Assessing the Impact of CETA on Canadian Transportation Network
Freight Day VI

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CETA

(Comprehensive Economic and Trade Agreement)

Signed in October, 2016

CETA

Eliminate Tariff barriers

More competition

More compatible regulations

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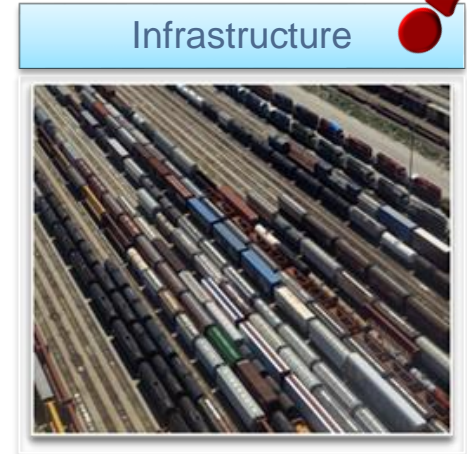UNIVERSITY OF TORONTO

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CETA

Economy

Regulations

Shipping

Social Impact

Employment

Infrastructure

Data

Commodity OD Flow

```
                    ┌──────────┐
                    │    OD    │
                    │   Flow   │
                    └────┬─────┘
          ┌──────────────┴──────────────┐
    ┌───────────┐                 ┌───────────┐
    │   After   │                 │ Prior to  │
    │   CETA    │                 │   CETA    │
    └─────┬─────┘                 └─────┬─────┘
      ┌───┴───┐                     ┌───┴───┐
 ┌────────┐┌────────┐         ┌────────┐┌────────┐
 │ Import ││ Export │         │ Import ││ Export │
 └────────┘└────────┘         └────────┘└────────┘
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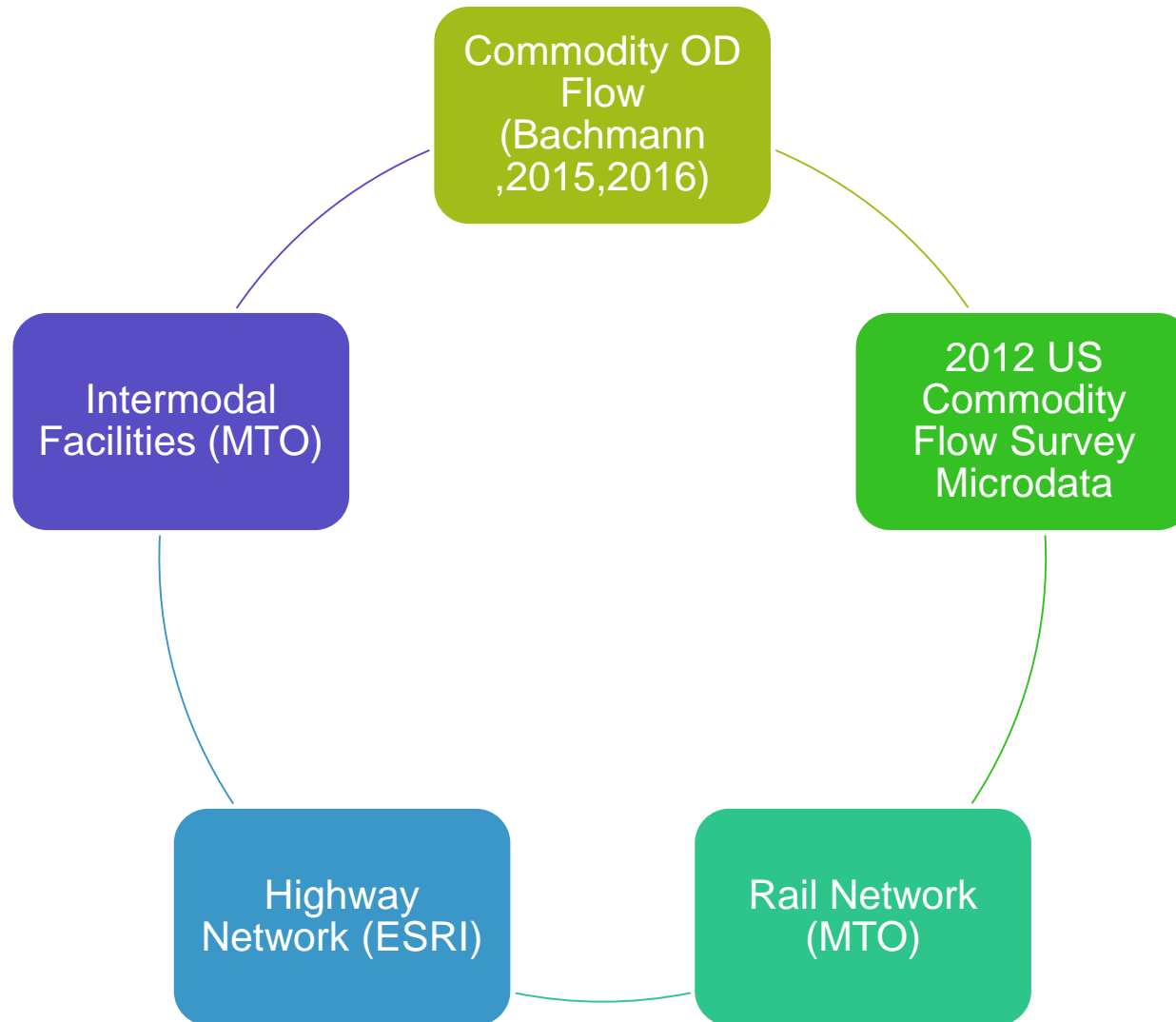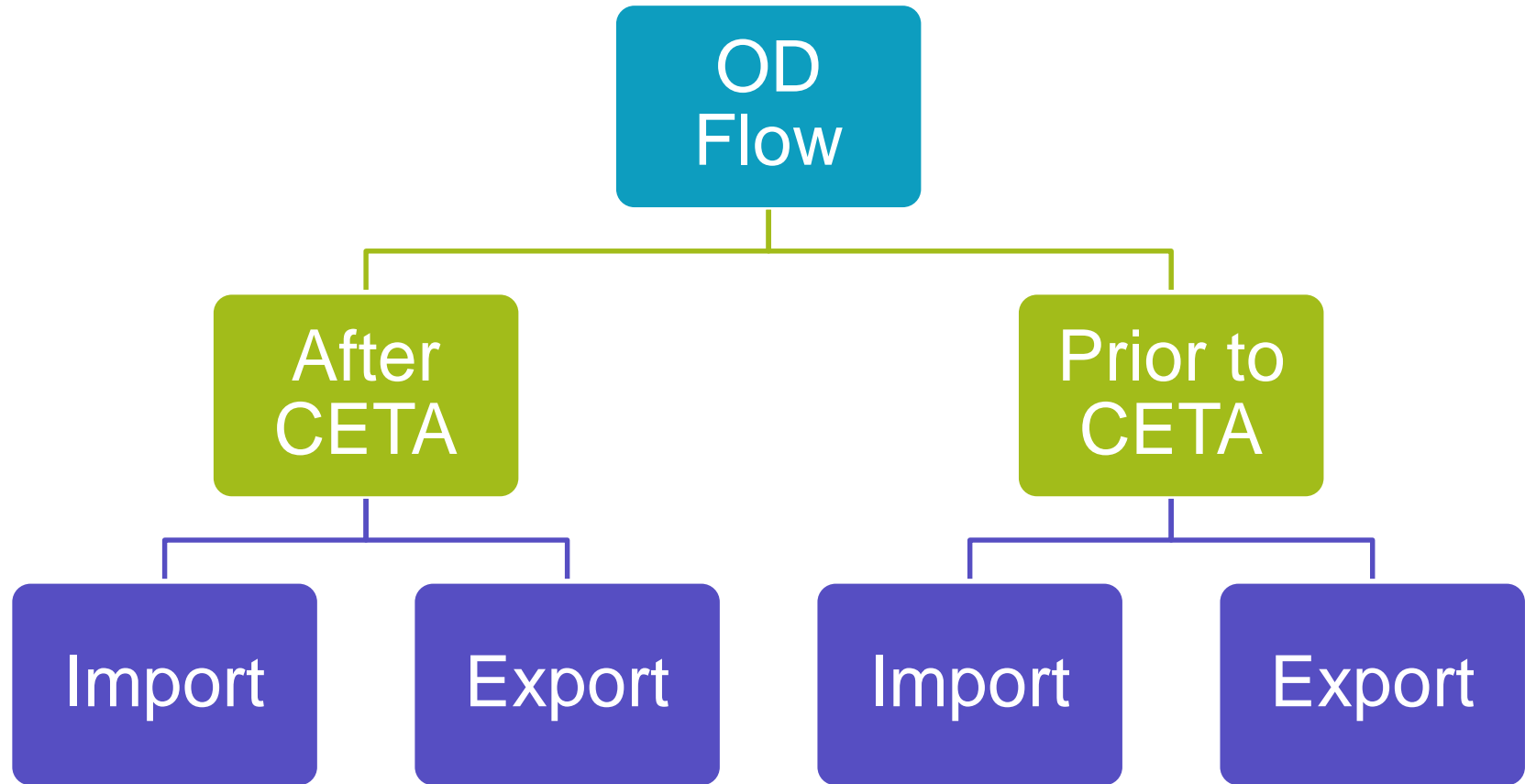
