CATPRN

Canadian Agricultural Trade Policy Research Network

An Assessment of Barriers to Trade in Biofuels on Production and Consumption in Canada

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Consumption Mandate in Canada

- Average renewable content
  - **Gasoline**: **5%** by 2010.
  - **Diesel**: **2%** by 2012.

Implications of Federal Mandate

	Projected Demand Created by Mandate	Current Production Capacity	Required Increase in Capacity
Ethanol (by 2010)	3.1 billion litres	1.5 million litres	1.6 billion litres **(↑ 107%)**
Biodiesel (by 2012)	600 million litres	322 million litres	278 million litres **(↑ 86%)**

Proposed Biodiesel Projects in Alberta

• **Advanced Biodiesel Group**, Irricana	20 million litres/yr
• **BFUELS Canada Corp**, Chin	24-40 million litres/yr
• **Biostreet Canada Inc**, Vegreville	175 million litres/yr
• **CR Fuels**, Strathmore	114 million litres/yr
• **CR Fuels**, Purple Springs	114 million litres/yr
• **Canadian Bioenergy**, Fort Saskatchewan	200 million litres/yr
• **Cansource Biofuels Corp**, Mayerthorpe	40 million litres/yr
• **Dominion Biodiesel**, Calgary	22 million litres/yr
• **Alberta Ethanol & Biodiesel GP**, Innisfail	378 million litres/yr
• **Kyoto Fuels**, Lethbridge	33 million litres/yr
• **Western Biodiesel Inc**., Aldersyde	19 million litres/ yr
• **Western Biofuels**, Lavoy	227 million litres/yr
• **TOTAL**	**1382 million litres/yr**

Economic Research Problem - 1

- Producers of biofuel in Canada have a comparative *disadvantage* in production.
  - Lower opportunity costs in Brazil, Southeast Asia and in tropical regions.

- Land
- Labour
- Capital
- Feedstock

Economic Research Problem - 2

- Tariffs stifle access to cheaper sources of supply.

Tariff Item	Description	MFN Tariff	Applicable Preferential Tariffs
2207.20.11.00	Ethyl alcohol, specially denatured	4.92¢/litre	CCCT, LDCT, UST, MT, CT, CRT: free
2207.20.12.00	Ethyl alcohol, denatured	4.92¢/litre	CCCT, LDCT, UST, MT, CT, CRT: free
2207.20.29.00	Ethyl alcohol, not denatured	12.28¢/litre	CCCT, LDCT, UST, MT, CT, CRT: free
3824.90.90.99	Miscellaneous chemical products, other, other, other (biodiesel)	6.5%	CCCT, LDCT, UST, MT, MUST, CIAT, CT, CRT: free GPT: 3%

Economic Research Problem - 3

- What are the consequences of import barriers given the projected increase in demand for biofuels in Canada?

Hypotheses

With effective import barriers:

1. Biofuel prices will be higher in Canada than they would otherwise be.
   - Implications for quantities demanded and supplied

2. World biofuel prices will be lower than they would otherwise be.
   - Implications for quantities demanded and supplied

Overview

- Background
  - WTO Classification of Biofuels
  - Production and Trade in Canada
- Conceptual Framework
- Empirical Model
- Preliminary Results

WTO Classification of Biofuels - 1

- ***Beyond the scope of the paper, but contextually important:***

- World Customs Organization lists biofuels as agricultural or chemical products, *not as fuels*.

  - No separate HS code for *fuel* ethanol
    - Specially denatured, denatured, other denatured
    - Undenatured

  - Many other products are listed with biodiesel in HS 3824.90.
    - Difficult to separate out biodiesel.

