Trade and Welfare Effects of NAFTA

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Yale University-NBER

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Federal Reserve Board

Conference: "**NAFTA at 20: Effects on the North American Market**"
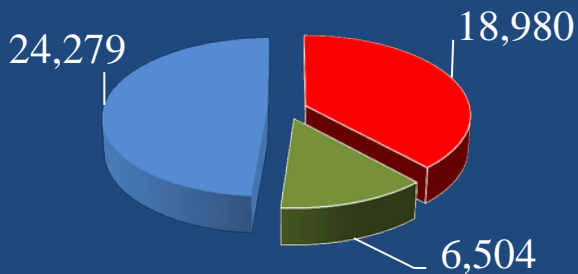
June, 2014

Structure of the talk

- Why was NAFTA different?
- Why is it difficult to measure the economic effects of NAFTA?
- Quantifying the economic effects of NAFTA's tariff reductions
  - Trade effects
  - Welfare effects

Why was NAFTA different?
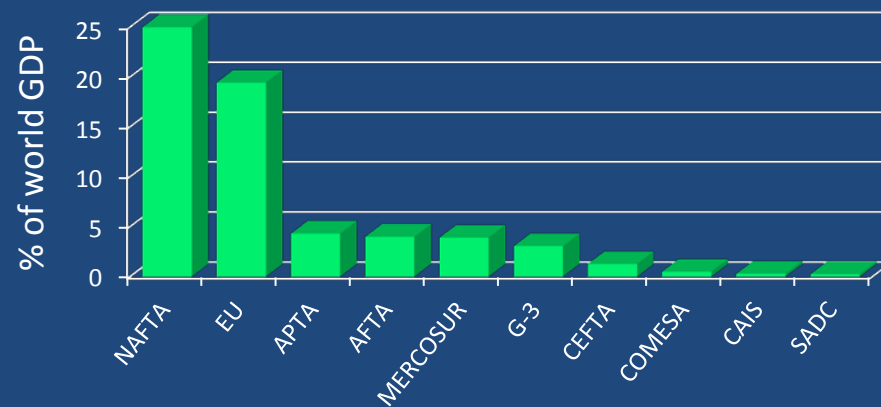
Why was NAFTA different?

- Free trade agreement between countries at different stages of development
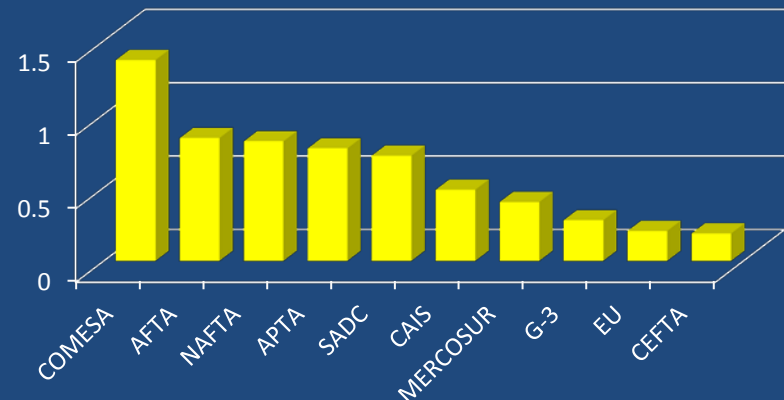
GDP per capita (1994)

24,279

18,980

6,504

- Canada
- Mexico
- US

Source: Angus Madison (1990 US dollars)

Size of FTA's in force by 1995

% of world GDP

NAFTA, EU, APTA, AFTA, MERCOSUR, G-3, CEFTA, COMESA, CAIS, SADC

Inequality across members

COMESA, AFTA, NAFTA, APTA, SADC, CAIS, MERCOSUR, G-3, EU, CEFTA

Note: inequality measured as the coef. of variation (GDP per capita)

Why was NAFTA different?

- Free trade agreement between countries at different stages of development

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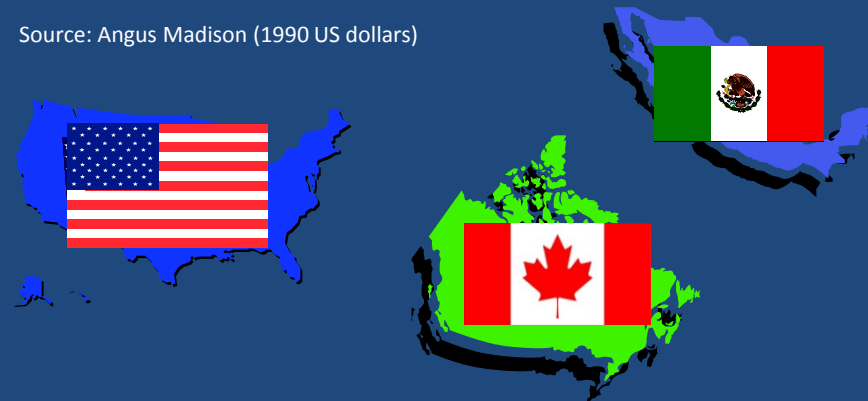■ Canada   ■ Mexico   ■ US

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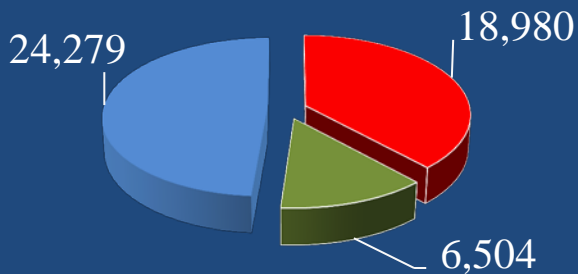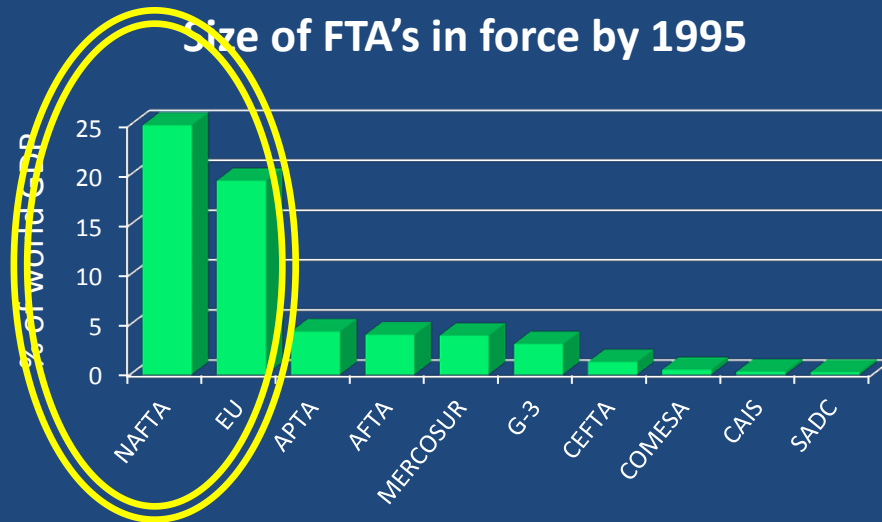# Why was NAFTA different?

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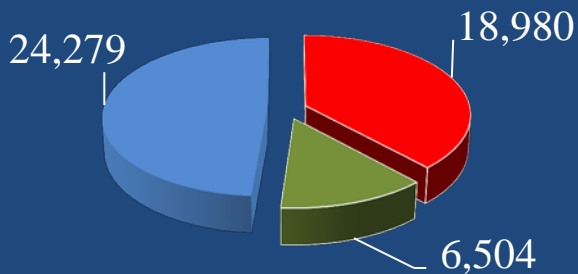## GDP per capita (1994)

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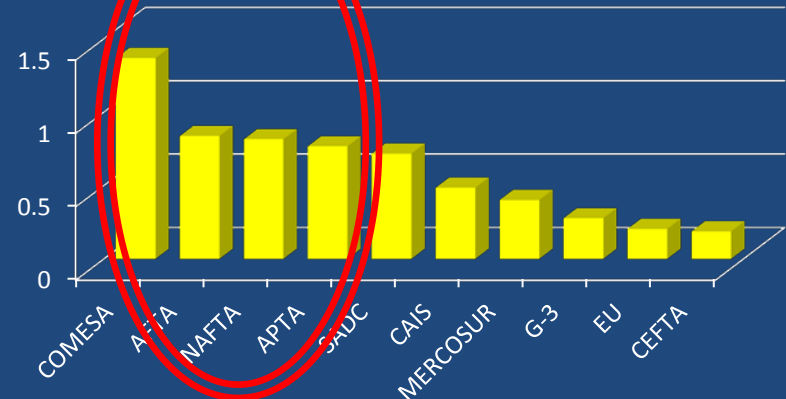
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What goods were they trading?