Commodity OD Flow

Annual Weight & Value

GSC-2 Commodity Group

Province of Origin

Province of Destination

Trade Partner

International Mode of Transport

Port of Clearance

2012 CFS Microdata

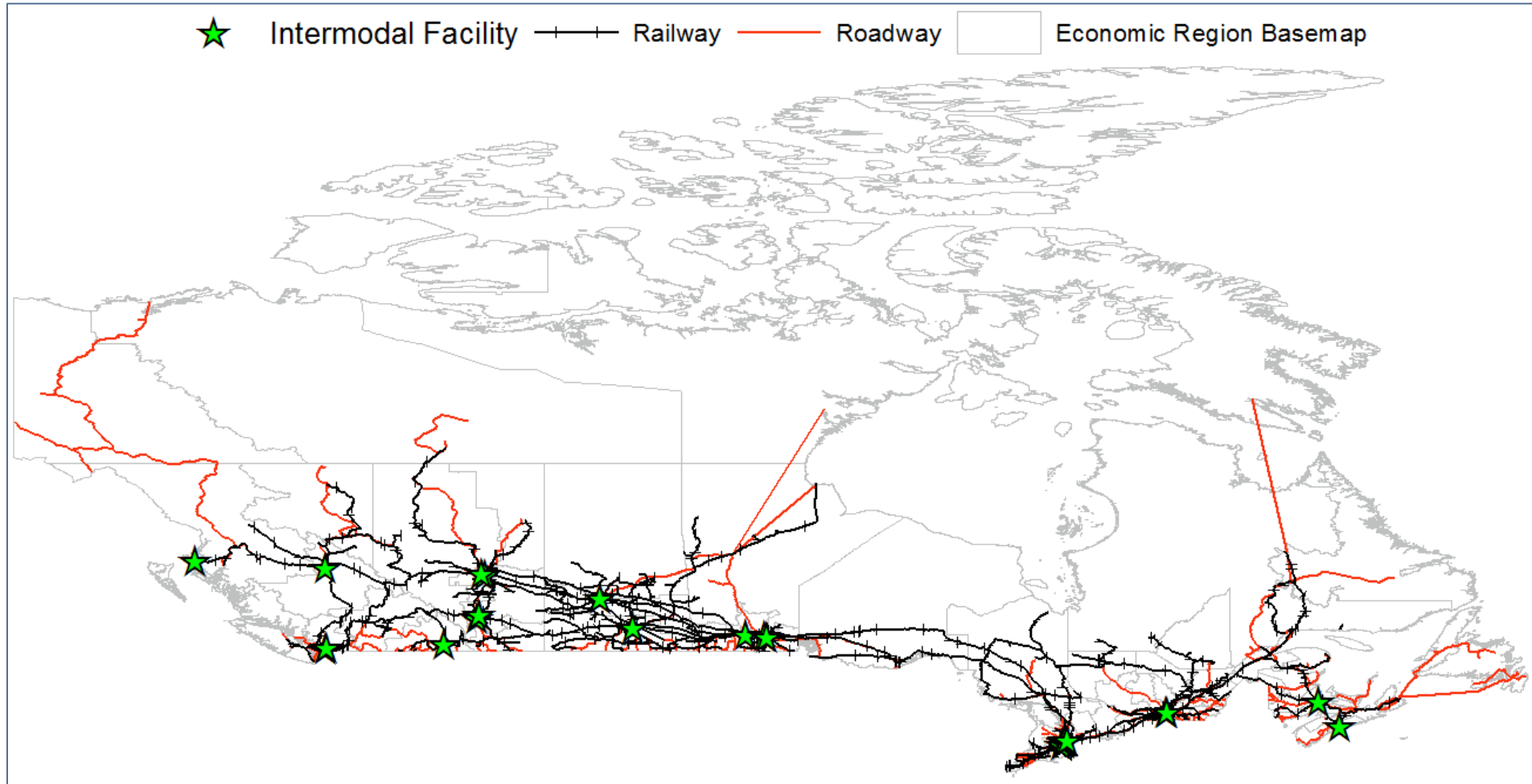|			
OD area	NAICS industry Class	Quarter of the year	SCTG commodity group
Domestic mode of transport	Shipment value	Shipment Weight	Distance (GC and routed)
Hazard material	Local vs. Export	Country of destination	Temperature control commodity

4,547,661 Shipments

Rail Network & Intermodal Facilities

Road Network

Legend: —— Roadway, ☐ Economic Region Basemap
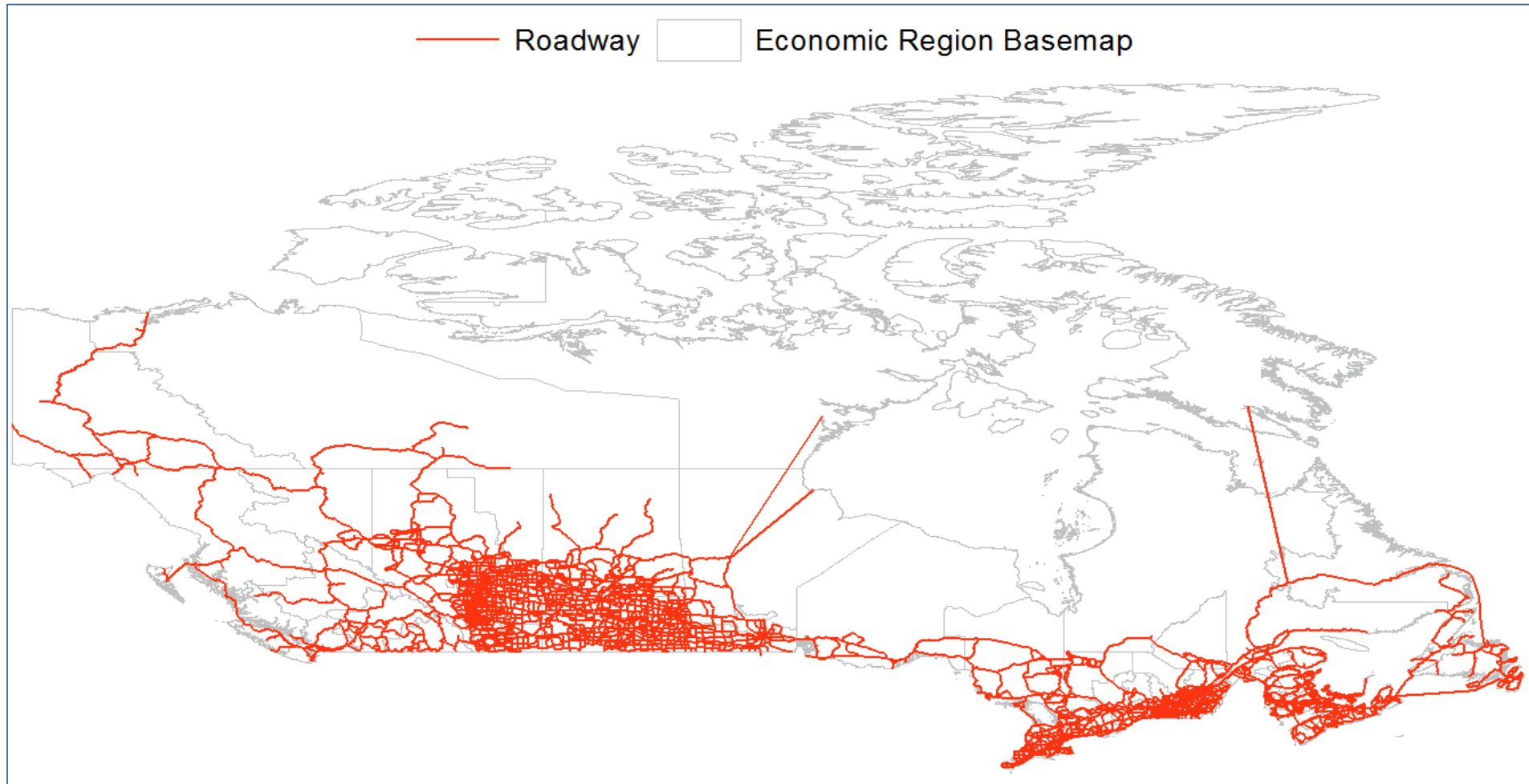
Methodology Overview
4 Stage Model

Commodity Generation	Commodity Distribution	Mode Share	Route Assignment
Amount of commodities imported/exported before and after CETA	Origin and Destination of imported/exported commodities within Canada	Percentage of imported/exported commodities carried by truck, rail or combination of modes for the domestic component of travel (within Canada)	Path used to transport commodities by truck/rail domestic modes of transport