WTO Classification of Biofuels - 2

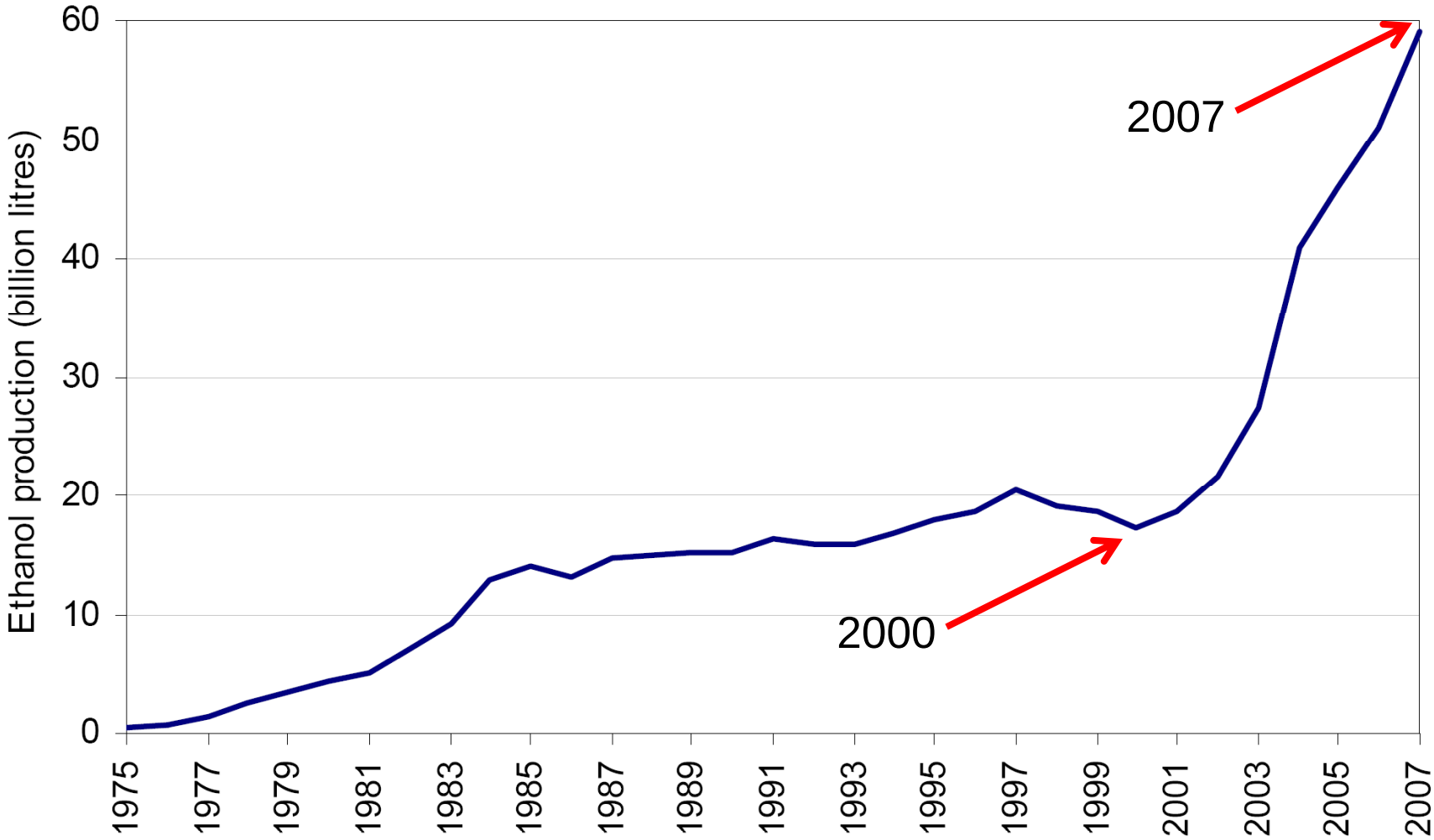
- Issues:

1. WTO rules differ for agricultural and industrial goods
   → different rules for ethanol and biodiesel
   → tariff rates are higher on ethanol than biodiesel

2. Biofuels could be classified as environmental goods in the ongoing negotiations on Environmental Goods and Services
   → subject to faster liberalization

3. The Brazilian government recently proposed that ethanol be reclassified as a fuel.
   → do biofuel subsides provide actionable benefits to producers of agricultural feedstock?

