Trade Flows and Exchange Rates: Importers, Exporters and Products

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Introduction

- International trade takes place between firms (a buyer and seller) for a given product at a given price

- Longstanding literature on effects of trade shocks on intensive and extensive margins of trade (Krugman, 1979; Baldwin and Krugman, 1988; Melitz, 2003)

- Decomposing full buyer-seller-product relationship may provide a deeper understanding of trade flows

- May reveal new mechanisms through which trade shocks (i.e. exchange rate shocks) affect economies

Objectives and takeaways

1. Document aspects of trade flows using transaction-level trade data

   - New relationships and products traded within relationships are important drivers of short- and long-run trade flows

2. Empirical analysis highlights relationship between exchange rate and firm-to-firm relationship formation and evolution

   - Importance of heterogeneous responses

3. Rationalize data findings in model of international trade with endogenous matching between multi-product exporters and importers

4. Explore the response of the model to exchange rate shocks

   - Highlight a novel channel through which exchange rates affect trade flows and the important role of heterogeneity

Related literature

Extensive margins of trade

- Countries: Helpman, Melitz and Rubenstein (2008)
- New importers and exporters: Melitz (2003), Eaton, Kortum and Kramarz (2011)
- Products: Broda and Weinstein (2006), Chaney (2008), Arkolakis, Ganapati and Muendler (2019)

Importer-exporter linkages

- Matching and heterogeneity: Bernard, Moxnes and Ulltveit-Moe (2018), Eaton et al. (2016), Blum, Claro and Horstmann (2010), Martin, Mejean and Parenti (2020), Monarch and Schmidt-Eisenlohr (2017), Heise (2018)

**Disconnect between exchange rates and real trade variables**

- Incomplete pass-through: Campa and Goldberg (2005), Burstein and Gopinath (2014)
- Sticky prices, strategic complementarities and imported intermediates: Gopinath and Rigobon (2008); Gopinath and Itskhoki (2010), Amiti, Itskhoki and Konings (2014)
- Trade elasticities: Backus, Kenoe and McGrattan (2002), Corsetti, Dedola and Leduc (2005)

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Canadian import data

- CBSA data housed at Statistics Canada

- Data on every commercial shipment to Canada from July 2002 to August 2008

- Organized at the 10-digit Harmonized Item Commodity Description and Coding System (HS10) level $\rightarrow$ product defined at HS6 level

- Importer and exporter identifiers, shipment value

- Cut of data covering nine broad product categories (Devereux et al., 2017): 66 million observations; 71,000 unique importers; 297,100 exporters

- In a given year, $\sim$40,000 importers; $\sim$121,000 exporters

Import flows dominated by large Canadian importers and foreign exporters

Importers
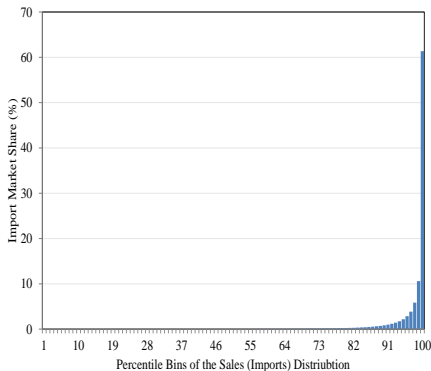
Exporters
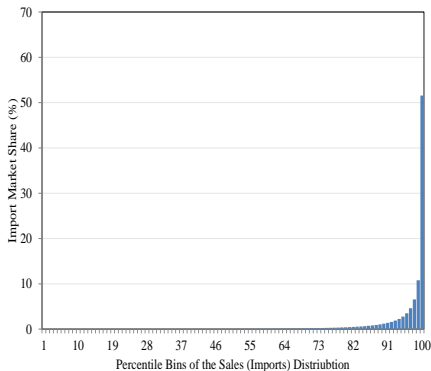
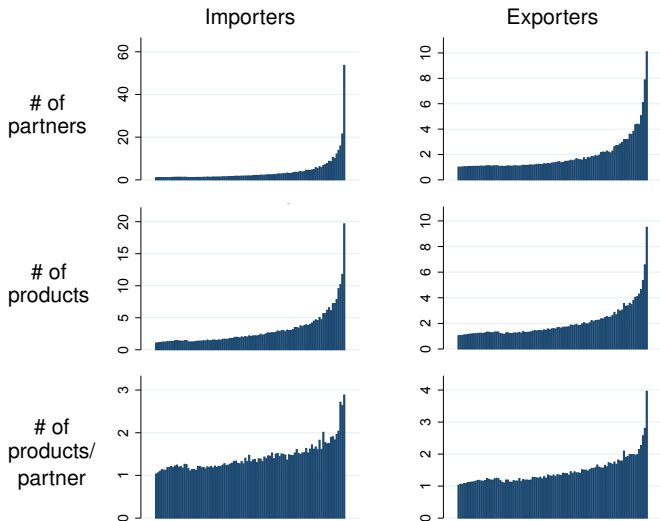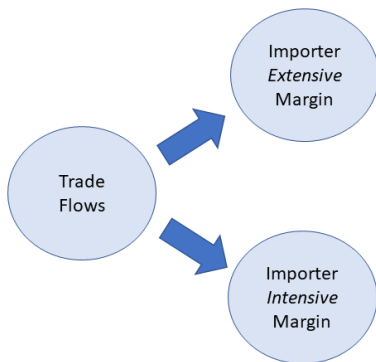- $\sim$400 importers account for 62% of imports, $\sim$1,200 exporters account for 52% in 2007
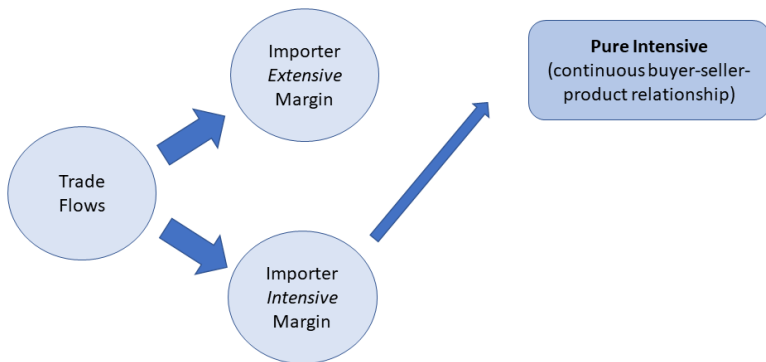
Larger firms have more trade partners, products and products/partner

