

Assortative Matching of Exporters and Importers

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Research Agenda: Buyer-Supplier Relationships in International Trade

- The majority of international trade is buyer-supplier relationships [firm-to-firm or B-to-B].
- Anecdotes tell that not all trading partners are equal:
 - There are “good” and “bad” buyers/suppliers.
 - Trading with “good” buyers/suppliers bring several benefits (complementarity, technology spillover, network, reputation).
 - Both importers and exporters actively search for “good” partners.
- Research questions:
 - Who trade with “good” buyers/suppliers?
 - How do they match?

Today's talk: Capability Sorting of Exporters and Importers

- There exist large differences in capability (productivity/quality) among exporters and importers.
- Do high capability importers trade with high capability exporters?
 - Positive assortative matching (PAM), negative assortative matching (NAM), or no systematic sorting?
- Capability sorting is important for:
 - Understanding impact of trade liberalization.
 - Understanding consequences of trade frictions.
 - Designing export promotion policies.

Difficulties in Identifying Exporter-Importer Sorting

- A natural approach may be a correlation approach: calculate correlations of some measure of capability of exporters and importers across matches.
- However, this approach is not feasible/difficult for typical trade data:
 - Customs transaction data do not contain domestic sales, employment, or capital.
 - Multi-product firms: Data on product-level capability are rarely available.
 - No established method of estimating capability (e.g. TFP) when sorting exists.
 - Few to few matching: Correlations of size-related variables (e.g. trade volume) of exporters and importers could be mechanically positive.

What This Paper Does

- We examine capability sorting in matching of Mexican exporters and US importers in textile and apparel products.
- A new stylized fact: product-level matching is approximately one-to-one.
 - Evidence of the restriction on the number of partners.
 - which we take as exogenously given.
 - Matching is crucial for firms.
 - Correlation approach is difficult to apply.
- We develop an alternative approach to identifying capability sorting based on a theory and a natural experiment.

Theory: Becker-Melitz model

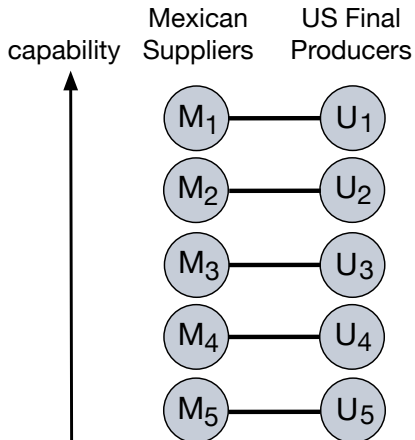
- “Becker+Melitz” matching model of suppliers (exporters) and final producers (importers)
 - Two-sided heterogeneity of suppliers and final producers a la Becker (73) and firm heterogeneity in capability a la Melitz (03).
 - Exogenous constraints on the number of trading partners (e.g. due to transaction costs) a la Becker (73).
 - Positive assortative matching (PAM) by capability due to complementarity.
 - We allow negative NAM and no systematic sorting.
- A key property: the stable matching depends on the distributions of firms.
 - Matching changes when new exporters enter (rematching).
 - How matching changes differs across PAM, NAM, and no sorting.
- Importantly, this rematching implies a new type of gains from trade.

Natural Experiment

- US removed import quota under the Multifibre Arrangement (MFA) at the end of 2004.
 - Massive entry of Chinese exporters in quota-bound products.
- We compare quota-bound and other products on how US and Mexican firms switch the main partners. We find:
 - US importers switched their Mexican partners to those making greater pre-shock exports.
 - Mexican exporters switched their US partners to those making fewer pre-shock imports.
 - These switches more frequently occurs in quota-bound products
- This pattern is consistent with PAM, but not with NAM or no sorting (under normal circumstances).