Canada's Imports (1993)

Mexico's Imports (1993)

From NAFTA

17.8%   0.17%

82.1%

From rest of the World

31.5%   0.4%

68.1%

From NAFTA

26.90%   0.83%

72.27%

From rest of the World

37.70%   0.76%

61.54%
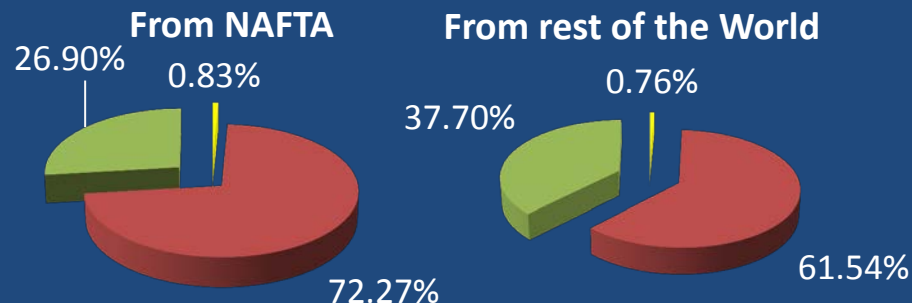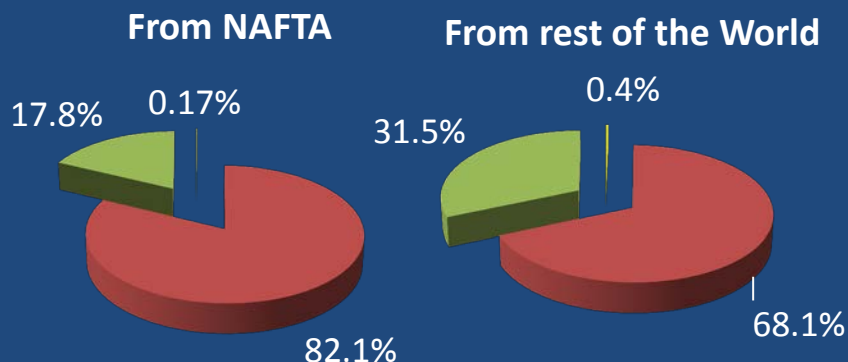
United State's Imports (1993)

■ Raw materials

■ Processed materials
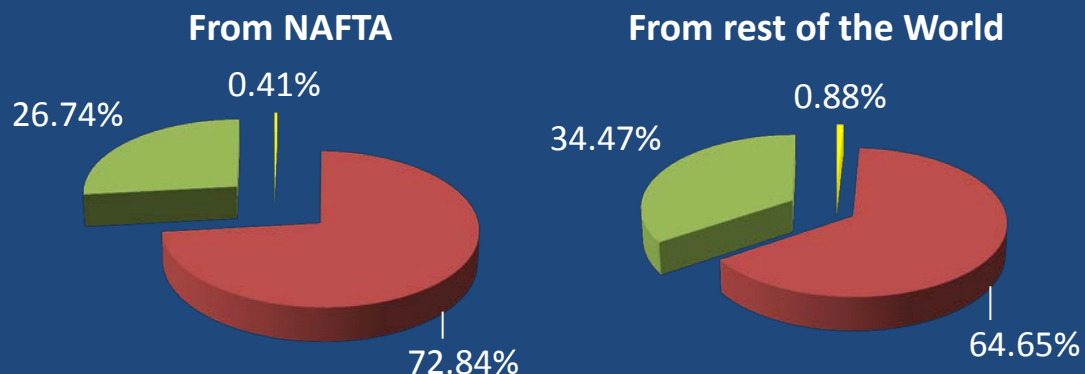
■ Final goods

From NAFTA

26.74%   0.41%

72.84%

From rest of the World

34.47%   0.88%

64.65%

Source: WITS, UNCTAD

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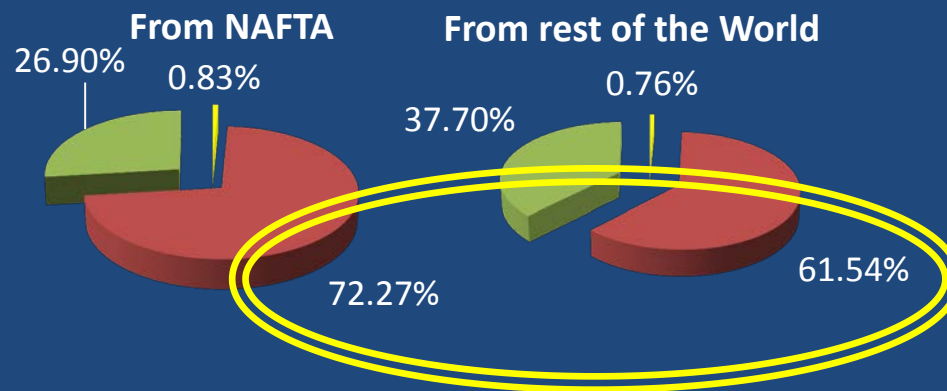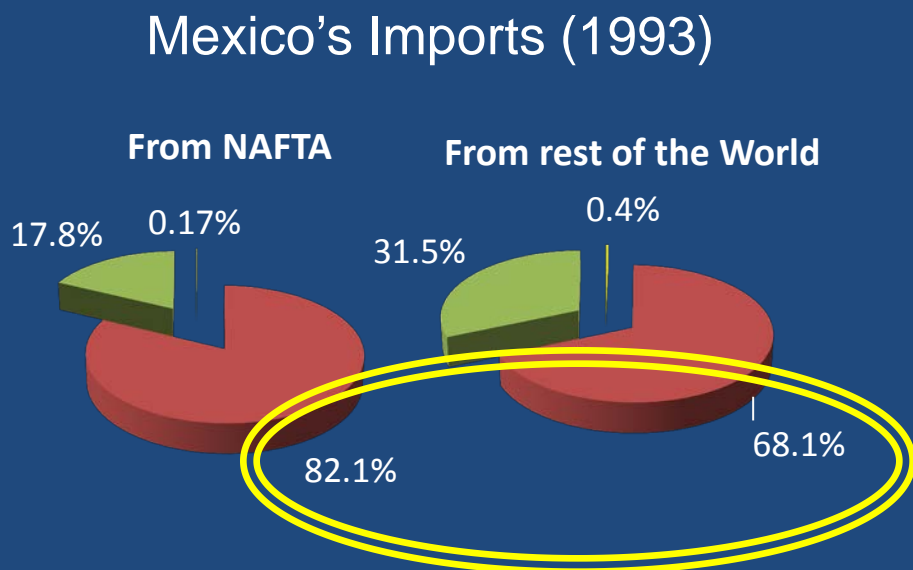
Mexico's Imports (1993)

Canada's Imports (1993)

Observation:
Most goods traded are processed materials (Intermediate goods and capital goods)