World Production of Ethanol 1975-2007



Source: Steenblick, 2007

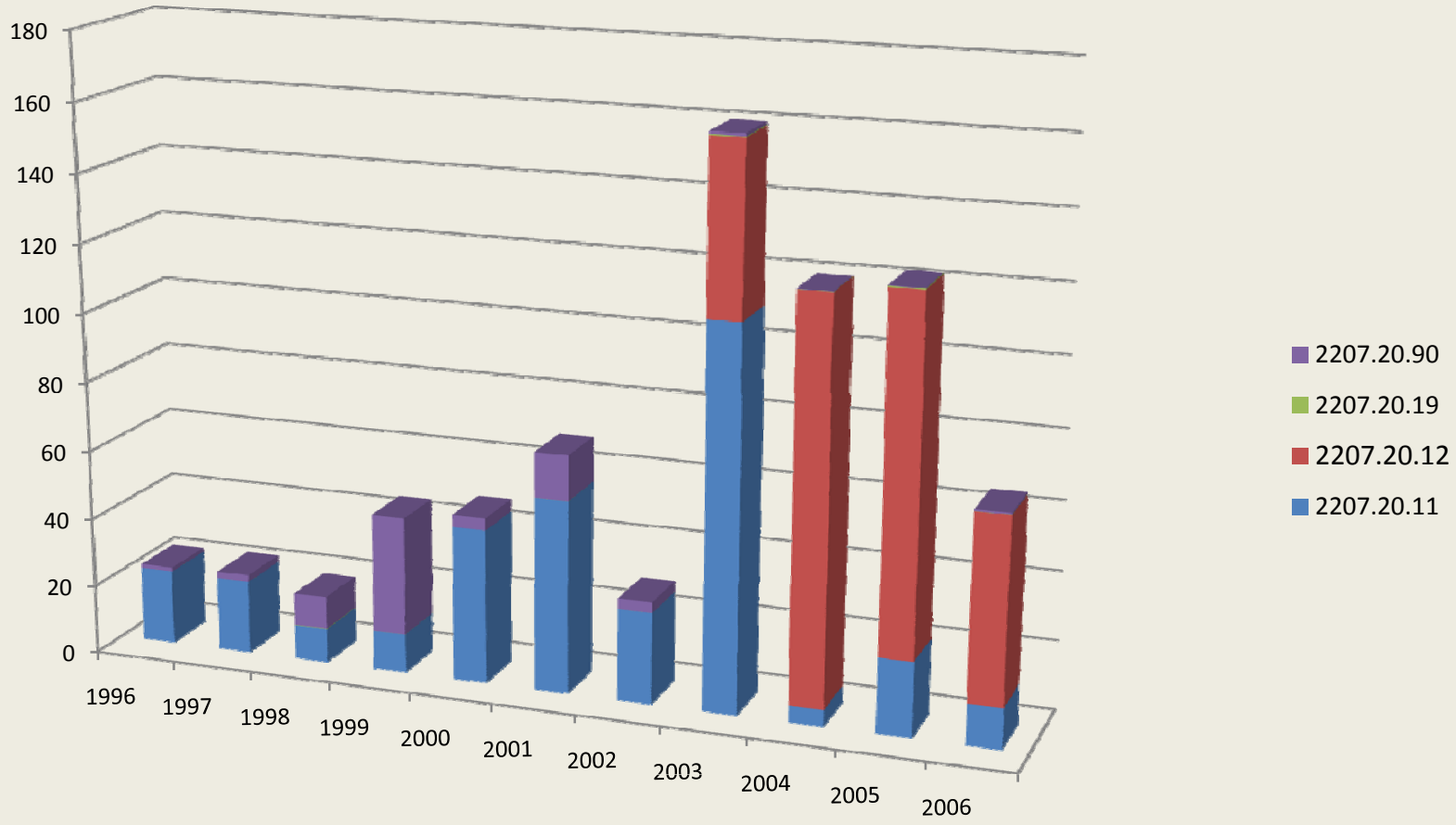
Production in Canada

Ethanol

Plant Name	City	Province	Feedstock	Capacity
Permolex	Red Deer	AB	Wheat	40,000,000 L
Husky Energy	Lloydminster	SK	Wheat	130,000,000 L
Terra Grain Fuels*	Belle Plaine	SK	Wheat	150,000,000 L
Poundmaker	Lanigan	SK	Wheat	12,000,000 L
NorAmera Bioenergy	Weyburn	SK	Wheat	25,000,000 L
Husky Energy	Minnedosa	MB	Wheat	130,000,000 L
Canadian Bioenergy	Sturgeon	AB	Canola	225,000,000 L
Iogen	Ottawa	ON	Wheat Straw	2,000,000 L
IGPC*	Aylmer	ON	Corn	150,000,000 L
Greenfield Ethanol*	Hensall	ON	Corn	200,000,000 L
Greenfield Ethanol	Tiverton	ON	Corn	26,000,000 L
Greenfield Ethanol	Chatham	ON	Corn	150,000,000 L
Greenfield Ethanol*	Johnstown	ON	Corn	200,000,000 L
Greenfield Ethanol	Varennes	QC	Corn	120,000,000 L
Collingwood Ethanol*	Collingwood	ON	Corn	50,000,000 L
Suncor Energy	St. Clair	ON	Corn	200,000,000 L

Source: Canadian Renewable Fuels Association

Ethanol Imported into Canada (millions of litres)