Commodity OD Flow Datasets Obtained from University of Waterloo (Bachmann, 2015, 2016)		**i. Commodity OD Flow Datasets** Obtained from University of Waterloo (Bachmann, 2015, 2016) **ii. 2012 United States CFS microdata** Obtained from United States Census Bureau	**Canadian Multimodal Transportation Network** Provided by MTO and ESRI

Adjustment
Province to Economic Region
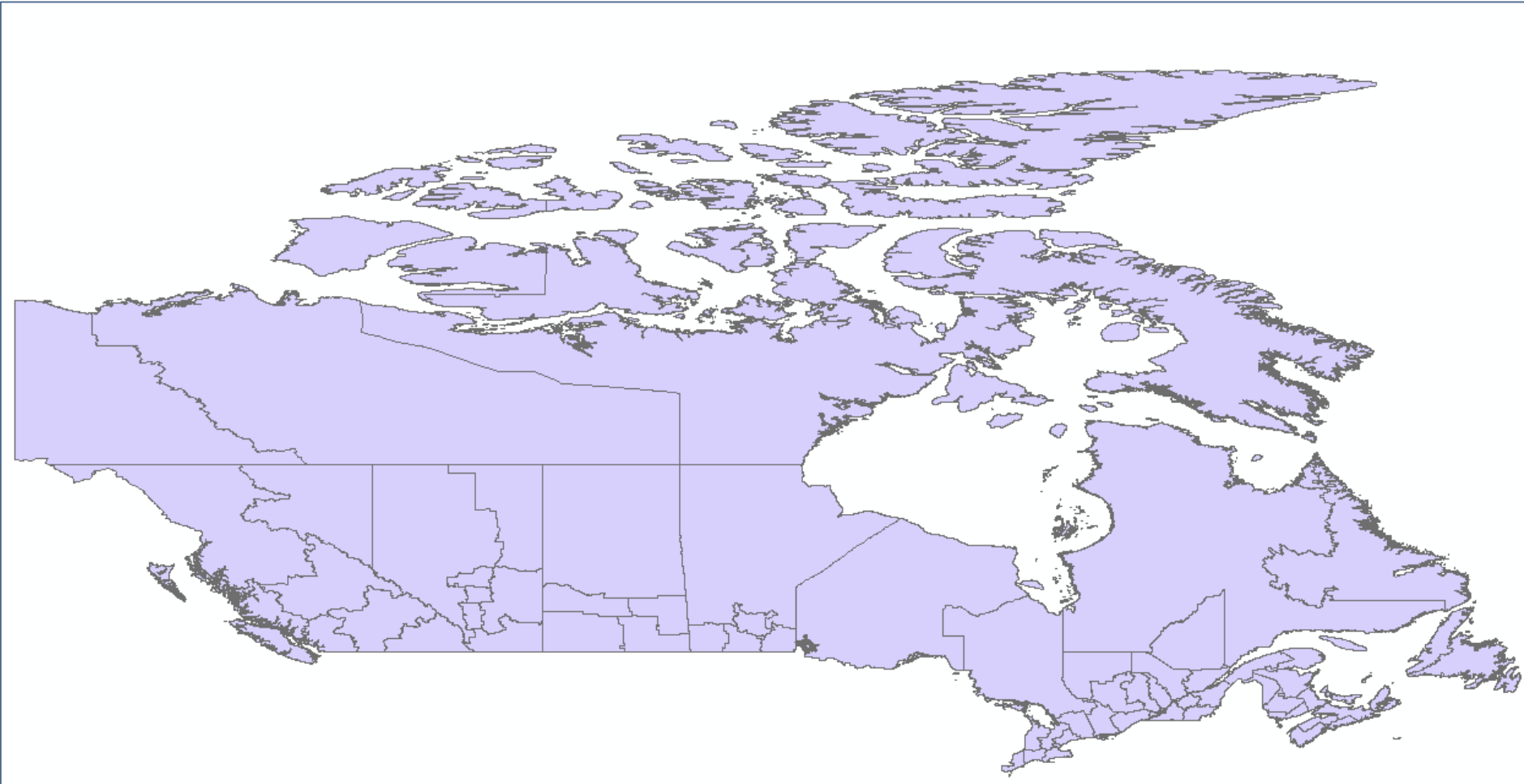
Adjustment
Area and Commodity Disaggregation

Economic Regions Population Size (,000)

Legend: 0 - 100 | 100 - 250 | 250 - 500 | 500 - 1000 | 1000 - 2000 | 2000 - 4000 | 4000 - 6000

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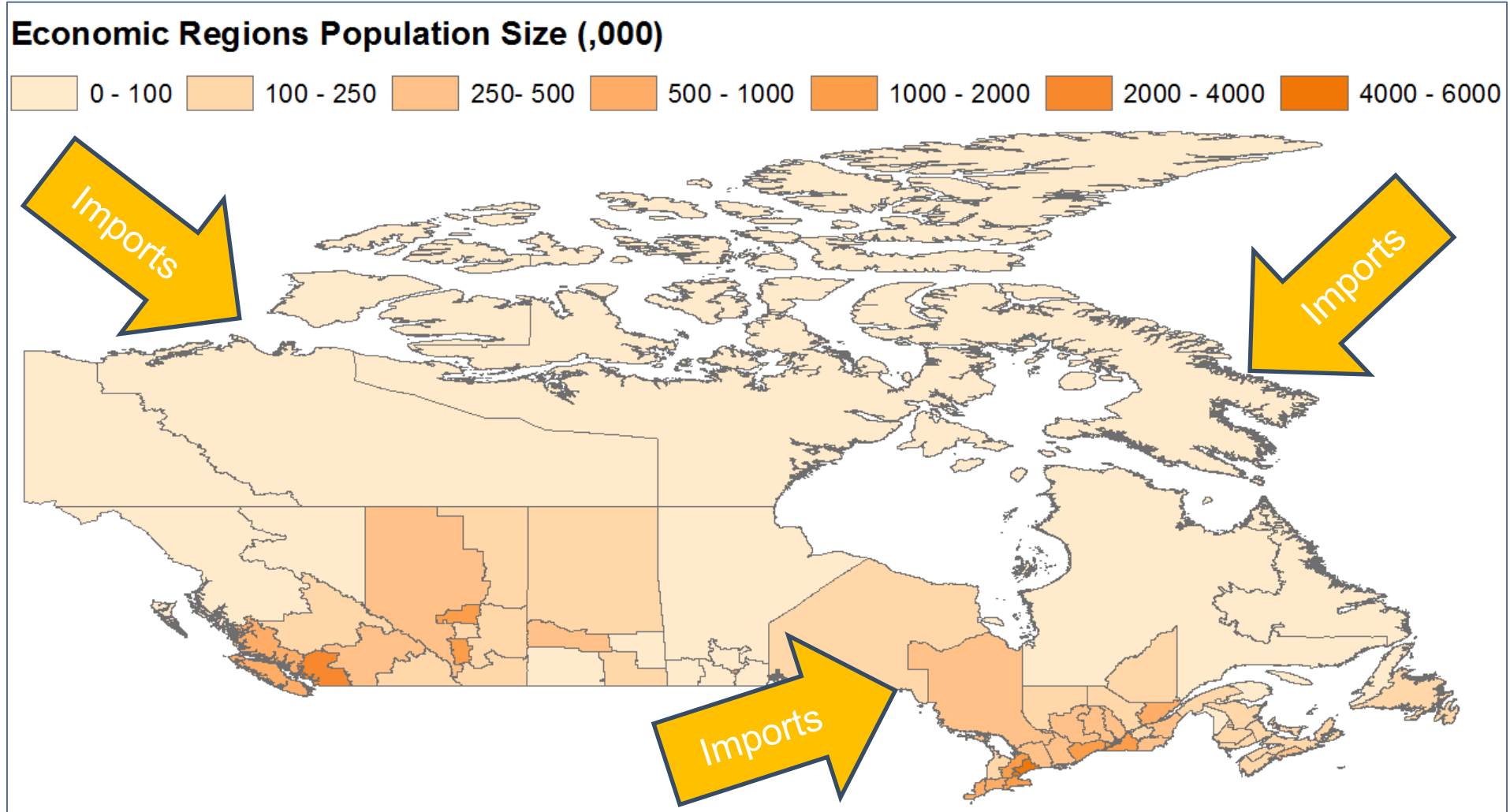
Adjustment
Area and Commodity Disaggregation

Economic Regions Employment Size (,000)

0 - 50 | 50 - 100 | 100 - 200 | 200 - 400 | 400 - 800 | 800 - 1600 | 1600 - 3200

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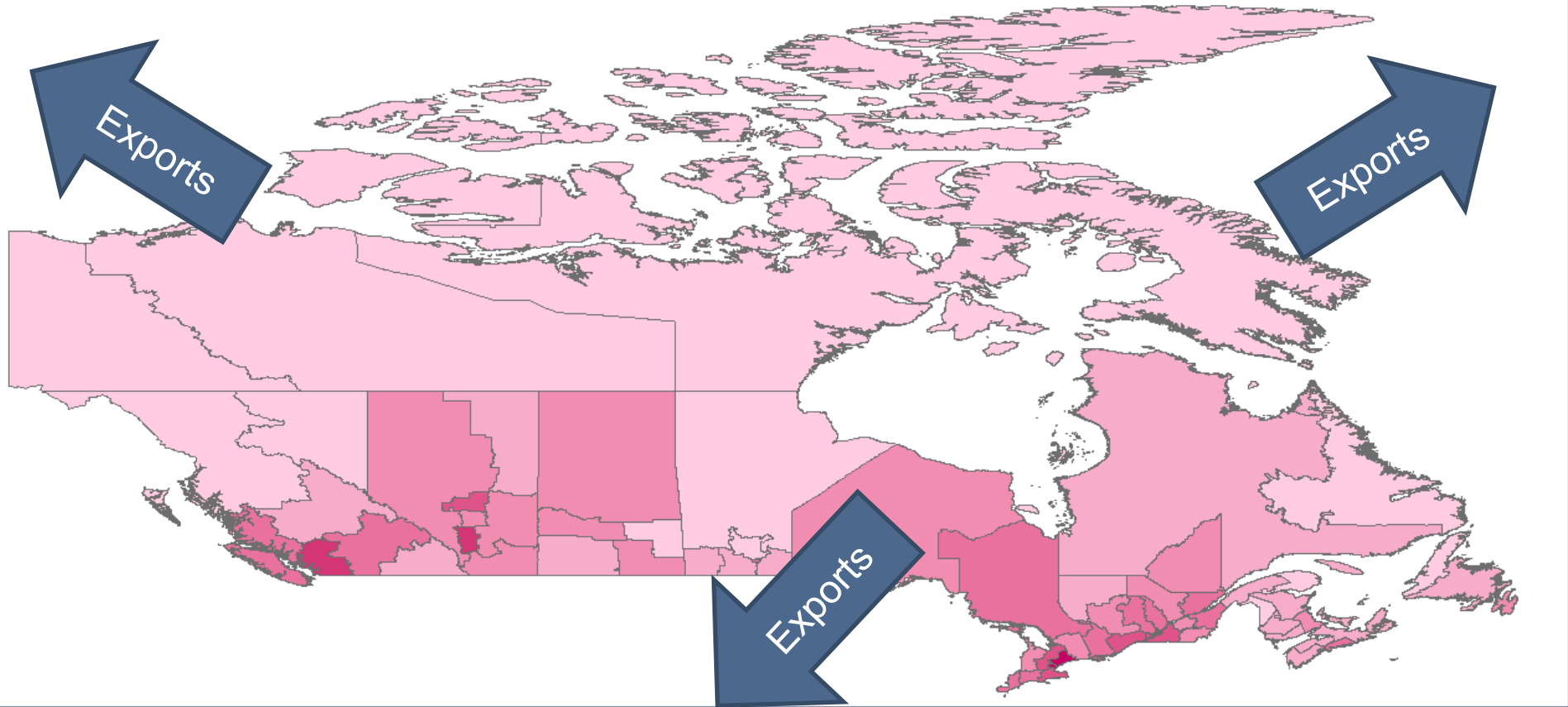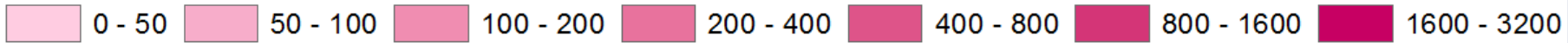
Adjustment
Port of Clearance (PC) Specification

Geographical Location

Coordinate

Water Access

HWY/Rail Access

Inland

PC Infrastructure Type

Border crossing

Marine port
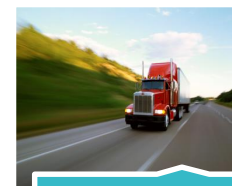
Airport

Inland

PC offered service

Water

Rail

Road

Air

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Adjustment
Port of Clearance (PC) Specification