■ Processed materials ■ Final goods
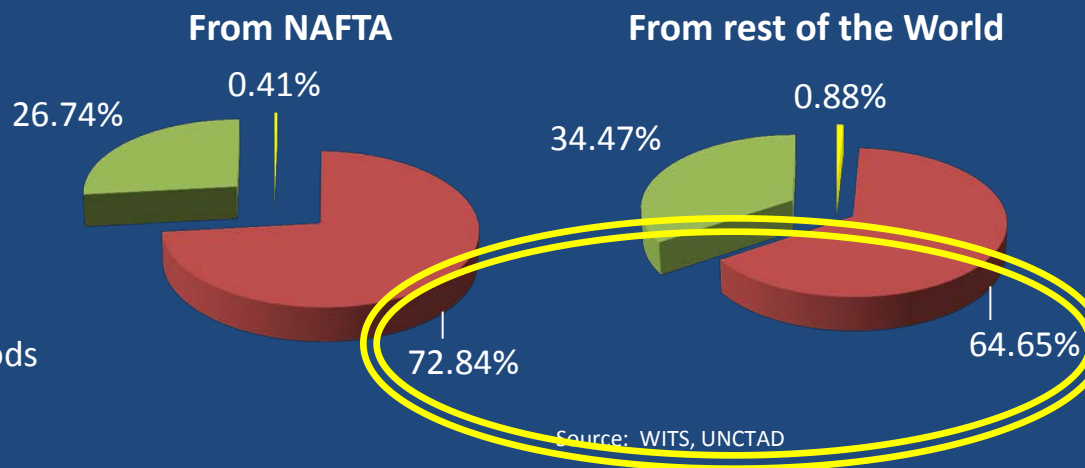
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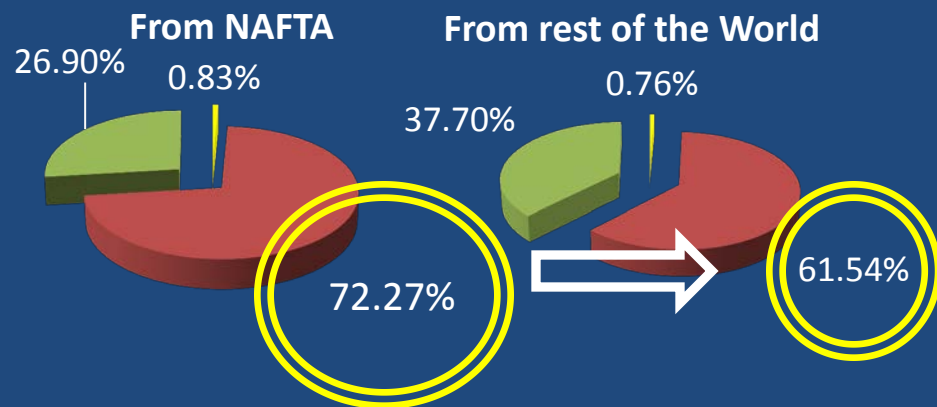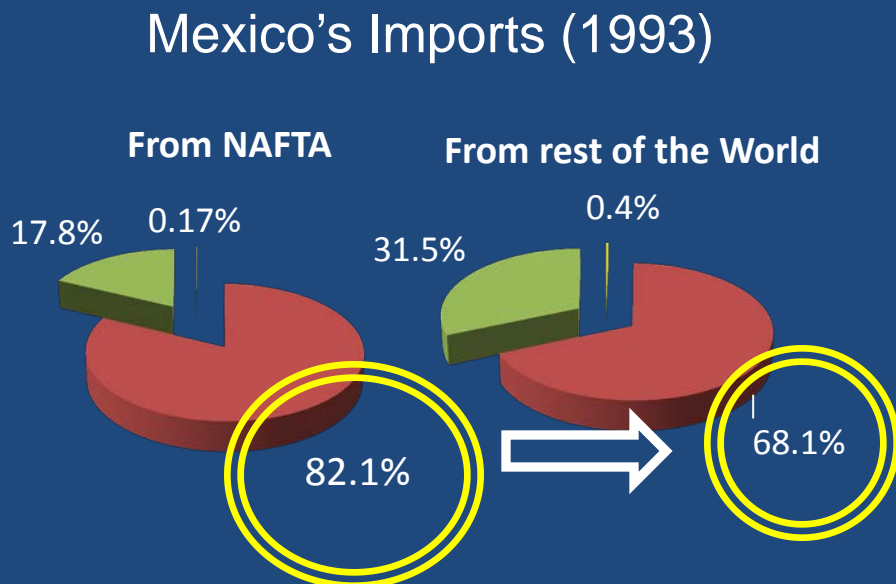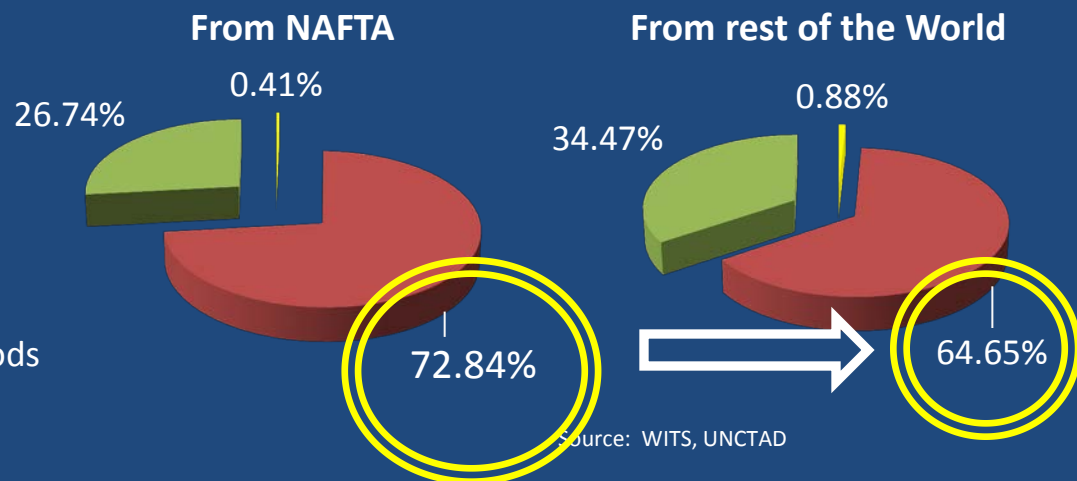
Observation:
Larger share of processed materials traded with NAFTA members compared to the rest of the world

■ Processed materials   ■ Final goods

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From NAFTA
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From rest of the World
37.70% 0.76%

72.27% → 61.54%

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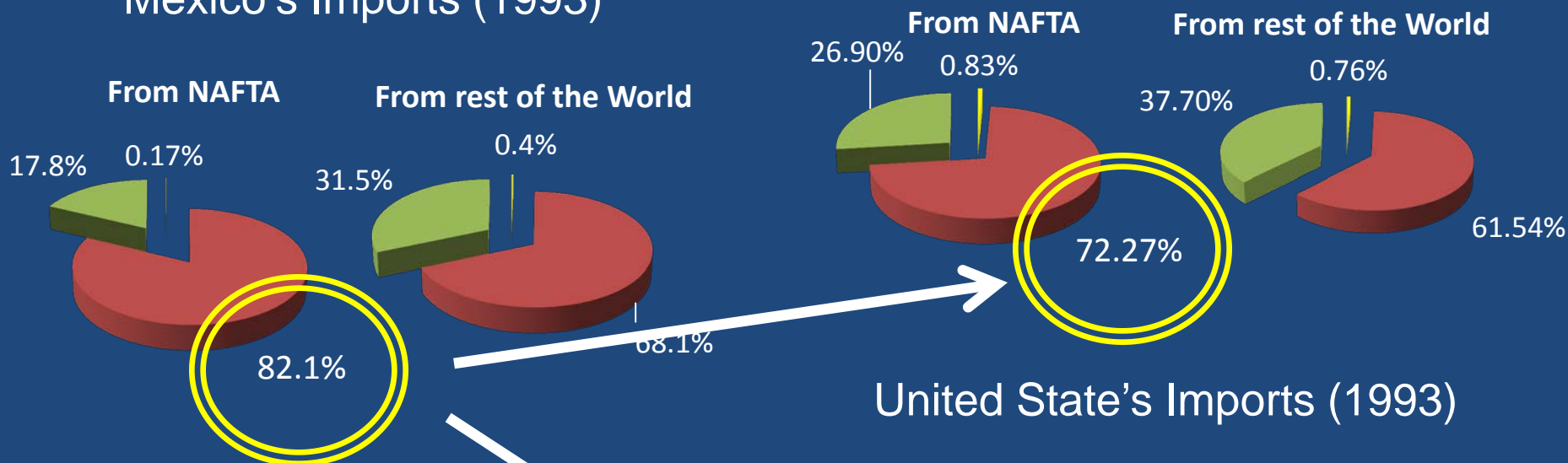
Observation:
Trade in processed materials from NAFTA was relatively more important for Mexico

■ Processed materials ■ Final goods

Source: WITS, UNCTAD

What goods were they trading?

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Mexico's Imports (1993)

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0.83%

From rest of the World
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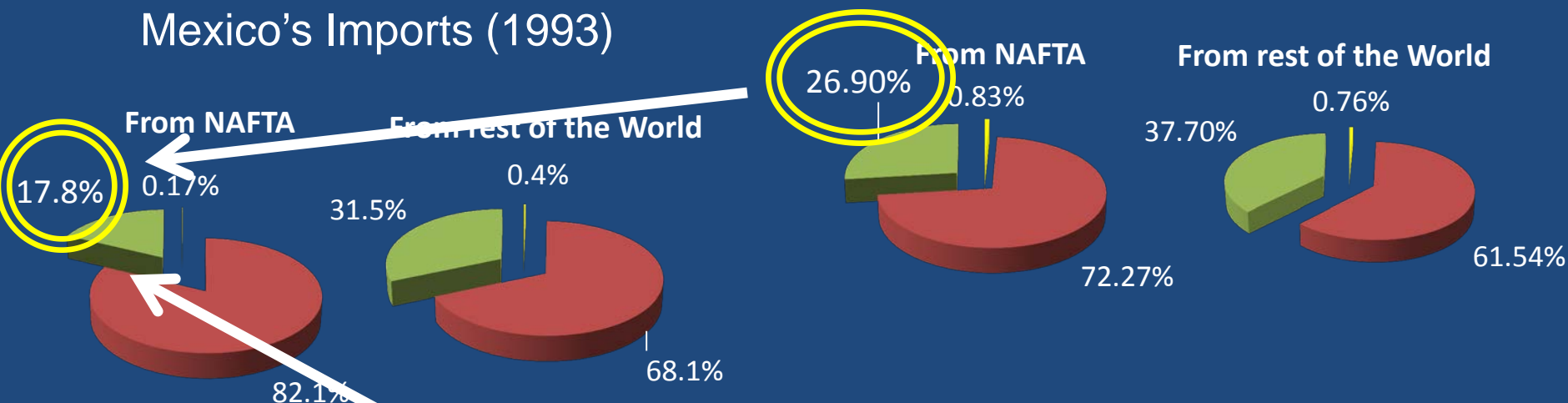
United State's Imports (1993)

Observation:
Trade in final goods from Mexico was relatively more important for Canada and the U.S.