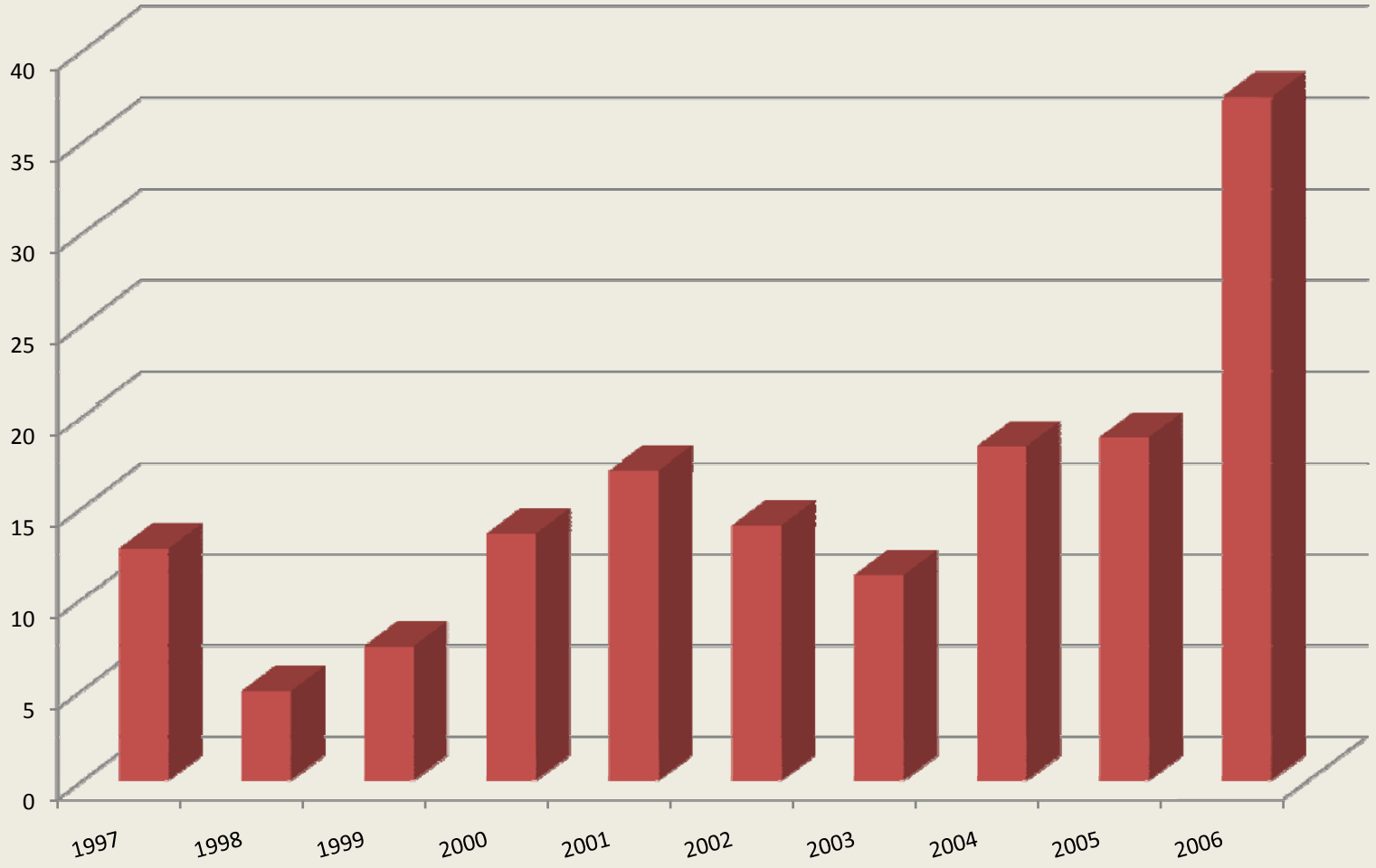


Canada Fuel Ethanol Imports

Major Sources	Destination
Brazil	Québec
United States	Ontario, Saskatchewan, Alberta , Manitoba, British Columbia, Québec

Minor sources: Austria, Ireland, Italy, Japan, United Kingdom

Exports of Denatured Ethyl Alcohol, any strength (millions of litres)

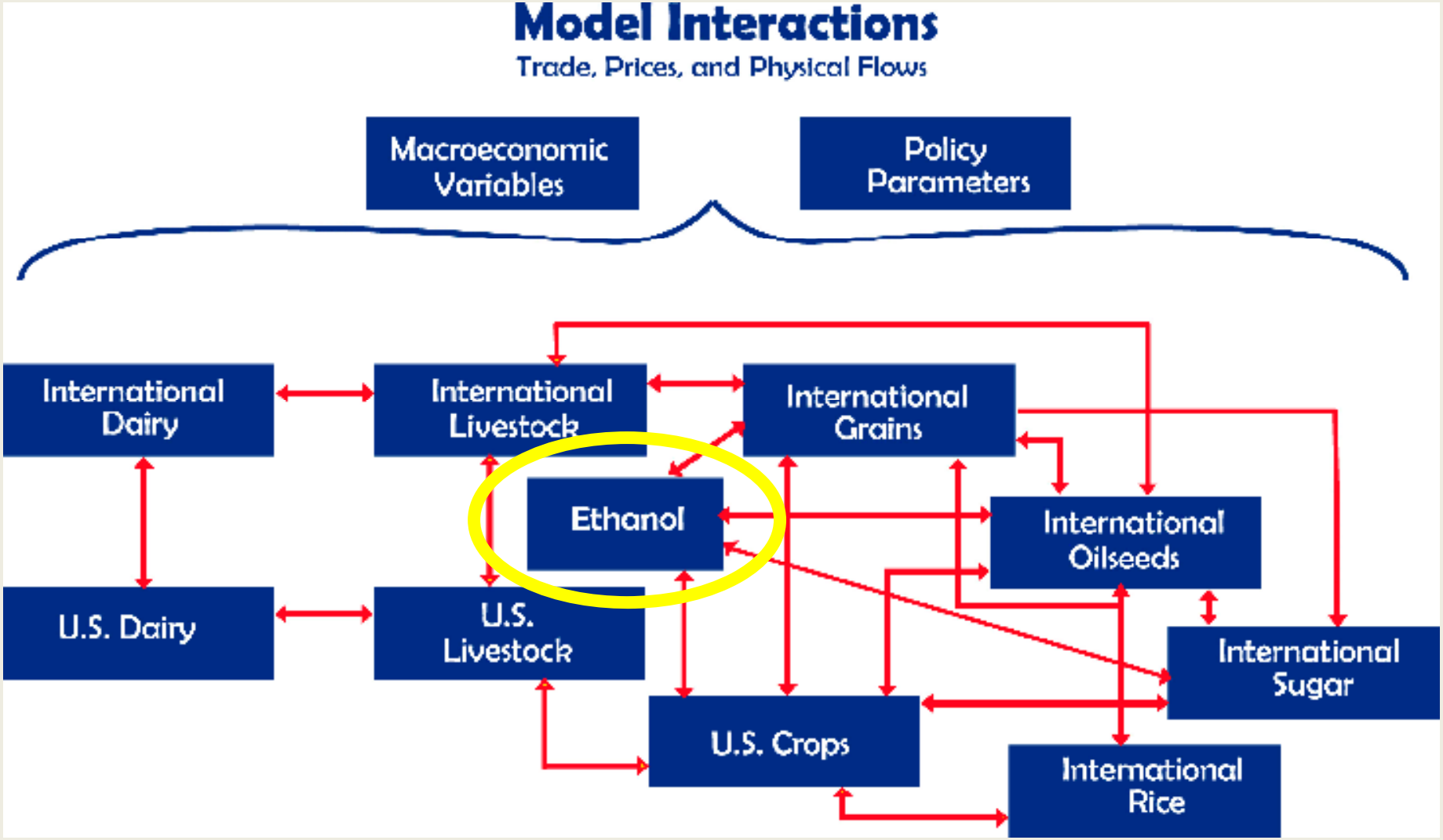


Denatured Ethyl Alcohol Exports

Major Sources	Destination
Ontario	Georgia, Russian Federation, USA, Ukraine, Japan, Iran, Haiti, Greece, Turkey, Israel, India, Germany
Alberta	USA, South Africa, Iran, France
Saskatchewan	USA

Conceptual Framework

FAPRI Modeling System



Conceptual Framework - 2

- **International ethanol model:**
  - Multi-market partial equilibrium
  - Complete country models for
    - U.S., Brazil, China, India, and EU-25
    - Net trade equations are set up for **Canada**, Japan, South Korea, and ROW.
  - Composed of behavioral equations for production, consumption, ending stocks, and net trade.