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Decomposition of firm-level trade transactions

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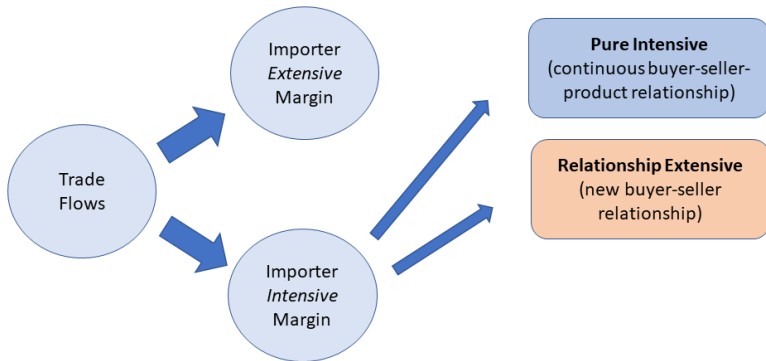
Decomposition of firm-level trade transactions

Importance of relationship and product margins

Panel A: Short-Run Contributions (quarterly, 2003:3-2008:2)

	Relationship extensive	Product extensive	Pure intensive
Share of trade transactions (%)	24.6	15.9	56.8
Share of trade value (%)	8.1	3.4	87.9

Panel B: Long-Run Contributions (annual, 2007 compared to 2003)

	Relationship + Product extensive	Pure intensive
Share of trade transactions (%)	70.4	29.6
Share of trade value (%)	53.7	46.3

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Empirical model

$$\Delta y_{it} = c + \beta \Delta ex_t + Z_t' \gamma + \rho time + \alpha_i + \theta_q + \epsilon_{it}$$

- i is either an importer or an importer-exporter relationship

- Δy_{it} (quarterly) takes on different meanings:

    1. change in number of importer trade partners
    2. change in number of importer products
    3. change in number of products per trade relationship

Relationship and product margins are sensitive to the exchange rate

	Dependent variable					
	Importer partners		Importer products		Relationship products	
	I	II	III	IV	V	VI
Exchange rate (Δex_t)	**0.153*****	**0.146*****	**0.149*****	**0.138*****	**0.060*****	**0.053*****
	(0.028)	(0.028)	(0.032)	(0.031)	(0.014)	(0.015)
Canadian GDP growth		0.695**		1.316***		0.930
		(0.285)		(0.321		(0.153)
Firm FE	Yes	Yes	Yes	Yes	No	No
B-S FE	No	No	No	No	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.042	0.042	0.059	0.059	0.145	0.145
Obs.	688,152	688,152	688,152	688,152	2,252,656	2,252,656