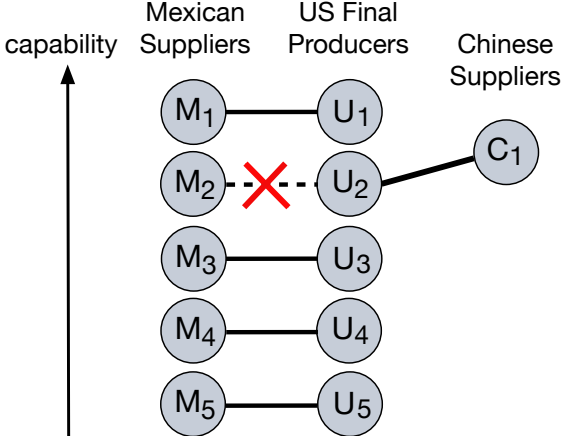
Thought experiment: Pre-shock

- Positive assortative matching holds.



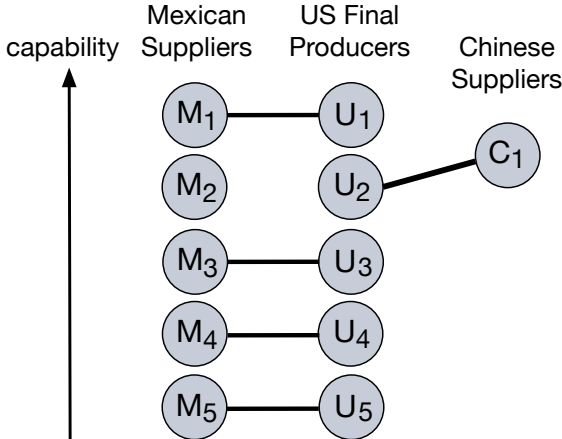
Entry of Foreign Suppliers

- Chinese firms enter and some US firms switch.



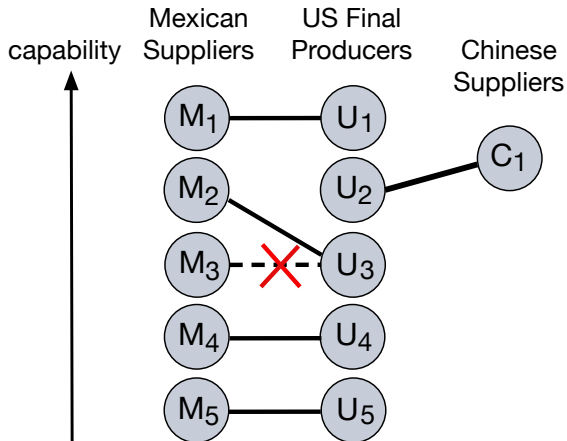
Existing Matching Becomes Unstable

- Some exporters are left without partners.



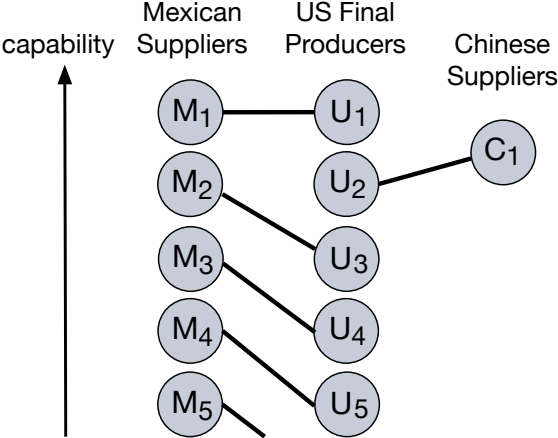
Adjustment to Shock: Re-matching

- Room for re-optimization for matching (re-matching).



Post-shock: Partner Upgrading and Downgrading

- Re-matching: partner upgrading for US and partner downgrading for Mex.