Conceptual Framework - 3

- The model solves for world ethanol prices by equating ES and ED across countries.

- In the country models, including **Canada**:
  - Demand for ethanol is derived from a refiner's cost function for blended gasoline.
  - The proportion of ethanol in blended fuel ↑ as the ethanol price ↓ to capture substitution effects.

  - The relationship between quantity supplied of ethanol and price is estimated with consideration to:
    - Feedstock (corn and wheat)
    - Prices of dry-mill ethanol co-products (DDGs)
    - Production subsidies

Conceptual Framework - 4

- The U.S. ethanol model is incorporated within the U.S. crops model
  - includes behavioral equations that determine crop planted acreage, domestic feed, food and industrial uses, trade, and ending stocks.

- The model solves for the set of prices that brings annual supply and demand into balance in all markets.

Conceptual Framework - 5

- Brazilian anhydrous ethanol price as the world ethanol price,
  - Assume Brazil is the major exporter of ethanol.

- Domestic prices for of ethanol in each country is linked to world price through exchange rates and other price policy wedges.

Empirical Model – 1

- Calibrated on 2006 data, generates a 10-year baseline to 2016.

- Current policies maintained
  - Tax credits
    - US: ethanol $0.135/litre; biodiesel $0.264/litre
  - Tariffs
    - US: ethanol tariff of $0.143/litre

Empirical Model – 2

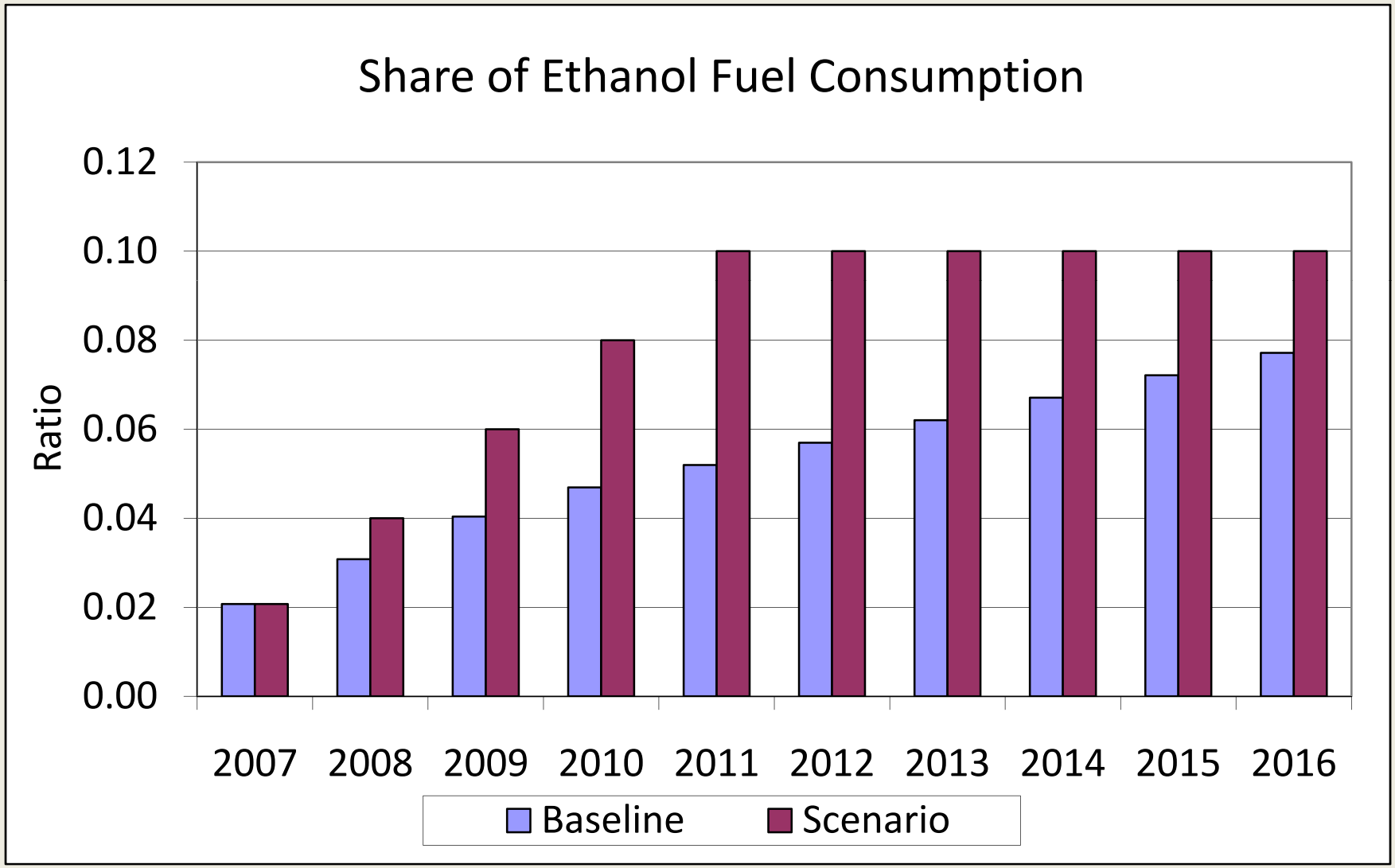
- Data for ethanol supply and utilization:
  - F.O. Lichts, FAO, USDA, and the European Commission Directorate General for Energy and Transport.
- Macroeconomic data:
  - International Monetary Fund and Global Insight.
- Canadian data:
  - Agriculture Canada, Statistics Canada, USDA's Foreign Agricultural Service Attaché Reports.