26.74%

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From rest of the World
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■ Processed materials ■ Final goods

Source: WITS, UNCTAD
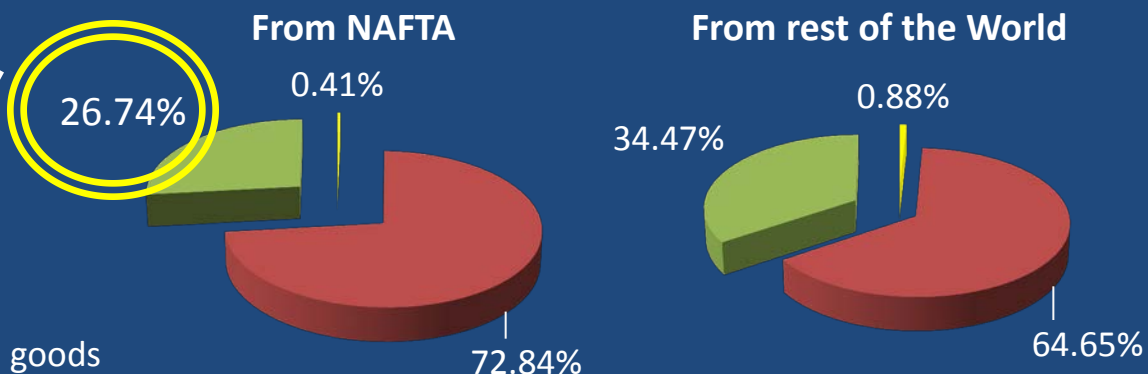
Bottom line 1

- An assessment of the economics effects of NAFTA will have to take into account that:

  - a) countries have different structures of production

  - b) most trade is in intermediate goods

  - c) global value chain

Why is/was it difficult to measure the economic effects of NAFTA?

Difficult to identify the NAFTA effect

GDP per capita of Mexico

Chart: GDP per capita of Mexico (U.S. dollars, 1990), 1991–2004, with annotations: "NAFTA enters into force", "Tequila Crisis", "Dot-com bubble in the U.S.", "China joins WTO".
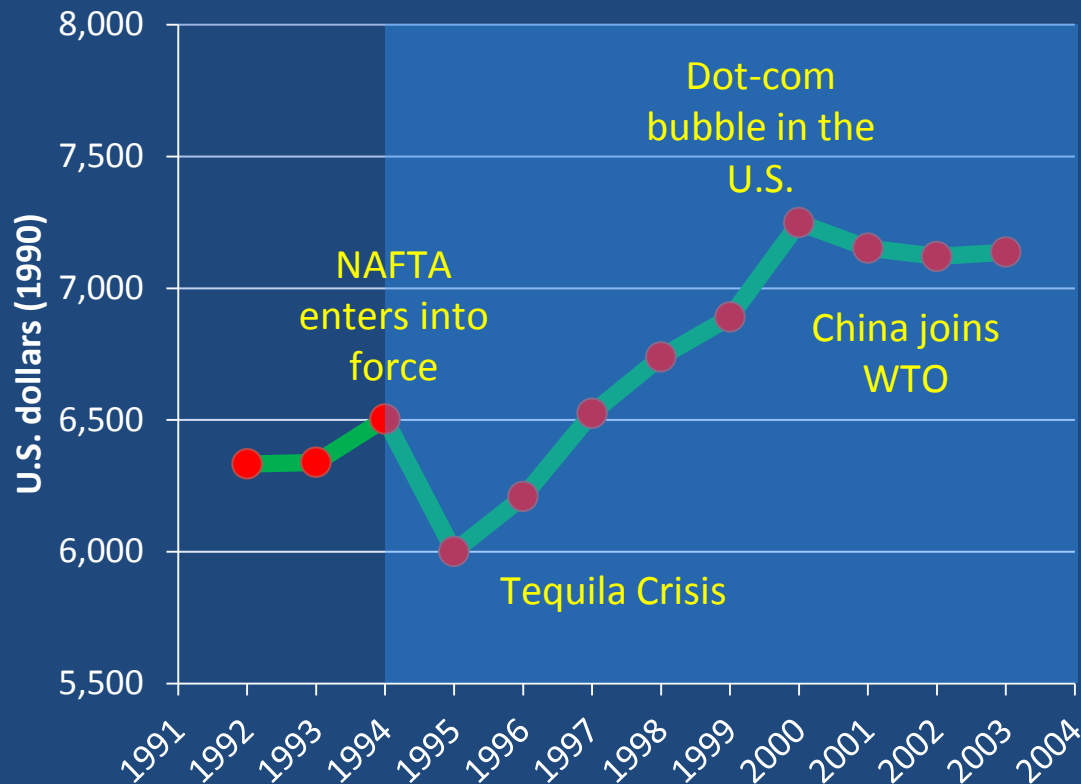
Timeline of FTA in force by country

Mexico timeline (1993–2006): NAFTA, Costa Rica, Nicaragua, Chile, EU, Israel, EFTA, Salvador, Guatemala, Honduras, Uruguay, Japan.

Canada timeline (1993–2006): NAFTA, Chile, Israel, Costa Rica.

United States timeline (1993–2006): NAFTA, Jordan, Singapore, Chile, Australia, Morocco, Bahrain, CAFTA.
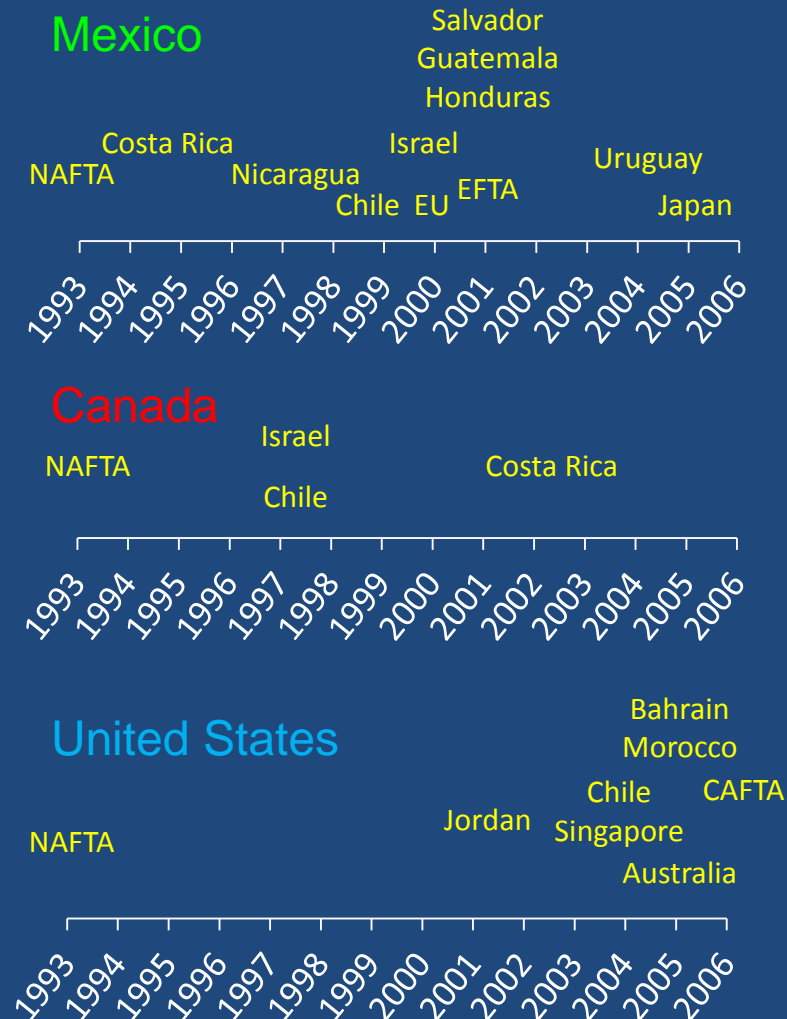
Bottom line 2

- Difficult to identify the effects of NAFTA

    - a) countries were exposed to many factors not directly related to NAFTA, Tequila crisis, Dot-com bubble, China's accession

    - b) after NAFTA, countries signed several trade agreements, in particular Mexico

Quantifying the economic effects of NAFTA's tariff reductions

How can we evaluate the economic effects of NAFTA?