Data

Data

- Mexico's customs records for textile/apparel (HS50-63).
 - The identities of Mexican exporters and US importers, transaction value, product code (HS 6 digit).
- Excluded:
 - Exports by individuals and courier companies (e.g. FedEx).
 - Exporters who do not report importers for more than 80% of exports (mostly duty free zone trade, Maquiladora/IMMEX).
 - Transactions from January to May since data start from June 2004.
- US quota information.
 - Indicators on whether Chinese exports in each HS 6 product faced binding quotas by the US (created from the indicators by Brambilla et al.(10)).

Finding 1: Approximately One-to-one Matching

Main-to-Main Share

- Main-to-main match for a given product.
 - the exporter is the largest (main) seller for the importer of the product.
 - at the same time, the importer is the largest (main) buyer for the exporter of the product.
- Main-to-main share.

$$\text{Main-to-main share} = \frac{\text{Trade volume of main-to-main matches}}{\text{Aggregate trade volume}}$$

- If this main-to-main share is close to one, we call matching is approximately one-to-one.

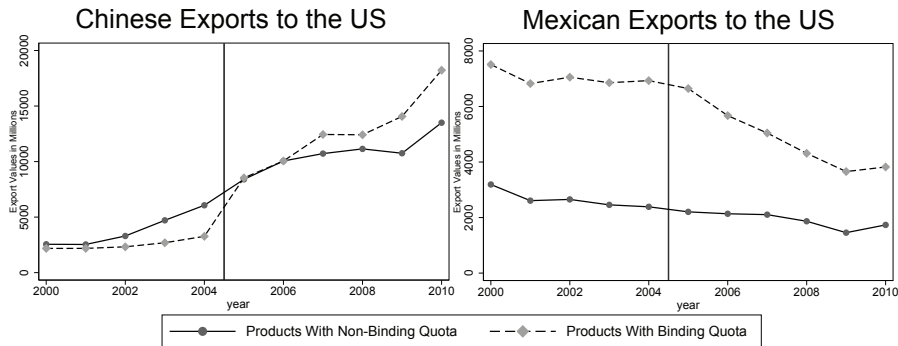
Main-to-Main Share: Aggregate Textile/Apparel

Year	All	Main-to-Main Share			
		Processing Trade		Trade Protection	
		Maquila	Non-Maquila	MFA Quota-bound	Quota-free
2004	0.77	0.77	0.78	0.78	0.80
2005	0.79	0.79	0.79	0.82	0.79
2006	0.80	0.80	0.83	0.81	0.82
2007	0.83	0.83	0.83	0.84	0.85

Finding 2: Systematic Re-matching

The End of the Multi-Fibre Arrangement

- The US removed import quotas on certain textile/apparel products from non-NAFTA countries in January 1, 2005.
- The increase in Chinese exports reduced other countries' exports to the US (Brambilla, Khandelwal and Schott 10; Harrigan and Barrows 09).



- The increase is driven by new Chinese exporters who have various capabilities (Khandelwal, Schott and Wei, 13) $\Rightarrow dM_C > 0$ in our model.

Upgrading and Downgrading Dummies

- For HS6 product, we rank exporters and importers by their pre-shock (2004) trade volume with the main partners, respectively.
- For firm i , HS6 product g and country $c \in \{US, Mex\}$, we construct the following dummies:
 - $Upgrading_{ig}^c = 1$ if the 2007 main partner of product g for firm i in country c has a higher rank than the 2004 main partner.
 - $Downgrading_{ig}^c = 1$ if the 2007 main partner of product g for firm i in country c has a lower rank than the 2004 main partner.
 - Note: these dummies are zero if a firm does not change the main partner between the two periods.