Empirical Model - 3

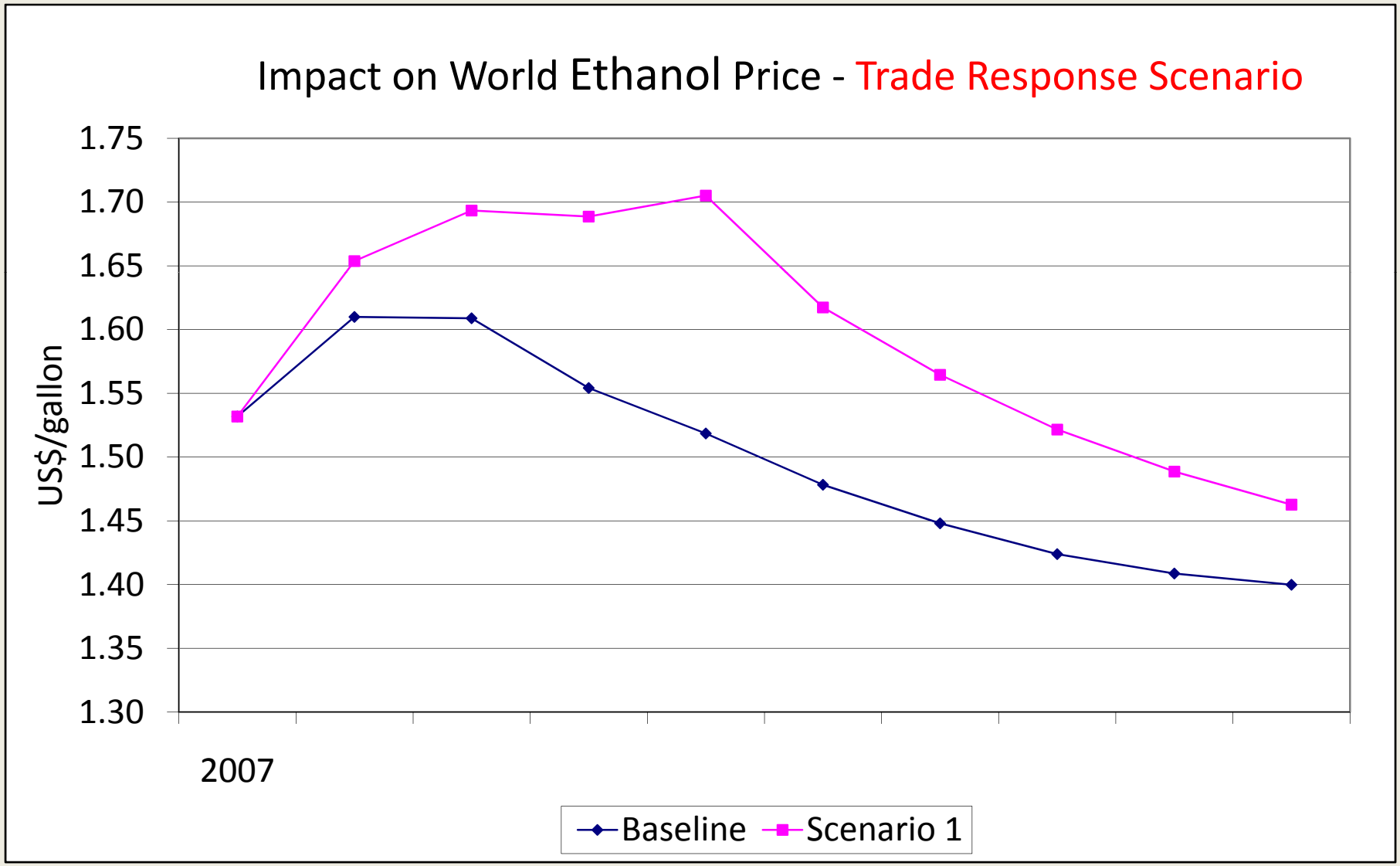
- Two scenarios:
  1. Impact of an increase in Canadian ethanol demand to 10% of domestic liquid fuel consumption by 2011 (i.e., doubling the present mandate), with a trade response.

  2. Impact of an increase in Canadian ethanol demand to 10% of domestic liquid fuel consumption by 2011 (i.e., doubling the present mandate), without a trade response.