- Use new developments on the international trade literature to quantify/identify the effects

- These methodologies account for:
  - Bottom line 1
    - Multi-countries with different structure of production
    - Intermediate goods traded
  - Bottom line 2
    - Isolate the effect of a policy (control for other changes)

Tariffs before NAFTA

Applied tariffs Mexico to Canada (1993)
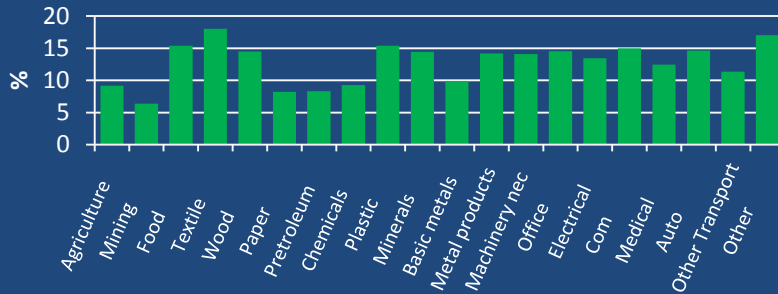
Applied tariffs Mexico to USA (1993)
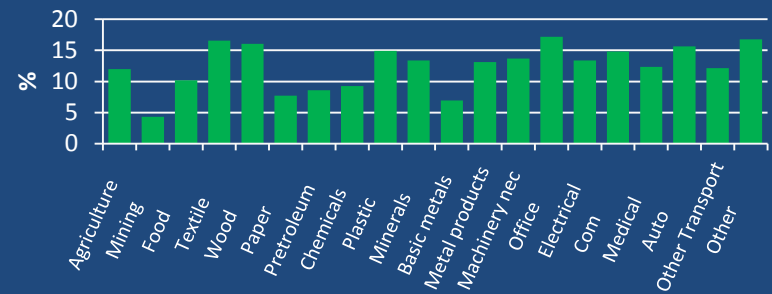
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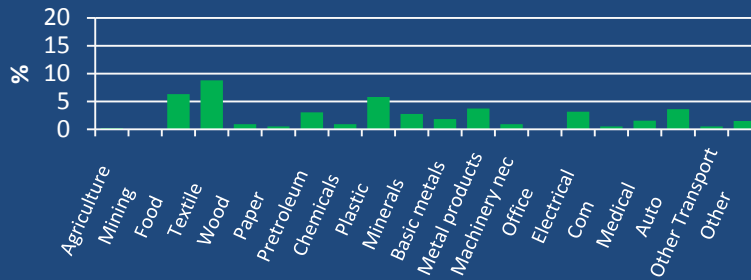
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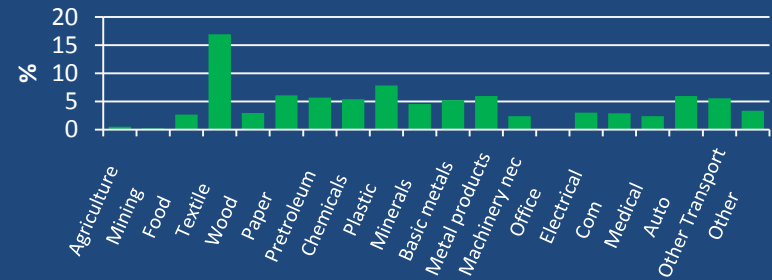
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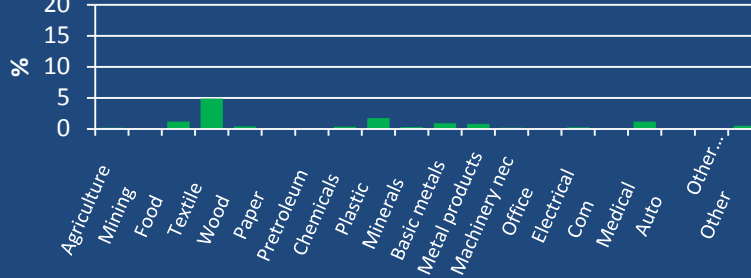
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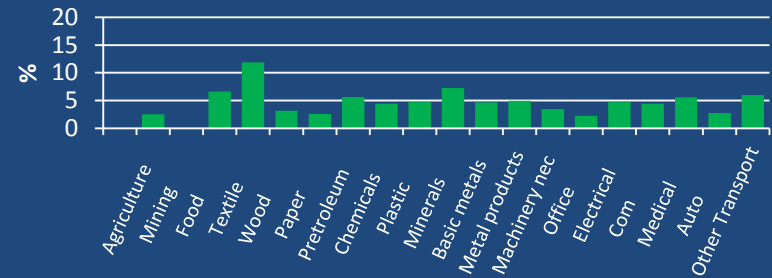
Welfare effect from tariff changes

- Welfare in country n given by $W_n = I_n/P_n$
  - Welfare effect from tariff changes:

$$dlnW_n = \frac{1}{I_n}\sum_{j=1}^{J}\sum_{i=1}^{N}(E_{ni}^{j}\,dlnc_n^{j} - M_{ni}^{j}\,dlnc_i^{j})$$

$$+ \frac{1}{I_n}\sum_{j=1}^{J}\sum_{i=1}^{N}\tau_{ni}^{j}M_{ni}^{j}(lnM_{ni}^{j} - dlnc_i^{j})$$

- We can also decompose the welfare effects into measures of **multilateral** and **multisectoral** terms of trade and volume of trade effects from tariff changes

Welfare effects

Welfare from *NAFTA's Tariff Reductions*

Country	Total	Terms of Trade	Volume of Trade	Real Wages
Mexico	1.31%	-0.41%	1.72%	1.72%
Canada	-0.06%	-0.11%	0.04%	0.32%
United States	0.08%	0.04%	0.04%	0.11%

- The major source of gains is increases in volume of trade
  - Mostly reflecting net trade creation
- Terms of trade effects are mixed
  - Average export prices across sectors fall by 2% and 0.6% for Mexico and Canada and increase by 0.1% for the U.S.
- Still, real wages increase for all NAFTA members and Mexico gains the most, followed by Canada and the U.S.

Welfare effects

NAFTA's Tariff Reductions

Country	Terms of Trade		Volume of Trade	
	NAFTA	Rest of the world	NAFTA	Rest of the world
Mexico	-0.39%	-0.02%	1.80%	-0.08%
Canada	-0.09%	-0.02%	0.08%	-0.04%
United States	0.03%	0.01%	0.04%	0.00%

- Mexico and Canada's terms of trade deteriorate, mostly with NAFTA
  - U.S.'s terms of trade improve, mostly with NAFTA
    - intermediate goods are sourced from Mexico and Canada, countries where export prices fell
- Trade created with NAFTA members is the single most important contributor to the positive welfare effects
  - reduction in volume of trade with the rest of the world reflects trade diversion

Welfare effects

NAFTA's Tariff Reductions

Sectoral contribution to welfare effects

- Aggregate change in terms of trade in each country is explained by a handful of sectors
  - 76% of Mexico's terms of trade deterioration is derived from Electrical Machinery, Communication Equipment, and Auto (Motor Vehicles)
  - 51% of U.S.'s terms of trade improvement comes from the same sectors
  - 52.5% of Canada's terms of trade deterioration is from Auto, Other Transport and Basic Metals
- In general,
  - sectors where the magnitude of the reduction in import tariffs was larger,
  - with large share of materials used in production,
  - and that have strong sectoral linkages