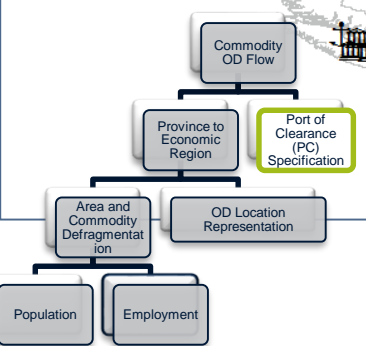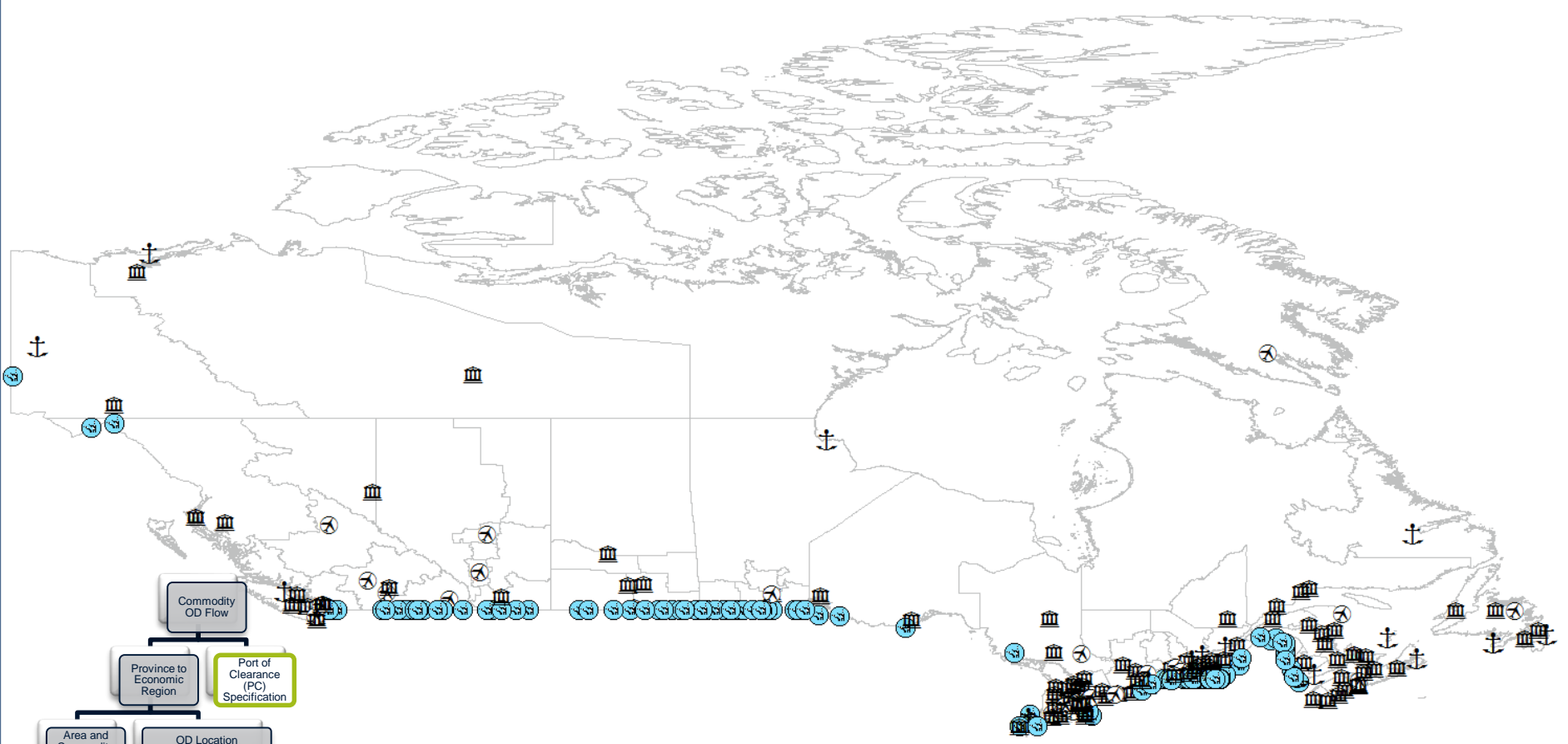
Adjustment
CFS Microdata

CFS Microdata: 4,547,661 records

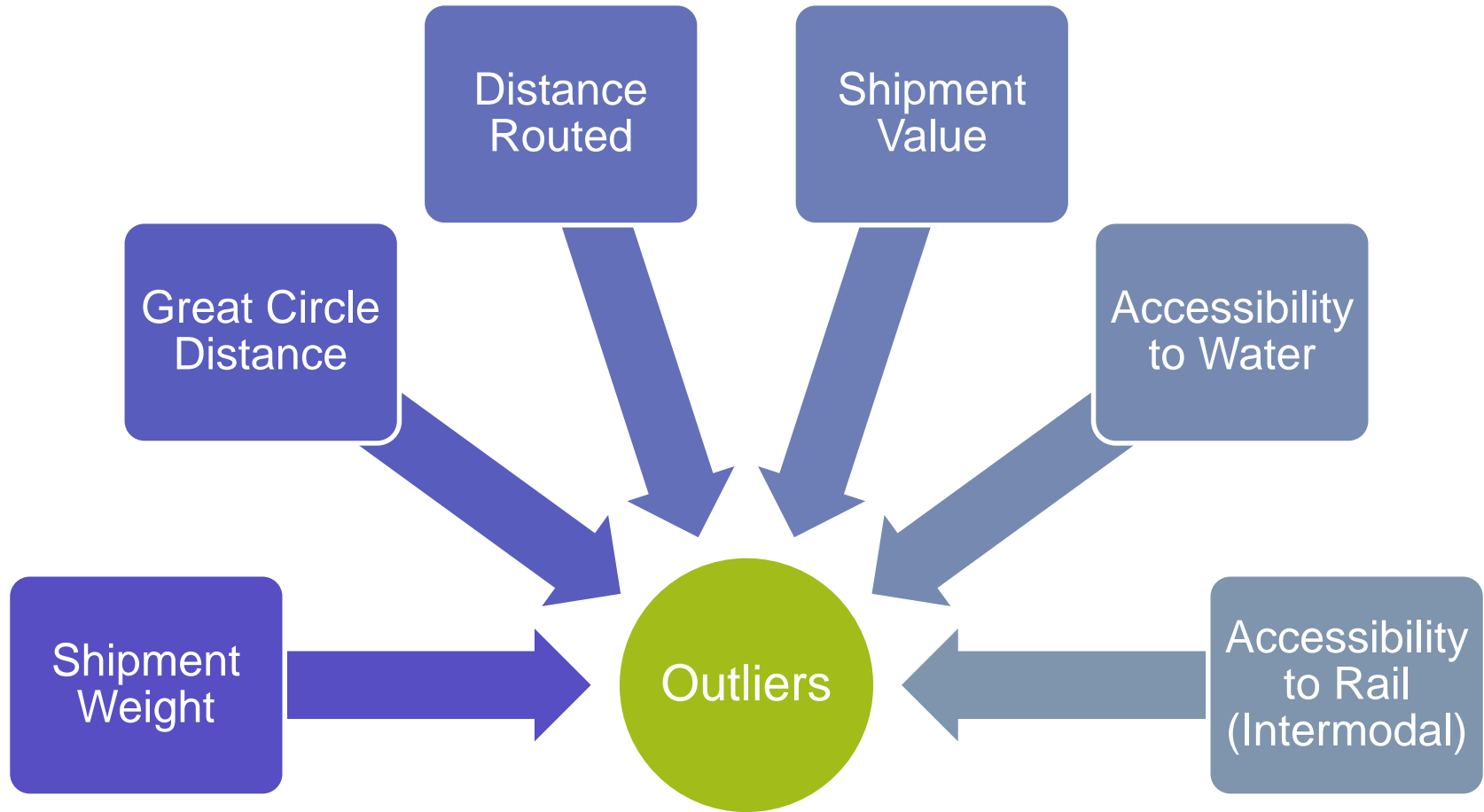**CFS Microdata Exports:** 185,721 records

Dataset Clean up: 128,825 records

Statistical Measure: 128,825 records

Adjustment
CFS Microdata (Statistical Measure)

Mode Share

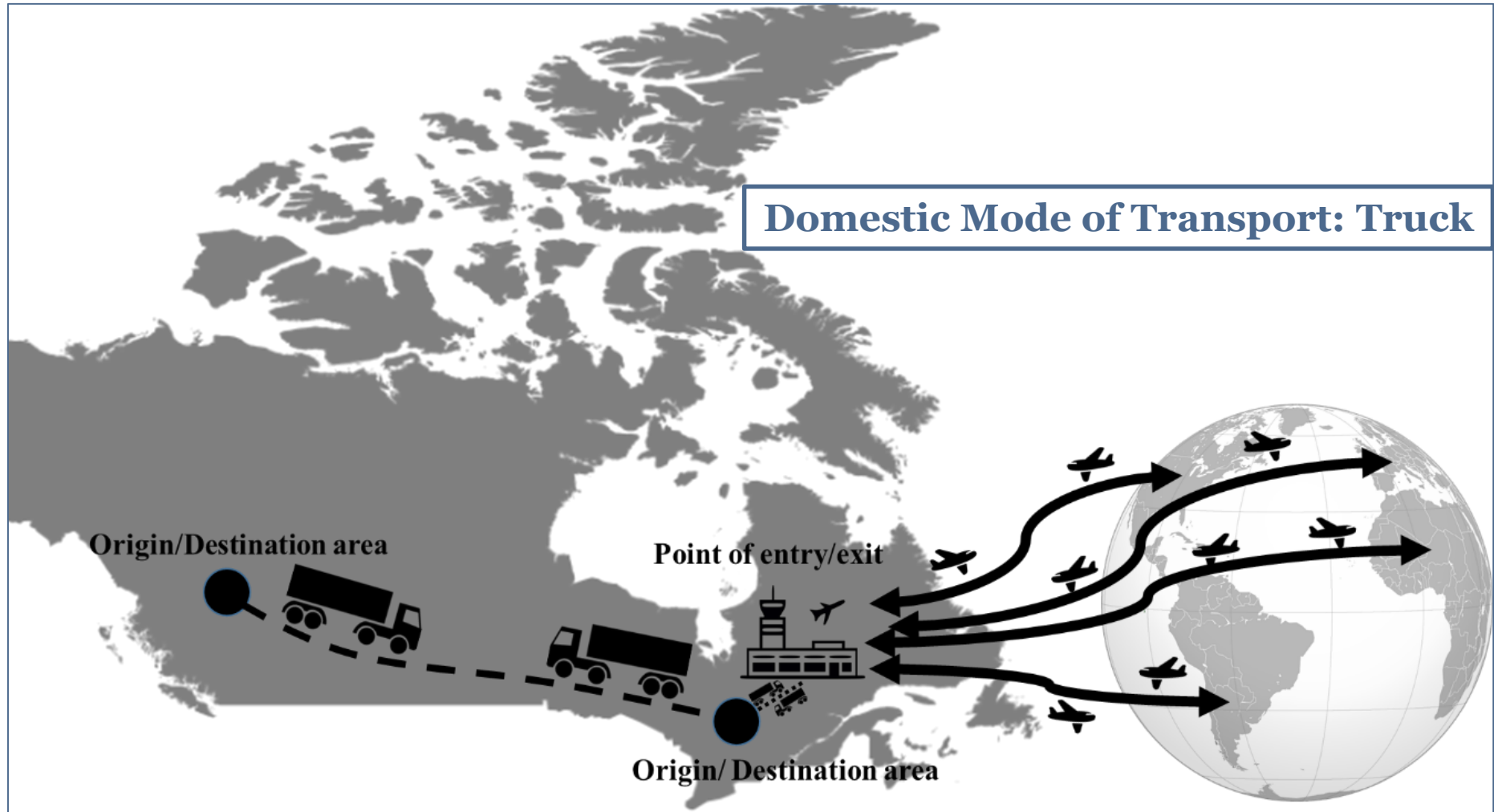Develop a choice based model using US CFS Microdata

BUT WAIT …

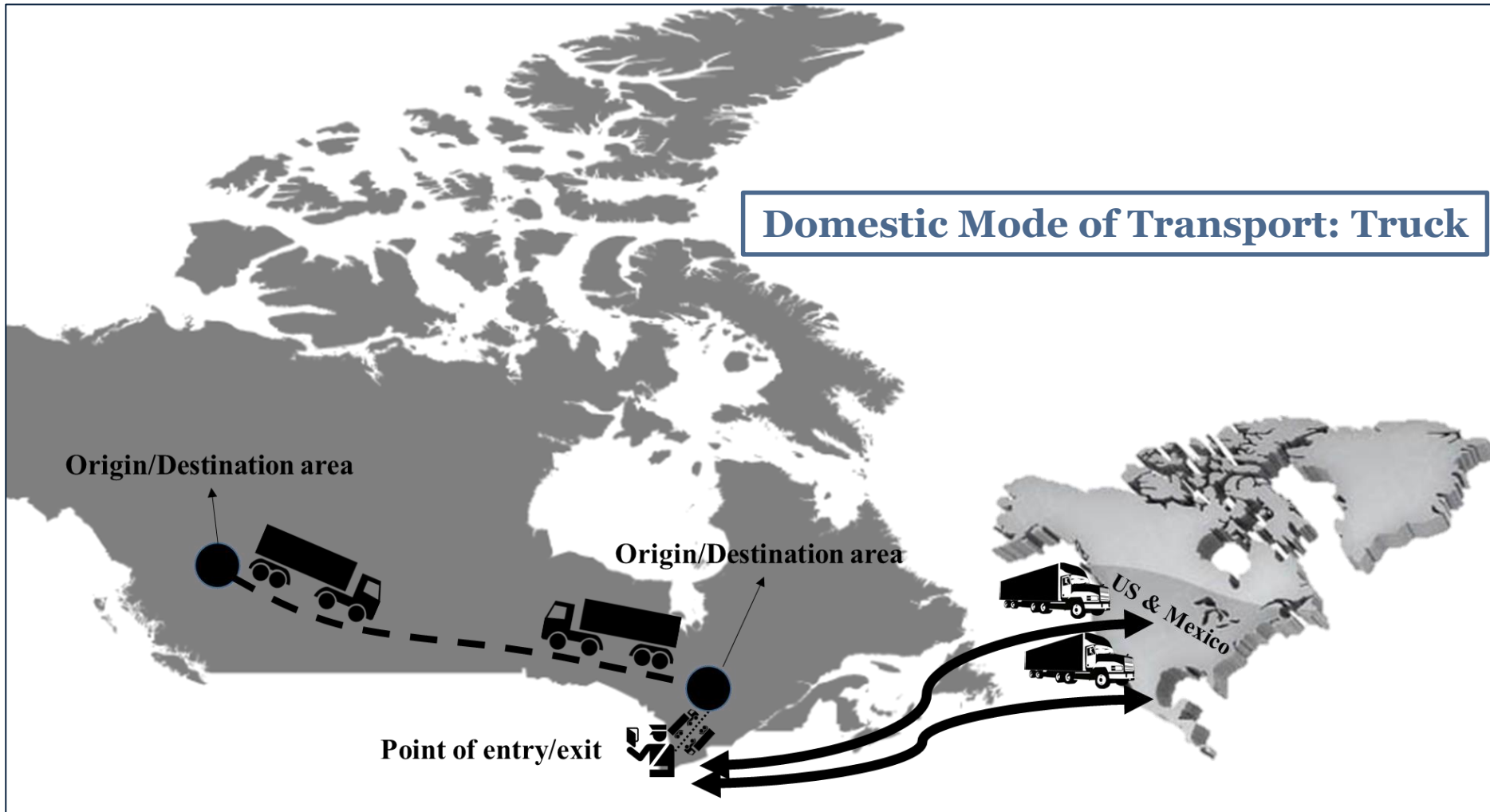We have information about the services that are offered at each **port of clearance**

Mode Share
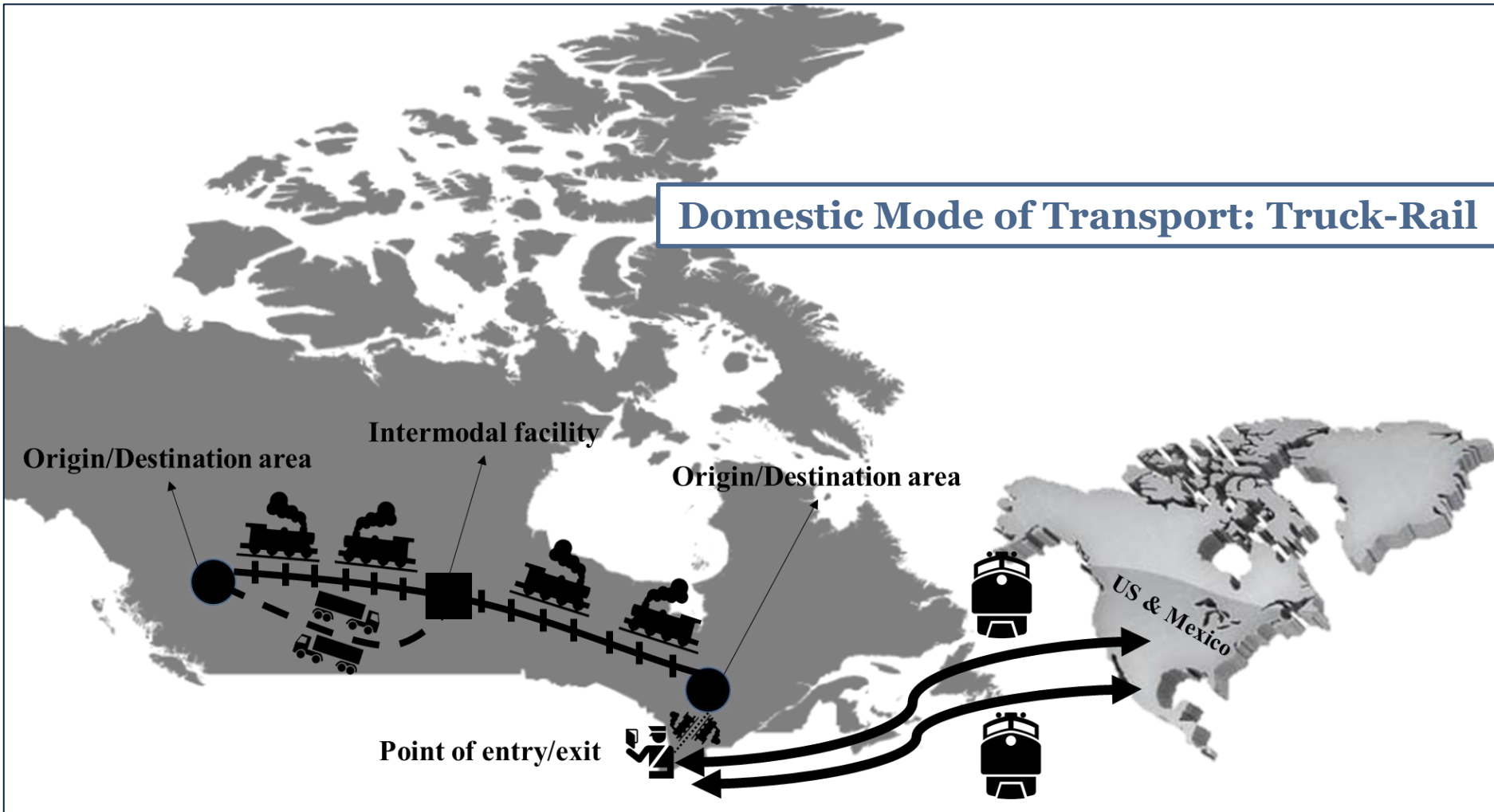## Port of Clearance with Air-only Services:

Domestic Mode of Transport: Truck

Origin/Destination area

Point of entry/exit

Origin/ Destination area

Mode Share
Port of Clearance with Road-only Services:

Domestic Mode of Transport: Truck

Origin/Destination area

Origin/Destination area

US & Mexico

Point of entry/exit

Mode Share
Port of Clearance with Rail-only Services:

Domestic Mode of Transport: Truck-Rail

Origin/Destination area

Intermodal facility

Origin/Destination area

US & Mexico

Point of entry/exit

Mode Share
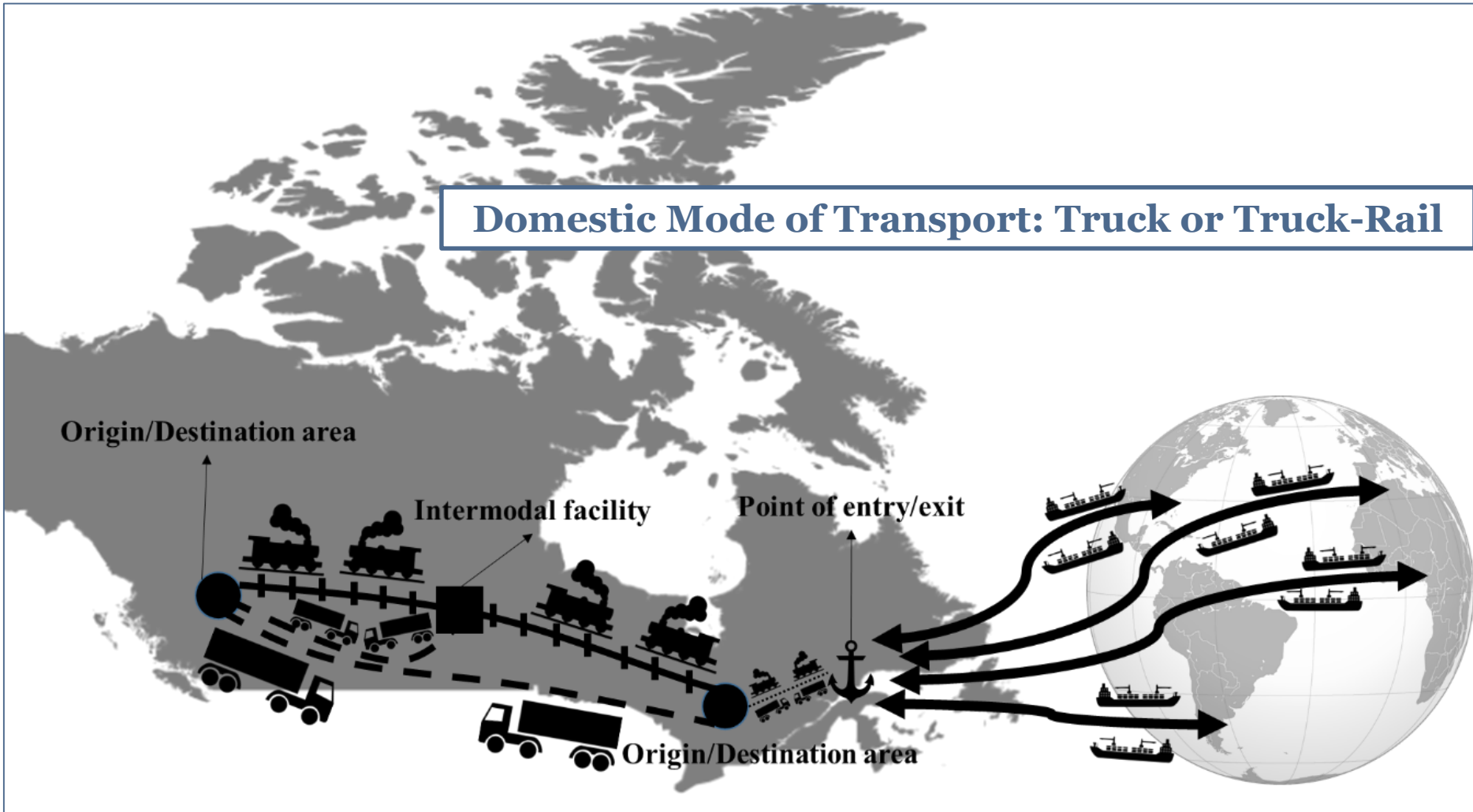## Port of Clearance with Marine-only Services:

Domestic Mode of Transport: Truck or Truck-Rail

Origin/Destination area

Intermodal facility

Point of entry/exit

Origin/Destination area

Mode Share
Port of Clearance with Marine-only Services:

SCTG Commodity Group	Routed Distance	Annual Weight
• Does not match SCTG-2	• From Highway Network	• From Commodity OD Flow

Frequency: % Annual Tonnage	CFS-Routed Distance (Km)											
	0-250	0-250	250-500	250-500	500-750	500-750	750-1000	750-1000	1000-1750	1000-1750	>1750	>1750
SCTG Group	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck
A	0.10%	99.90%	14.66%	85.34%	18.28%	81.72%	53.25%	46.75%	17.88%	82.12%	31.74%	68.26%
B	1.49%	98.51%	15.03%	84.97%	16.19%	83.81%	24.81%	75.19%	40.28%	59.72%	61.89%	38.11%
C	36.16%	63.84%	7.05%	92.95%	62.88%	37.12%	57.98%	42.02%	72.08%	27.92%	74.04%	25.96%
D	1.38%	98.62%	19.98%	80.02%	15.16%	84.84%	31.12%	68.88%	22.85%	77.15%	61.99%	38.01%
E	8.81%	91.19%	19.24%	80.76%	58.51%	41.49%	51.33%	48.67%	31.26%	68.74%	55.41%	44.59%
F	3.68%	96.32%	18.41%	81.59%	12.78%	87.22%	30.54%	69.46%	33.84%	66.16%	27.84%	72.16%
G	0.44%	99.56%	15.14%	84.86%	9.29%	90.71%	13.07%	86.93%	28.36%	71.64%	19.50%	80.50%
H	8.87%	91.13%	17.51%	82.49%	6.48%	93.52%	6.16%	93.84%	21.81%	78.19%	20.65%	79.35%
