

# A Firm-Level Perspective on Canada-US Trade

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Editorial Cartoon by Bruce MacKinnon

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# Evolution of Trade Theory

# Trade Theory: **Country-Level Analysis**

- Assumes that average production cost is independent of output level.
- Gains from trade result from across-industry reallocations of labour, capital, etc.

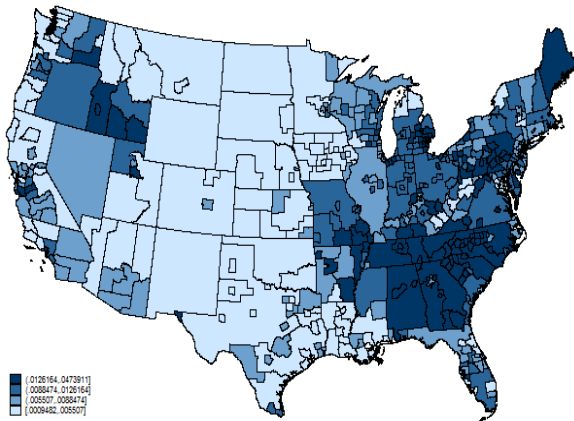
# Trade Theory: **Industry-Level Analysis**

- Assumes that **average production cost falls as output increases**.
- Additional gains from trade result from
  - Higher productivity due to higher firm-level outputs
  - More product variety available to consumers
  - Lower mark-ups due to increased competition

# Predicted Distributional Impacts of Trade

Export-oriented regions, industries, and workers gain while import-oriented ones lose from trade.

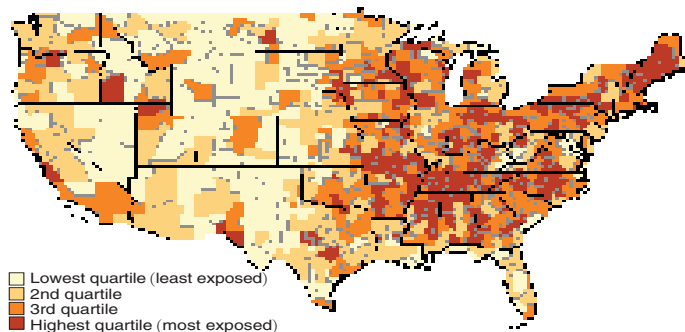
# Mexico Trade Vulnerable Regions



Source: Hakobyan and McLaren (2016)

# China Trade Vulnerable Regions

Panel B. Trade Exposure by Commuting Zone, 1990–2007



Source: Autor, Dorn, and Hanson (2013)



# Modern Trade Theory: **Firm-Level Analysis**

- Assumes that average production cost falls as output increases.
- Assumes that firms within an industry differ in their productivity – firms are heterogeneous.
- Incorporates variable and fixed costs of trade.

# Four Insights from Modern Trade Theory

- 1 There are Additional Effects on Productivity of Increased Trade
- 2 Firms **Within** Industries Experience Differential Impacts of Increased Trade
- 3 The Fixed Costs of Participating in International Markets Matter
- 4 Modern Theory Leads to Modern Empirical Analysis

# Productivity Effects and Firm-Level Effects

- 1 There are Additional Effects on Productivity of Increased Trade
- 2 Firms Within Industries Experience Differential Impacts of Increased Trade

## Basic Model

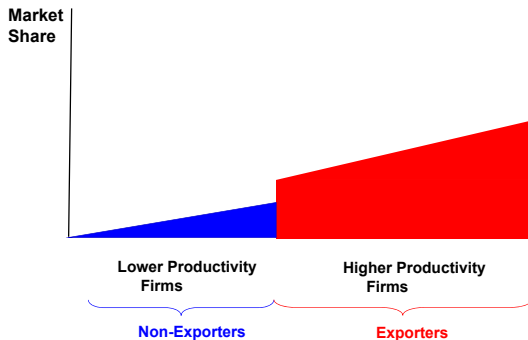
Melitz (2003)

Heterogeneous firms in the same industry choose whether or not to export and how much to export.