Sectoral effects

Mexico

Volume of tade

18% · 12% · 6% · 0%

Electrical equipment · Textile · Metal products · Auto · Office · Machinery nec

Canada

Volume of tade

0.8% · 0.5% · 0.3% · 0.0%

Auto · Textile · Metal products · Plastic · Electrical equipment · Food

USA

Volume of tade

12% · 8% · 4% · 0%

Electrical equipment · Textile · Communication · Auto · Medical · Other
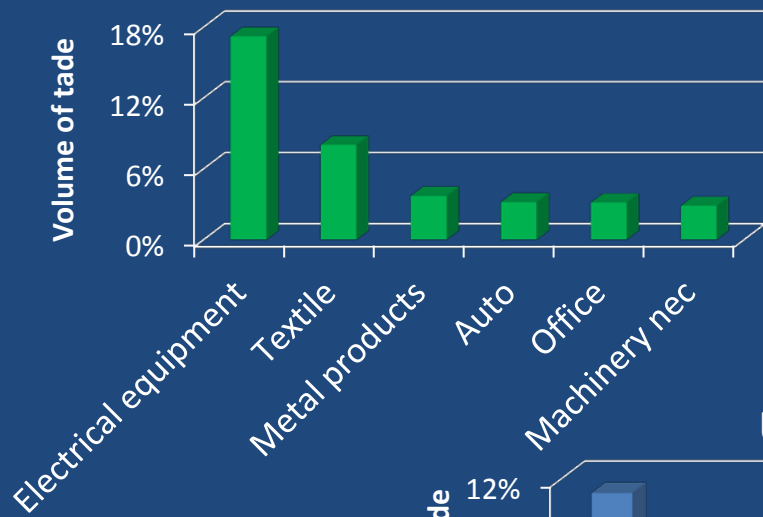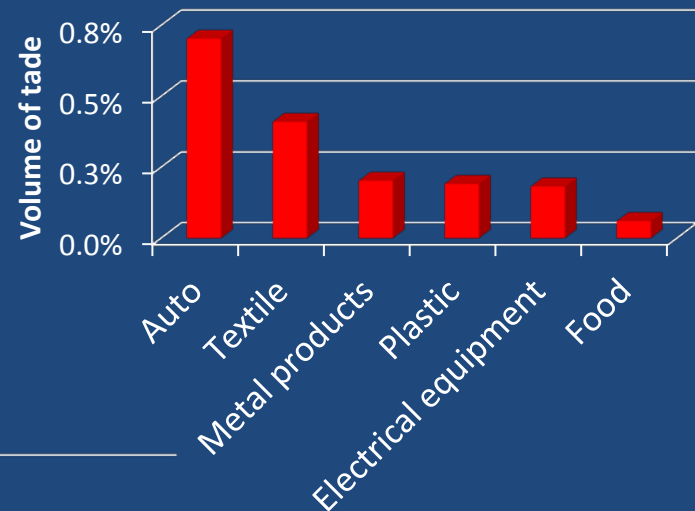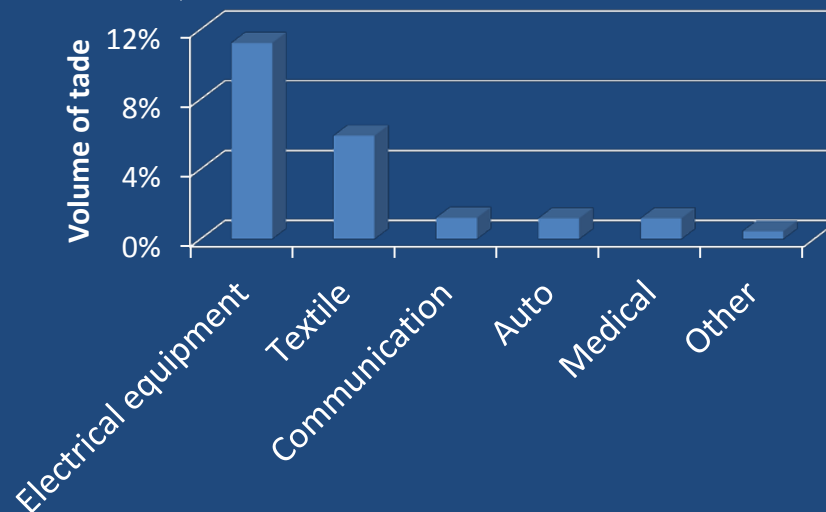
The sectors where trade was more created are: Electrical Equipment and Textiles

Trade effects

NAFTA's Tariff Reductions

Imports from NAFTA members before and after

Share of imports across members Before

Share of imports across members After

Legend:
- ■ USA
- ■ Mexico
- ■ Canada

Change in imports from NAFTA members

	Canada	Mexico	USA	Total change
Canada imports		59%	9%	11%
Mexico imports	117%		118%	118%
USA imports	7%	110%		41%

