The Effects of Trade Agreements: A Firm-Level Perspective

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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 from higher output
  - More product variety available to consumers
  - Lower mark-ups due to increased competition
Export-oriented regions, industries, and workers benefit from trade while import-oriented ones are harmed by trade.
US Regional Exposure to Trade with Mexico

Source: Hakobyan and McLaren (2016)
US Regional Exposure to Trade with China

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.
Focus on Three Insights from Modern Trade Theory

1. There are Additional Effects on Productivity of Increased Trade

2. The Fixed Costs of Participating in International Markets Matter

3. Modern Trade Theory Leads to Modern Empirical Analysis
Productivity Effects

1. There are Additional Effects on Productivity 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)

Market Share

Low Productivity Firms
Non-Exporters

High Productivity Firms
Exporters

Basic Model Melitz (2003)
Effects of Trade Liberalization

Pre-Liberalization

Market Share

Low Productivity Firms

High Productivity Firms

Non-Exporters

Exporters

Post-Liberalization

Market Share

Low Productivity Firms

High Productivity Firms

New Exporters

Exit

Non-Exporters

Exporters

Pre-Liberalization

Post-Liberalization

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Effects of Trade Liberalization

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

- An increase in profits from exporting
- Expansion by incumbent exporters
- Entry by new exporters

These firms gain from increased trade (winners).
Effects of Trade Liberalization

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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
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These firms are harmed by increased trade (losers).
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Contraction and exit by less productive firms and expansion by more productive firms ➞

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

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

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Extensions

These effects extend to firms’ decisions regarding innovating, importing intermediates, global value chains, ...

Trade can increase differences in productivity across firms within an industry.
Empirical Evidence: Canadian Manufacturing Data

For 1974-2010 among Canadian manufacturing firms, labour productivity was 13% higher for exporters than for non-exporters.

Source: Baldwin and Yan (2017)

Canadian manufacturing firms which began exporting between 1984 and 1996 were 58% larger and 7% more productive than non-exporters.

Source: Lileeva and Trefler (2010)
Empirical Evidence: US-Canada Free Trade Agreement

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

<table>
<thead>
<tr>
<th>Source</th>
<th>Productivity Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth of most productive plants</td>
<td>4.1%</td>
</tr>
<tr>
<td>Contraction &amp; exit of least productive plants</td>
<td>4.3%</td>
</tr>
<tr>
<td>Incumbent exporters’ investments</td>
<td>1.4%</td>
</tr>
<tr>
<td>New exporters’ investments</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

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

2 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 firm and markets
Effects of Trade Liberalization

Pre-Liberalization

Post-Liberalization

Market Share

Low Productivity Firms

High Productivity Firms

Non-Exporters

Exporters

New Exporters

Exit

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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

3 Modern Trade 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 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 countries depends on

- Their size
- Measures of bilateral characteristics such as:
  - Distance between countries
  - Whether countries share a common language
  - Whether countries have a regional trade agreement (RTA)
  - ...

Empirical Gravity

Figure 16: The forces of gravity for France in 2003

Source: Mayer and Ottaviano (2007)
Empirical Gravity

Modern trade theory implies that we should examine extensive and intensive margin responses separately.
Empirical Gravity

Figure 17: The extensive margin

Source: Mayer and Ottaviano (2007)
Empirical Gravity

Figure 18: The intensive margin

Source: Mayer and Ottaviano (2007)
Helpman, Melitz, and Rubenstein (2008) conclude:

“... Regional Trade Agreements ... predominantly reduce the fixed costs of trade:

they have a great influence on a firm’s choice of export location, but not on its export volume

once the exporting decision has been made."
Modern trade theory showed that Traditional Empirical Gravity equations were misspecified.
## Empirical Gravity: Multi-Country Trade

<table>
<thead>
<tr>
<th>Bilateral Characteristic</th>
<th>Traditional Gravity</th>
<th>Theory-Based Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance (1% increase)</td>
<td>-1.00%</td>
<td>-0.80%</td>
</tr>
<tr>
<td>Common Language</td>
<td>123%</td>
<td>28%</td>
</tr>
<tr>
<td>RTA</td>
<td>0%</td>
<td>50%</td>
</tr>
</tbody>
</table>

69 countries; 1986-2006  
Source: UN & WTO Publication (2016)
## Gravity: Canadian Inter-Provincial Trade Agreements

### Estimated Impact on Inter-Provincial Trade Volumes

<table>
<thead>
<tr>
<th>Provincial Trade Agreement</th>
<th>Theory-Based Gravity Without International Flows</th>
<th>Theory-Based Gravity With International Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPP (1993)</td>
<td>11%</td>
<td>13%</td>
</tr>
<tr>
<td>APA (1996)</td>
<td>37%</td>
<td>36%</td>
</tr>
<tr>
<td>TCA (2009)</td>
<td>-30%</td>
<td>-30%</td>
</tr>
<tr>
<td>PARE (2009)</td>
<td>-29%</td>
<td>-27%</td>
</tr>
<tr>
<td>TILMA/NWPTA (2007/2010)</td>
<td>9%</td>
<td>7%</td>
</tr>
</tbody>
</table>

10 provinces, US, ROW; 1992-2013  
Source: Lapham & Teeter (2019)  
Based on Beaulieu & Zaman (2019)
### Gravity: Importance of Provincial Borders

#### Estimated Intra-Provincial Trade Volumes Relative to Inter-Provincial Trade Volumes

<table>
<thead>
<tr>
<th>Year</th>
<th>Theory-Based Gravity Without International Flows</th>
<th>Theory-Based Gravity With International Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>26</td>
<td>119</td>
</tr>
<tr>
<td>2001</td>
<td>25</td>
<td>114</td>
</tr>
<tr>
<td>2007</td>
<td>25</td>
<td>112</td>
</tr>
<tr>
<td>2013</td>
<td>24</td>
<td>108</td>
</tr>
</tbody>
</table>

10 provinces, US, ROW; 1992-2013

Source: Lapham & Teeter (2019)

Based on Beaulieu & Zaman (2019)
Contributions of Firm-Level Theoretical Analyses of Trade

1. Models with firm heterogeneity provide explanations for features of disaggregated trade data that cannot be addressed with homogeneous firm models.

2. Models with firm heterogeneity have improved our understanding of the mechanisms through which economies respond to trade liberalization.

3. This increased understanding of the margins along which an economy adjusts to trade liberalization are important for evaluating the welfare effects of increased trade.
The Importance of Heterogeneity

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

5. Changes in trade policy induce intensive and extensive margin adjustments.

6. The effects of trade policy depend crucially on the composition of firms within industries.

7. Trade policy changes have distributional effects within industries.
Sources of Gains from Trade

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
Estimating the Effects of Inhibitors and Promoters of Trade

9. Allows for separate measures of the effects on intensive versus extensive margin responses.

References: Survey Papers


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