Because there are fixed costs of exporting, the more productive firms will export while the less productive will not export.

# Basic Model

Melitz (2003)





# Effects of Trade Liberalization

A decrease in trade costs, a decrease in tariffs, or expanded trading opportunities  $\implies$

● An increase in profits from exporting  $\implies$

- Expansion by incumbent exporters
- Entry by new exporters

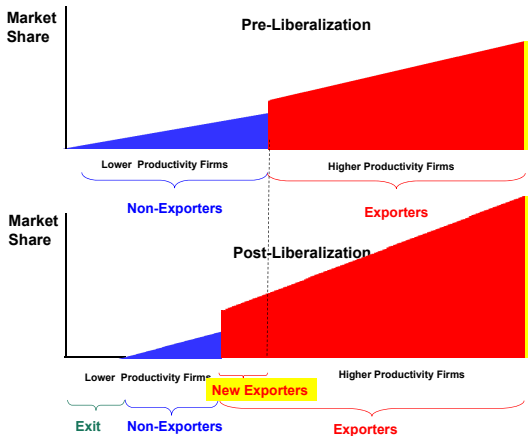
These firms gain from increased trade (winners).







# Effects of Trade Liberalization



## Effects of Trade Liberalization

Expansion by exporters  $\Rightarrow$









# Effects of Trade Liberalization

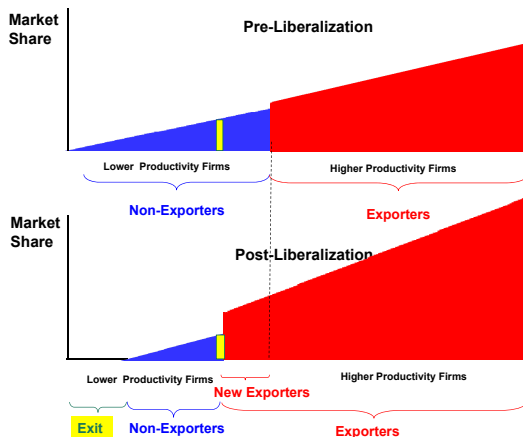
Expansion by exporters  $\implies$

- An increase in the demand for labour  $\implies$ 
  - An increase in wages  $\implies$ 
    - A decrease in profits from domestic sales  $\implies$ 
      - Contraction by some non-exporters
      - Exit by some non-exporters

These firms are harmed by increased trade (losers).



# Effects of Trade Liberalization







# Effects of Trade Liberalization

Contraction and exit by less productive firms and expansion by more productive firms  $\implies$

- An increase in average industry productivity due to reallocation within an industry
- Winners and losers within an exporting industry



# Some Empirical Evidence: US-Canada Free Trade Agreement

Estimates of effects of US-CFTA on Canadian manufacturing productivity:

Source	Productivity Increase
Growth of most productive plants	4.1%
Contraction & exit of least productive plants	4.3%
Incumbent exporters' investments	1.4%
New exporters' investments	3.5%

Sources: Trefler (2004) and Lileeva and Trefler (2010)

# Policy Implications

- The degree of firm heterogeneity within an industry matters for the impact of trade policy.

# Policy Implications

- Trade policy negotiators need access to quantitative studies based on firm-level and plant-level data.

(For example, to obtain estimates of the degree of heterogeneity within an industry.)



# Policy Implications

- There should be increased emphasis on the links between trade policy and firm, industry, and aggregate productivity.
- Trade policies should be coordinated with productivity, innovation, investment, and industrial policies.