Trade effects

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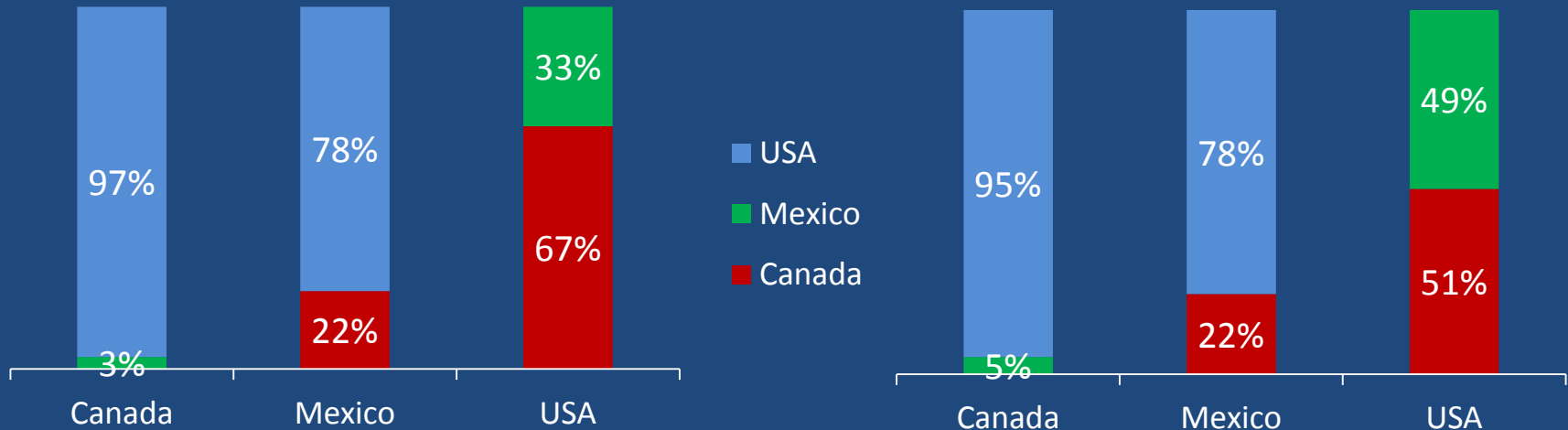|	Canada	Mexico	USA	Total change
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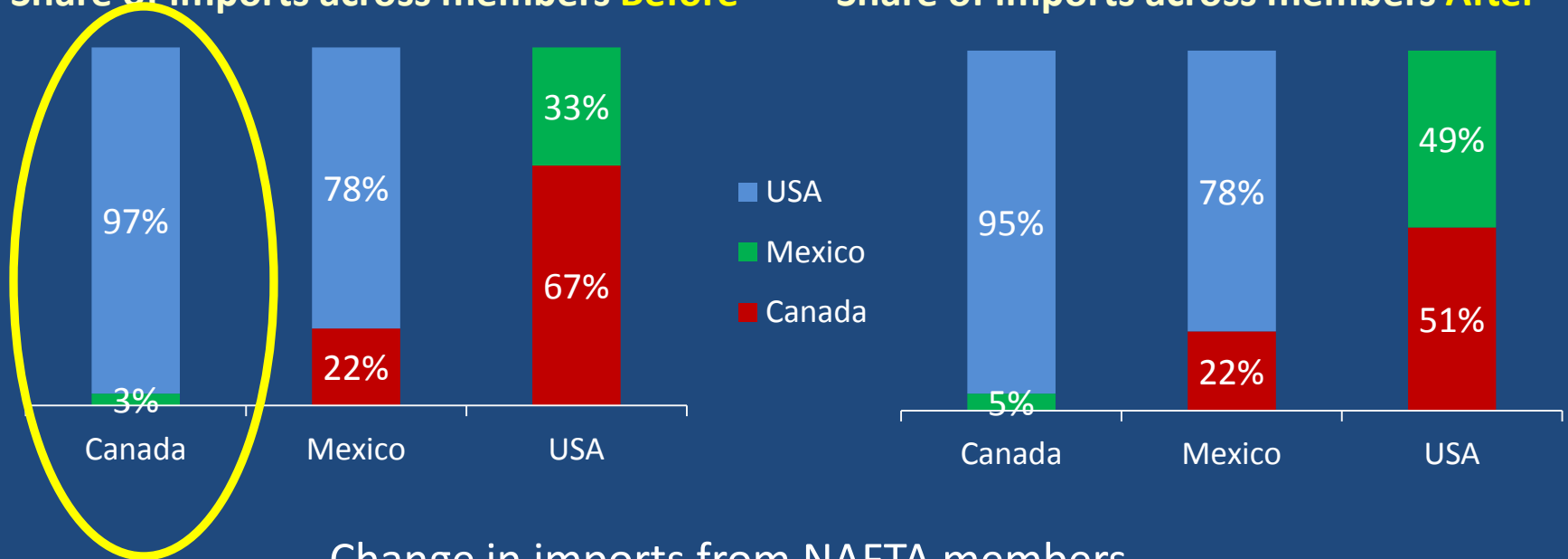|	Canada	Mexico	USA	Total change
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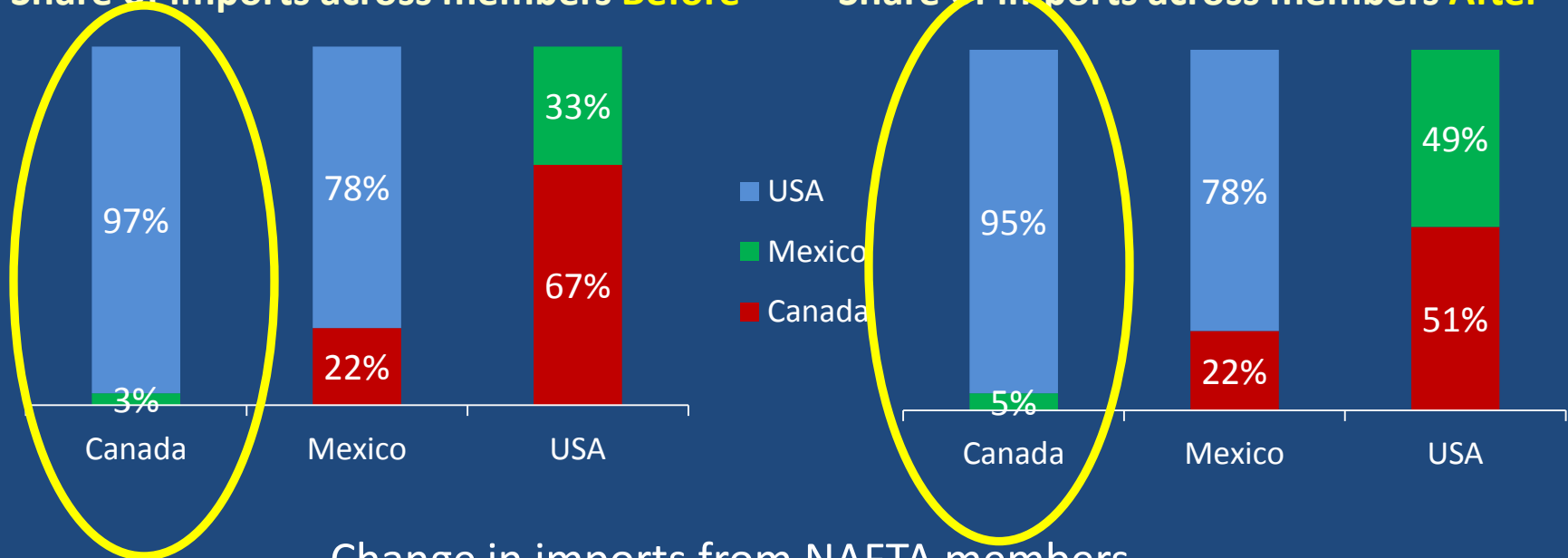|	Canada	Mexico	USA	Total change
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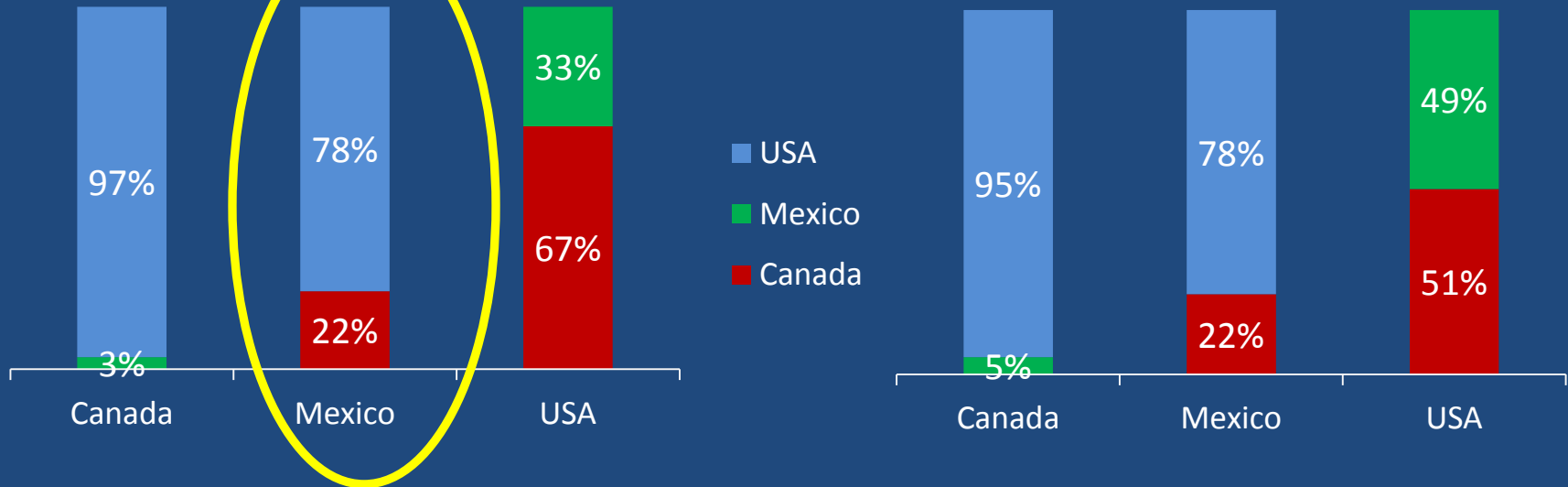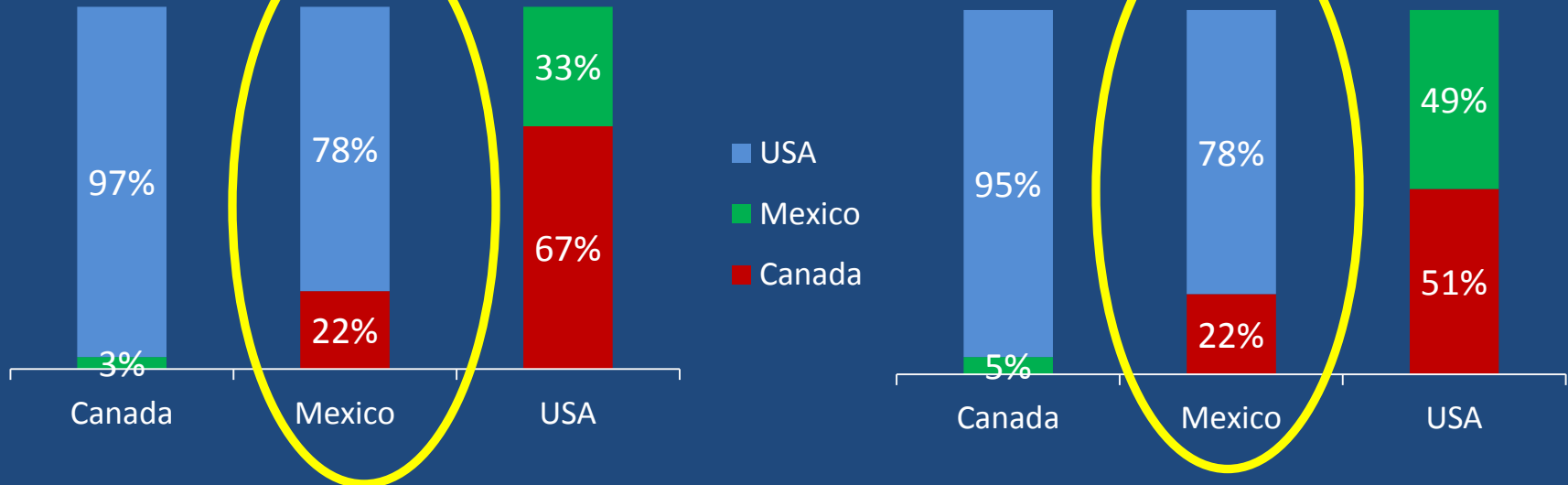|	Canada	Mexico	USA	Total change
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Trade effects