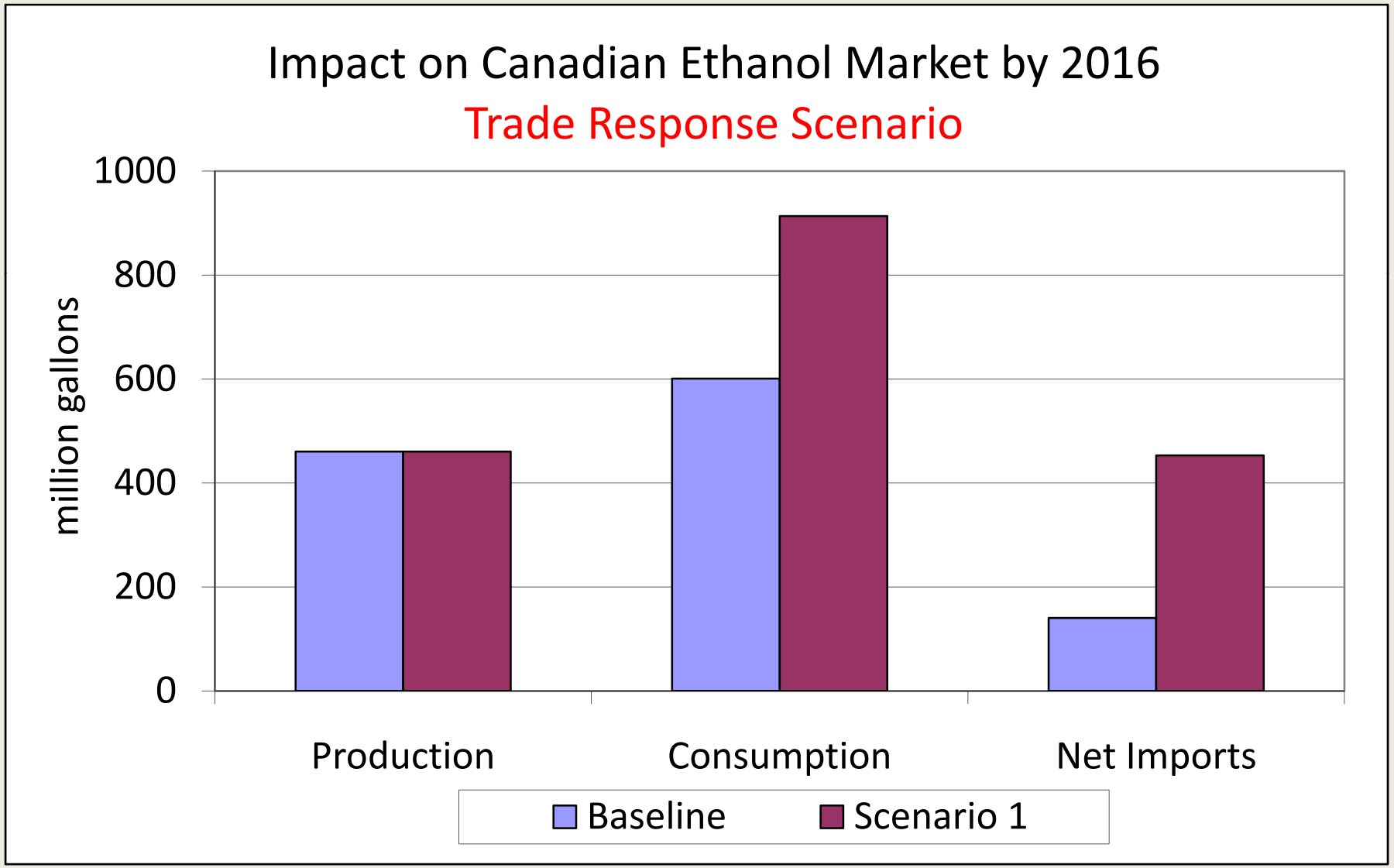
Preliminary Results - 1



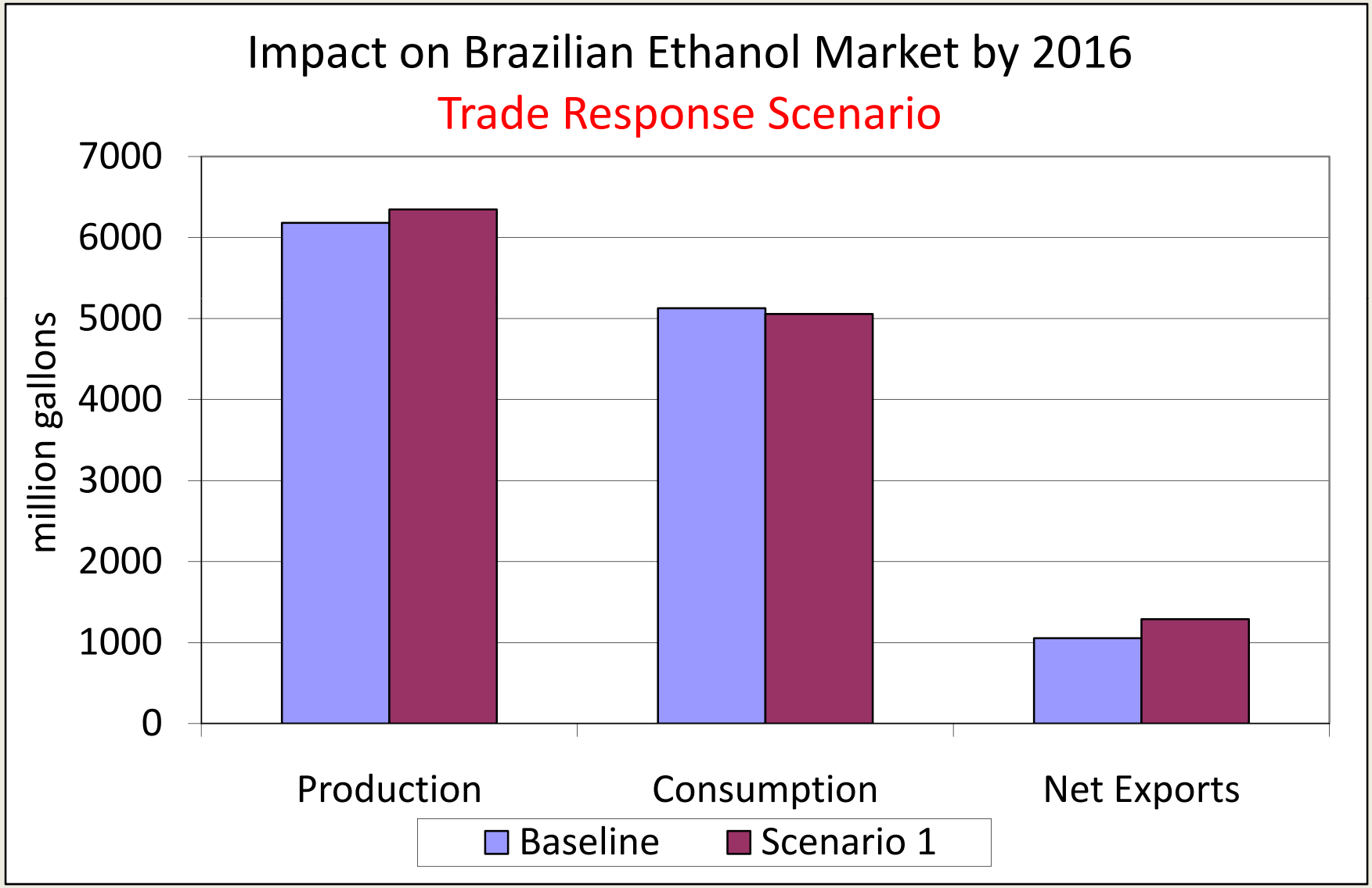
Preliminary Results - 2



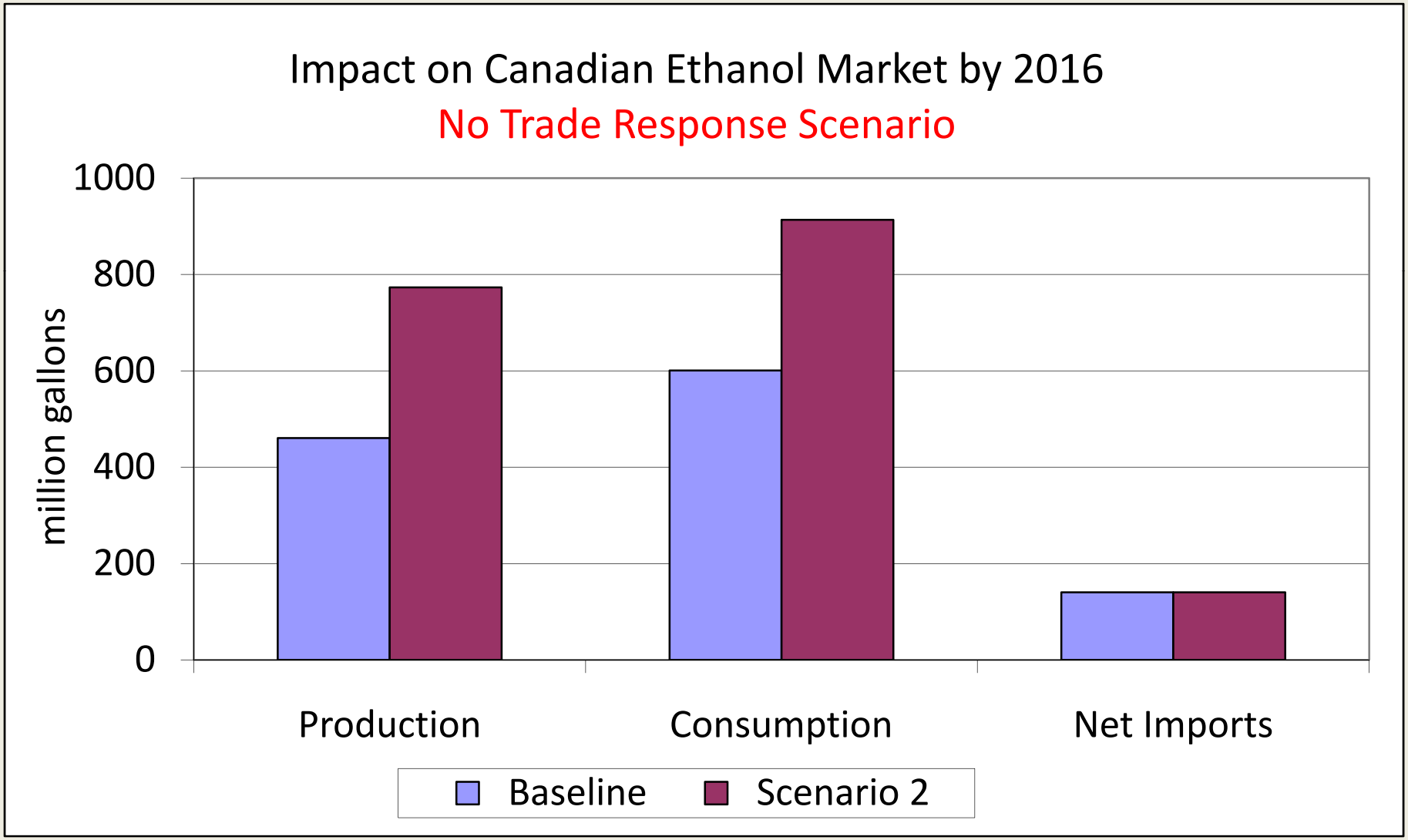
Preliminary Results - 2



Preliminary Results - 3



Preliminary Results - 4



Concluding Remarks

- Need to improve the mouse trap
  - With trade
    - Ethanol prices in Canada = prices in the US
    - But, prices increase by about US$0.10/gallon
      - This seems large.
  - w/o trade,
    - ethanol prices in Canada NOT solved endogenously.
    - A 10% ethanol blend requirement will be costly and have an important welfare effects.