Specification

For firm i , HS6 product g , chapter (HS 2 digit) s , our specification is

$$\text{Upgrading}_{igs}^{US} = \beta_1 \text{Binding}_{gs} + \lambda_s + \varepsilon_{igs}^u$$

$$\text{Downgrading}_{igs}^{US} = \beta_2 \text{Binding}_{gs} + \lambda_s + u_{igs}^u$$

$$\text{Upgrading}_{igs}^{Mex} = \beta_3 \text{Binding}_{gs} + \lambda_s + \varepsilon_{igs}^m$$

$$\text{Downgrading}_{igs}^{Mex} = \beta_4 \text{Binding}_{gs} + \lambda_s + u_{igs}^m.$$

- Binding_{gs} is a dummy variable on whether Chinese exports of product g to the US faced a binding quota in 2004.
- λ_s is a HS 2 digit fixed effect; $\varepsilon_{igs}^u, u_{igs}^u, \varepsilon_{igs}^m, u_{igs}^m$ are error terms.
- The model predicts that $\beta_1 > 0, \beta_2 = 0, \beta_3 = 0, \beta_4 > 0$.

US Importer's Partner Changes

$$\text{Upgrading}_{igs}^{US} = \beta_1 \text{Binding}_{gs} + \lambda_s + \varepsilon_{igs}^u$$

$$\text{Downgrading}_{igs}^{US} = \beta_2 \text{Binding}_{gs} + \lambda_s + u_{igs}^u$$

	<i>Upgrading</i> ^{US} (β_1)		<i>Downgrading</i> ^{US} (β_2)	
	Linear Prob.	Probit	Linear Prob.	Probit
	(1)	(2)	(3)	(4)
Binding	0.052** (0.021)	0.052*** (0.020)	-0.017 (0.027)	-0.017 (0.024)
HS2 FEs	Yes	Yes	Yes	Yes
Obs.	718	707	718	707

significance: *** 1%; ** 5%; * 10%; SE clustered at HS6

- Average probability of upgrading in sample = 0.03.

Mex Exporter's Partner Change

$$Upgrading_{igs}^{Mex} = \beta_3 Binding_{gs} + \lambda_s + \varepsilon_{igs}^m$$

$$Downgrading_{igs}^{Mex} = \beta_4 Binding_{gs} + \lambda_s + u_{igs}^m.$$

	$Upgrading^{Mex} (\beta_3)$		$Downgrading^{Mex} (\beta_4)$	
	Linear Prob.	Probit	Linear Prob.	Probit
	(1)	(2)	(3)	(4)
Binding	-0.003	-0.003	0.127***	0.150***
	(0.020)	(0.044)	(0.035)	(0.019)
HS2 FEs	Yes	Yes	Yes	Yes
Obs.	601	522	601	601

significance: *** 1%; ** 5%; * 10%; SE clustered at HS6

- Average probability of downgrading in sample = 0.15.

Robustness Checks and Additional Analysis

- Alternative ending periods.
- Alternative ranking based on total trade volume and unit price.
- Additional controls (Maquiladora share, initial ranks, locations, material types).
- Placebo checks for 2007-11 and 2009-11.
 - No differential background trend between the treatment and control.
- The paper does additional analysis to reject alternative explanations:
 - Survival bias+repeated random matching.
 - Segment switching.
 - Negative assortative matching.

Summary

- Natures of trade data make it difficult to directly document capability sorting of exporters and importers.
- We have developed an alternative approach for identifying capability sorting: Becker-Melitz model with a natural experiment.
 - Rematching in response to a shock to increase the mass of suppliers.
- The rematching pattern of the Mexico-US apparel trade at the end of the Multi-Fibre Arrangement we have found:
 - Exporter-importer matching is positive assortative on capability.
 - This suggests that trade liberalization improves matching of firms in the world.

Implications of Our Findings

- Importance of matching for firms.
 - We confirm the premise of the literature on information frictions causing mis-matching (e.g. Casella & Rauch, 02; Rauch & Casella, 03; Rauch & Trindade, 03).
 - Investigating the roles of friction in the light of matching will be important future research.
- “Good buyers” and “bad buyers” (e.g. Chaney, 14).
 - Every exporter prefers to trade with high capable importers, but only high capable exporters can do so.