I	6.31%	93.69%	35.73%	64.27%	6.14%	93.86%	7.96%	92.04%	30.47%	69.53%	40.77%	59.23%

Mode Share
Port of Clearance with Marine-only Services:

| SCTG group	SCTG group description	SCTG-2	GSC-2
A	Agricultural products and fish product	1,2,3,4,5	1,2,3,4,5,6,7,8,9,10,12,14,19,20
B	Grains, alcohol, and tobacco products	6,7,8,9	11,21,22,23,24,25,26,45
C	Stone, nonmetallic minerals, and metallic ores	10,11,12,13,14	18
D	Coal and petroleum products	15,16,17,18,19	15,16,17,32,44
E	Basic chemicals, chemical and pharmaceutical products	20,21,22,23,24	33
F	Logs, wood products, textiles and leather	25,26,27,28,29,30	13,27,28,29,30,31
G	Base metals and machinery	31,32,33,34	34,35,36,37
H	Electronics, motorized vehicles, and precision instruments	35,36,37,38	38,39,40,41
I	Furniture, mixed freight, and miscellaneous manufactured products	39,40,41,43	42

Network Assignment
Mode Share: Truck

Water

Road

Air

— Roadway ☐ Economic Region Basemap
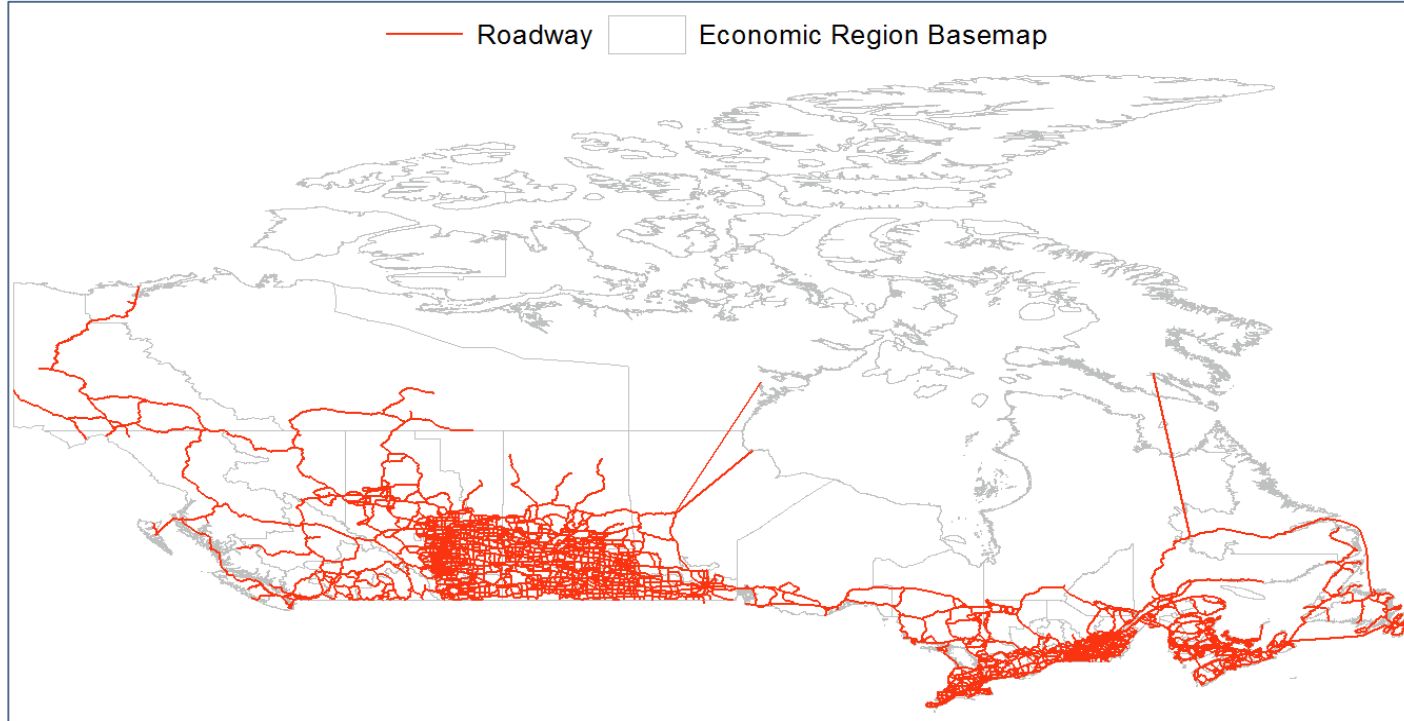
Network Assignment
Mode Share: Truck-Rail
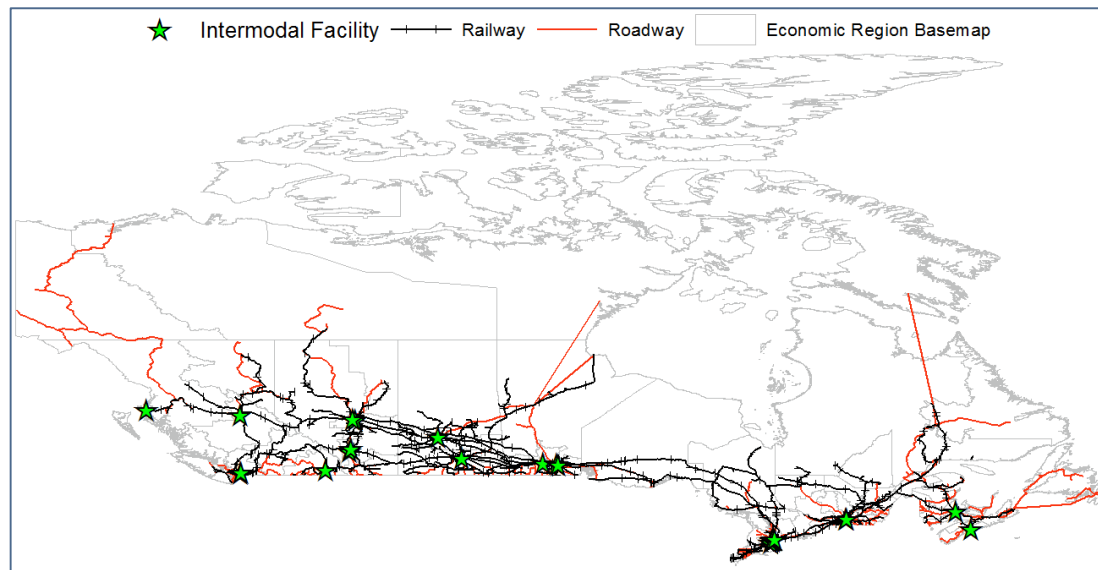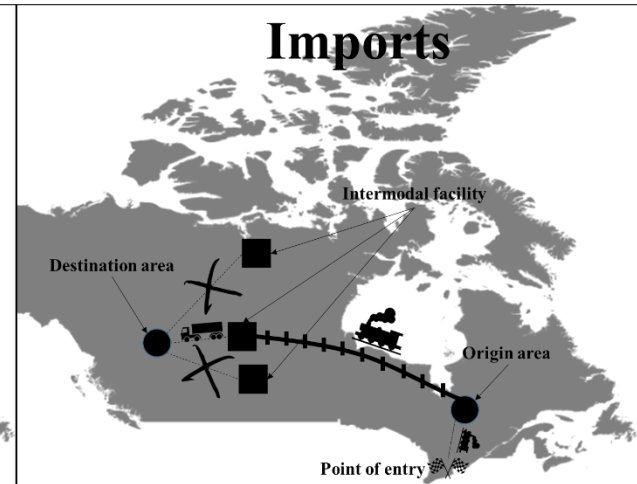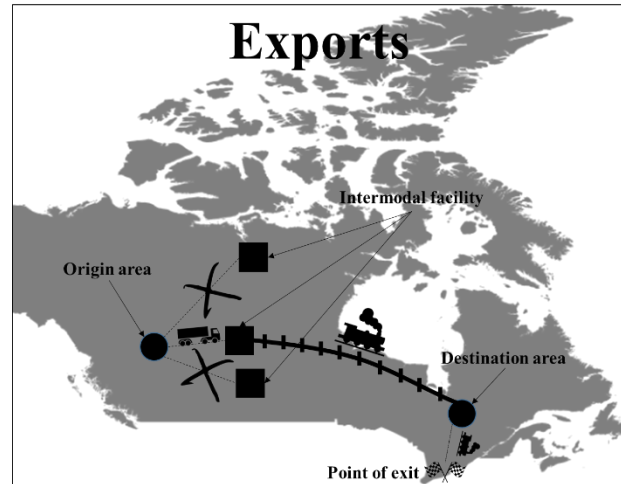
Result
Export (Province of Exit)

	Difference (%)	
	Rail	Truck
Alberta	⮕ 0.0%	⬇ -0.5%
British Columbia	⬇ -1.0%	⬇ -0.9%