NAFTA's Tariff Reductions

Exports from NAFTA members before and after

Share of exports across members Before

	Canada	Mexico	USA
USA	99%	94%	
Mexico			34%
Canada	1%	6%	66%

Share of exports across members After

	Canada	Mexico	USA
USA	98%	95%	
Mexico			50.5%
Canada	2%	5%	49.5%

Legend:
- USA
- Mexico
- Canada

Change in exports from NAFTA members

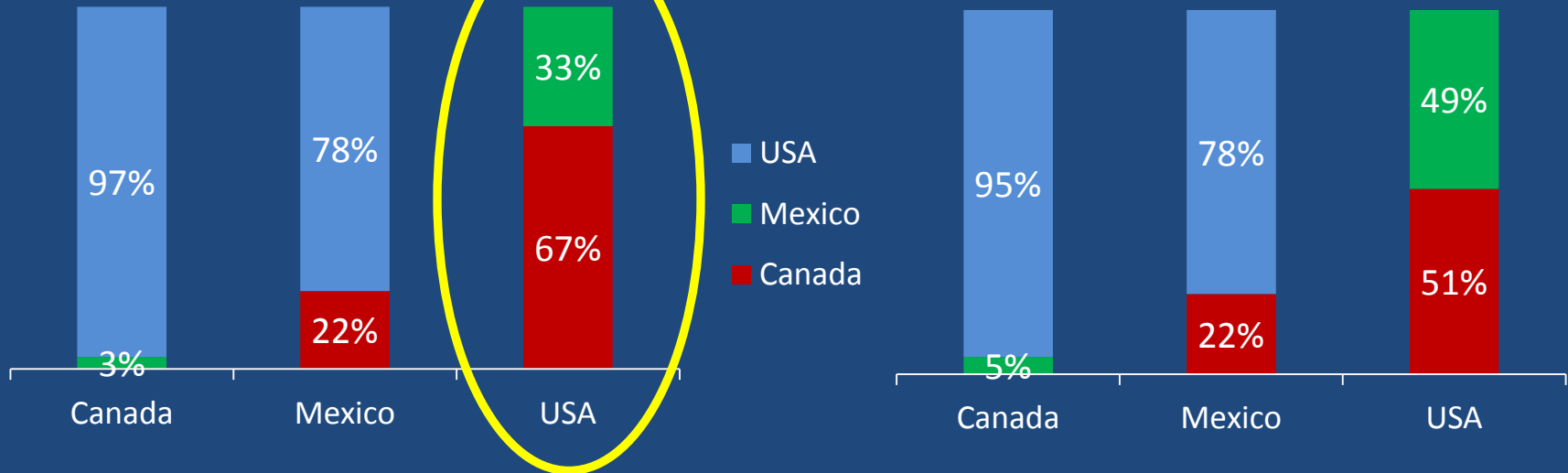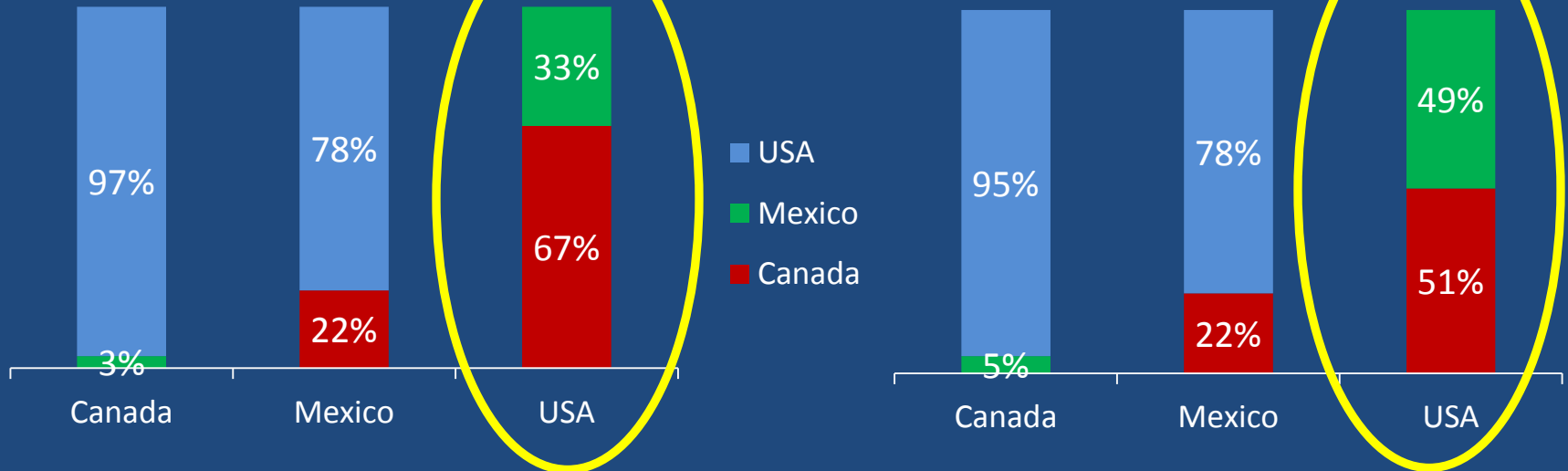|	Canada	Mexico	USA	Total change
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Exports from NAFTA members before and after

Share of exports across members Before

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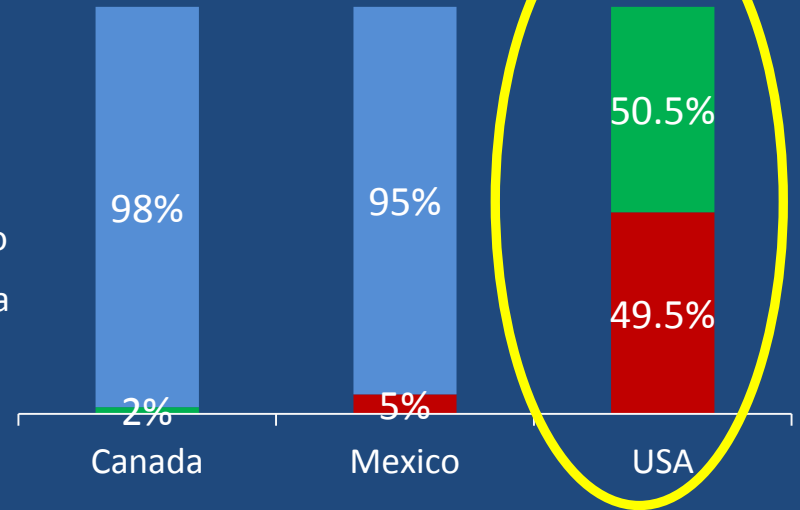
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Canada 99% 1%
Mexico 94% 6%
USA 34% 66%

Canada 98% 2%
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Comparing different margins

Welfare across different models

Country	One sector	No Materials	No I-O	Benchmark
Mexico	0.41%	-0.50%	0.66%	1.31%
Canada	-0.08%	-0.03%	-0.04%	-0.06%
United States	0.05%	0.03%	0.04%	0.08%

Imports growth across different models

Country	One sector	No Materials	No I-O	Benchmark
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Summary

- NAFTA generated large trade effects
  - Intermediate inputs
- Mexico was the largest winner
  - Most of the benefits obtained by trade creation
  - By importing intermediate goods is how Mexico exported more
- Accounting for sectoral interrelations is quantitatively and economically meaningful
  - Intermediates and sectoral linkages play an important role for welfare analysis

Canada's export shares by sectors: Model versus data

y = 0.9267x
R² = 0.7295
correl= 0.86

U.S. export shares by sectors: Model versus data

y = 0.836x
R² = 0.4135
correl= 0.86
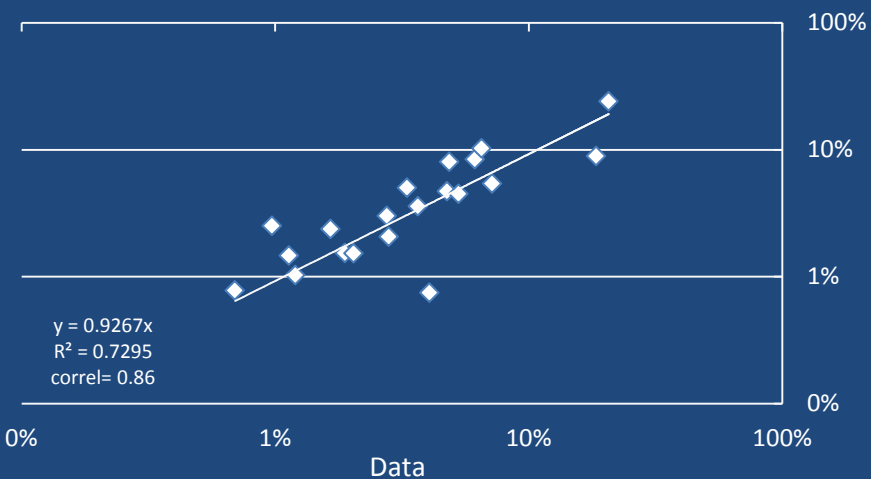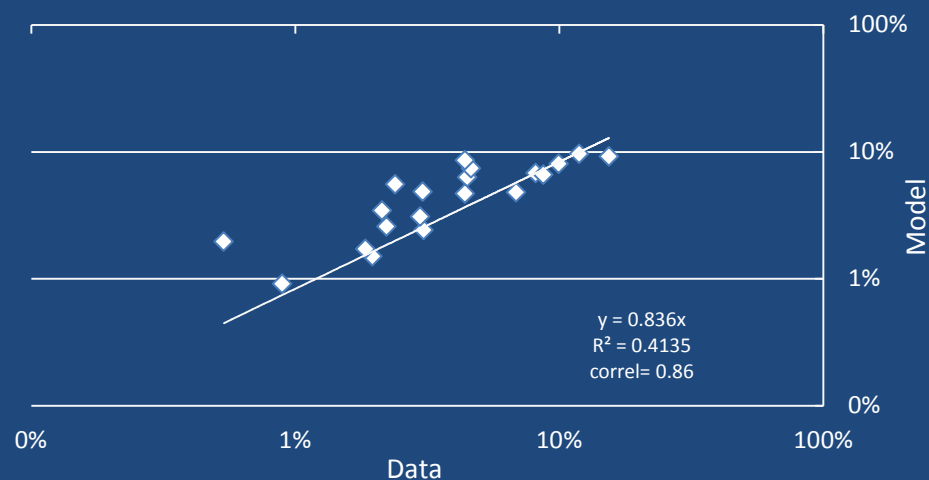
Mexico's export shares by sectors: Model versus data

y = 0.9427x
R² = 0.3504
correl= 0.59