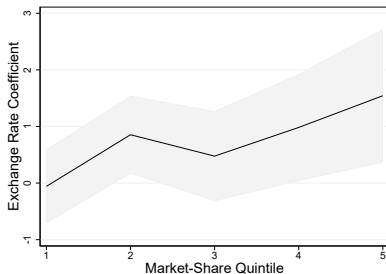## Larger firms react more to exchange rates

Approach 1:

$$\Delta y_{it} = c + \beta \Delta ex_t + \alpha_0 MS_{i,t-1} + \sum_{j}^{2} \left[\beta_j (\Delta ex_t \cdot MS_{i,t-1}^{i}) \right] + \epsilon_{it}$$

Approach 2:
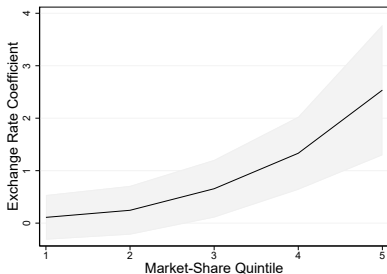

(a) Number of Partners   (b) Number of Products

Model overview

- Partial equilibrium model of import market with monopolistic competition

- Characterized by interaction between heterogeneous (Pareto distributed productivity) exporters/sellers and importers/buyers

- Multi-product exporters, higher production cost for products further from core competence (Arkolakis et al., 2019)

- Each seller chooses a measure of goods for each buyer (with a markup), incurs fixed cost for each buyer and product with a relationship

  - Cut-off points for new partners and products within relationship, generating endogenous matching and product selection

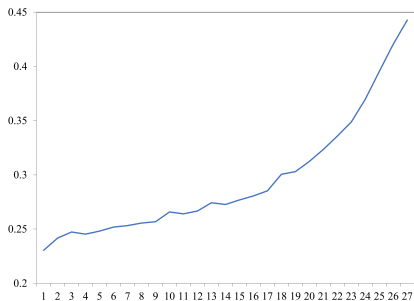- Exchange rate enters model as homogeneous (i.e. two-country model) per unit cost of production

Calibration and fit

1. Model discretized to 100 exporters, 32 importers and 8 products

2. Elasticities and Pareto shape drawn from literature

3. MSM to estimate fixed costs of new relationship and products, as well as the shape parameters for core competency function
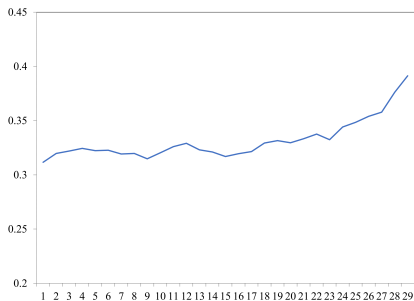

Importer market share

Importer trade partners
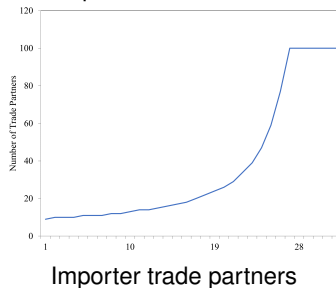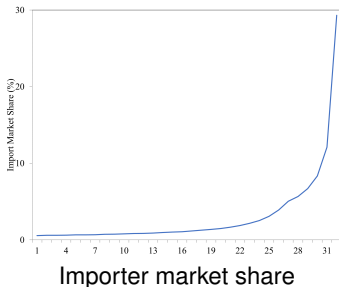
Isolating the exchange rate shock

- Response to exchange rate is positive and heterogeneous

Importer partners

Importer Product per partner

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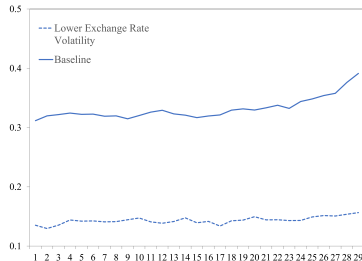0

Counterfactual exchange rate shock

- Lower variance of exchange rate draw by 50%

- Significant drop in the contributions from relationship and products margins (>50%)

- Larger reduction in the response of the larger firms highlights the role of fixed costs in adjustment process
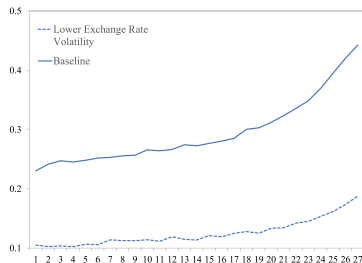
Importer partners

Importer products per partner

Summary

- Expansion along partner and product margins plays an important role in explaining import flows

- These margins are sensitive to movements in the exchange rate and aggregate response is driven by large firms

- These findings can be rationalized in a simple model with heterogeneous multi-product exporters and importers

- Data findings and model constitute a new channel through which exchange rates affect trade