Manitoba	⬆ 16.3%	⬇ -0.6%
New Brunswick	⬇ -0.7%	⬇ -0.5%
Newfoundland/Lab	⬇ -0.7%	⬇ -0.5%
Nova Scotia	⬇ -0.5%	⬇ -0.5%
Ontario	⬇ -1.4%	⬇ -0.8%
Prince Edward Is.	⬆ 3.8%	⬇ -0.9%
Quebec	⬇ -0.1%	⬆ 1.2%
Saskatchewan	⬇ -0.9%	⬇ -0.7%
Yukon, North West Terr., Nunavut	⬇ -1.9%	⬇ -1.6%
Total	⬇ -0.7%	⬇ -0.6%

Port of Clearance Province (row grouping label)

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Result
Import (Province of Entry)

			Difference (%)	
			Rail	Truck
Port of Clearance Province		Alberta	0.0%	-0.3%
		British Columbia	-0.5%	-0.1%
		Manitoba	3.6%	-1.3%
		New Brunswick	-0.2%	-0.7%
		Newfoundland/Lab	2.1%	2.4%
		Nova Scotia	6.5%	8.6%
		Ontario	-0.6%	-0.4%
		Prince Edward Is.	0.5%	0.7%
		Quebec	3.8%	5.4%
		Saskatchewan	-3.0%	-0.6%
		Yukon, North West Terr., Nunavut	-1.8%	-1.7%
		Total	1.3%	1.0%

Result
Commodity Group

Heavy Goods & Chemicals (Stone, Coal, Logs, Metal,...)

Agricultural products, Alcohol, Electronics, and manufactured products

Export

Annual Weight (tonnes)		Difference (%)	
		Rail	Truck
Commodity Group	A	↑1.0%	↑0.2%
	B	↑0.1%	↑1.0%
	C	↓-0.7%	↓-0.7%
	D	↓-0.3%	↓-0.4%
	E	↓-0.8%	↓-0.8%
	F	↓-1.7%	↓-1.3%
	G	↓-1.2%	↓-1.1%
	H	↑3.7%	↑0.0%
	I	↑4.2%	↓-0.4%
Total		↓-0.7%	↓-0.6%

Import

Annual Weight (tonnes)		Difference (%)	