# Policy Implications

- There should be increased attention to the distributional impacts of trade policies across firms and workers **within** industries.
- Trade policy should be inclusive and should be coordinated with domestic policy to assist firms and workers in adjusting to changes in policy. (Tapp (2017))

# Importance of Fixed Costs

## 3 Fixed Costs of Participating in International Markets Matter

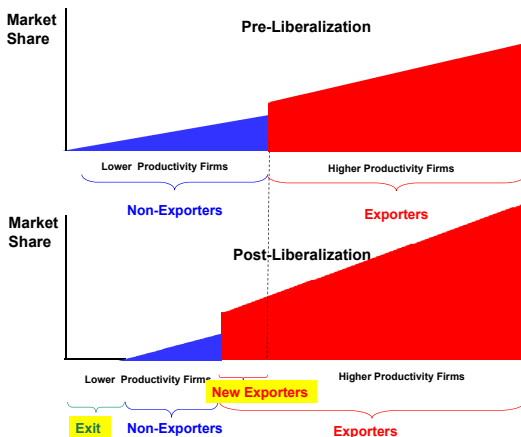
# Extensive Margin Responses

In the presence of fixed costs of trade...

There are intensive and **extensive margin** responses to changes in the trading environment:

- Intensive Margin Responses: Changes in trade flows of existing products by existing firms in existing markets
- **Extensive Margin Responses:** Changes in the number and composition of firms and markets

# Effects of Trade Liberalization



# Policy Implications

- There should be increased emphasis on the impact of trade policy on **potential** trade flows due to extensive margin effects:
  - Entry of new trading firms.
  - Expansion of traded products that previously were not traded.
  - Expansion of traded products into new markets.

# Policy Implications

- There should be increased emphasis on lowering fixed costs and regulatory obstacles that inhibit market access for trading firms.

# Empirical Analysis

## 4 Modern Theory Leads to Modern Empirical Analysis



# Firm-level Empirical Analysis

Firm-based trade theory implies an increased need for firm-level and plant-level empirical analysis to:

- guide the theory
- test the theory
- assess the impact of changes in trade costs
- assess the impact of trade policy

Firm-based trade theory guides firm-level empirical analysis.

# Example: Empirical Gravity Analysis

Traditional empirical gravity analysis is based on the idea that the volume of trade between two regions depends on

- Their size
- Features which affect trade costs such as:
  - Distance between regions
  - Whether regions share a common language
  - Whether regions have a trade agreement
  - ....

# Empirical Gravity

Modern trade theory showed that Traditional Empirical Gravity equations were misspecified.

# Structural Gravity Estimation: Canada-US Trade

Impact of a Regional Border on Trade		
Canada-US Border	Provincial Border	State Border
-79%	-44%	-32%

Data from 2012 for 201 regions

Source: Brown, Dar-Brodeur, Dixon (2019)

Related Traditional Gravity Estimates were -2100% for 1988 trade and -1400% for 1993 trade.

# Structural Gravity Estimation: Canada-US Trade

	Percentage <b>Fall</b> in Trade Associated with a 1% Increase in Distance	
Distance Range (Kilometers)	Within Canada Trade	Canada-US Trade
0-50	0.90%	—
50-150	0.24%	—
150-500	0.39%	0.95%
500-1000	1.22%	1.03%
1000-3000	0.87%	1.13%
> 3000	0.43%	1.02%

Data from 2012 for 201 regions

Source: Brown, Dar-Brodeur, Dixon (2019)

# Conclusions

# Contributions of Firm-Level Theoretical Analyses of Trade

- 1 Models with firm heterogeneity have improved our understanding of the mechanisms through which economies respond to changes in the trading environment.
- 2 This increased understanding of the margins along which an economy adjusts to shocks are important for evaluating the productivity and welfare effects of changes in the trading environment.

# The Importance of Heterogeneity

**3** Recent developments in trade theory and firm-level data analysis recognize the importance of heterogeneity in:

- Countries
- Regions within countries
- Industries
- Firms' technologies
- Firms' participation in international markets
- Firms' responses to changes in trade policy
- Products



# Effects of Trade Policy

- 4 Changes in trade policy induce intensive and extensive margin adjustments.
- 5 The effects of trade policy depend crucially on the composition of firms within industries.
- 6 Trade policy changes have distributional effects within industries.

# Sources of Gains from Trade

## 7 There are many sources of gains from trade:

- Comparative advantage
- Increased productivity due to higher output
- Increased product variety
- Lower markups
- Increased productivity due to across-firm reallocations
- Trade-induced product and production innovations

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