		Rail	Truck
Commodity Group	A	↑0.9%	↑0.7%
	B	↑5.6%	↑0.3%
	C	↑2.0%	↑2.0%
	D	↑0.1%	↑0.0%
	E	↓-0.6%	↓-0.8%
	F	↑1.2%	↑2.0%
	G	↑2.9%	↑2.1%
	H	↑5.0%	↑0.9%
	I	↑3.0%	↑1.3%
Total		↑1.3%	↑1.0%

Result

Port of Clearance Type	Difference (%)
Airport	⬆ 2.0%
Border	⬇ -0.9%
Inland	⬇ -0.4%
Port	⬇ -0.1%
Total	⬇ -0.6%

Port of Clearance Type	Difference (%)
Airport	⬆ 3.3%
Border	⬇ -0.9%
Inland	⬆ 4.0%
Port	⬆ 0.8%
Total	⬆ 1.1%

Tonne_Km	Difference (%)	
	Rail	Truck
Export	⬇ -0.4%	⬇ -0.2%
Import	⬆ 1.1%	⬆ 0.7%

Result

Decrease in Exports as Trades were diverted away from the United States

Annual Tonnes (million)	Base	CETA	% Difference
Exports	567.2	563.9	⬇ -0.6%
Imports	161.7	163.5	⬆ 1.1%

	Difference in Mode Share Ratio(%)	
	Rail	Truck
Exports	⬇ -0.09%	⬆ 0.03%
Imports	⬆ 0.24%	⬇ -0.07%

Findings

❑ Larger impact on:
  - Ports of Clearance in the Atlantic Region
  - Airports

❑ More demand on the rail network

❑ Increase in the export and import of:

  - Agricultural products and fish product
  - Grains, alcohol, and tobacco products
  - Electronics, motorized vehicles, and precision instruments
  - Furniture, mixed freight, and miscellaneous manufactured products

Thank You Questions

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