Trade Policy and the Structure of Supply Chains

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Big Picture Questions

- Offshoring and global value chains important and growing
- How do firms structure their sourcing relationships?
  - American style: low price plus monitoring
  - Japanese style: high price with repeated interactions
- What is the effect of trade policy on these relationships?
  - Reduction in uncertainty between U.S. and China
  - Impact on types of relationships
  - Impact on prices and welfare
Main Contributions

- Model of sourcing style with trade policy
- Reduced-form evidence on sourcing styles
  - American vs. Japanese
  - Impact of reduction in policy uncertainty
- Structural estimates of effects uncertainty has on welfare
  - More long-term, Japanese-style relationships
  - Lower input costs
Model overview

- N countries with consumers with Dixit-Stiglitz preferences over a continuum of varieties indexed by $j$

Buyers/importers

- Perfect competition
- Source domestically or offshore

Suppliers can exert costly effort to produce high quality good

Buyers choose supplier/system to minimize cost

- Japanese: efficiency price and repeated interactions
- American: lowest cost supplier and costly inspections
- Choose: 1) optimal order size and number of shipments; 2) optimal system
- Lowest cost supplier per product and period

- Infinitely repeated, static equilibrium
Model predictions

- Optimal shipment size larger under AS
  - Fixed cost to inspect independent of quantity
  - Inspection cost depends on product complexity
- AS always chosen when inspections costs are zero/low
  - Quality perfectly observable
  - Perfect mapping between effort and quality
- Increase in probability of trade peace leads to
  - Decreased costs of JS sourcing
  - Increase in optimal order size under JS (no effect on AS)
- More supplier switching under the AS
  - No value to repeated interactions under AS
  - Fixed cost of switching only under JS
- Trade costs are all fixed
New descriptive statistics on sourcing styles

- Construct importer-product-country-mode bins
- Classify as AS if $\Sigma \#suppliers / \Sigma \#shipments > 90^{th}$ ptile
  - Percentiles of suppliers/shipment within product-mode pairs
  - In model, importer sources each product from lowest-cost supplier
  - Expect more switching over time in AS
- Show that VPS and WBS higher for AS imports, while P lower
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- Show that VPS and WBS higher for AS imports, while P lower
- But, do relationship length predictions hold?
- Other determinants of the number of suppliers per buyer?
  - Risk diversification (more buyers for larger, less frequent orders)
  - Customization (fewer buyers and more frequent/smaller orders)
  - IP protection concerns (more relevant for longer product life-cycles)
- More convincing to use time series variation in SPS counts
Want more information on sourcing styles!

- How much trade occurs via JS and AS
  - JS in pre-PNTR: 4.4% for China, 8.6% for World, 11.1% for Japan
  - How much does AS constitute?
  - How do these quantities change over time?

- How do average product characteristics differ by type?
  - Customized versus not? (Nunn share of differentiated inputs; Fort share of plants purchasing CMS; Rauch indicator of how sold)
  - Potential for quality differences? (Khandelwal quality ladders)

- How do average country characteristics differ by type?
  - Trust (as in Bloom et al. 2012)
  - Contract enforcement
  - Human capital

- How much might be mechanical?
  - Show decomposition similar to BJRS
    \[ \ln P = \ln \# \text{Suppliers} + \ln \text{Ship/Supp} + \ln \text{VPS} - \ln Q \]
Role of trade policy uncertainty in sourcing styles

- Exploit reduction in uncertainty from Chinese accession to WTO
- Triple difference comparing imports
  - From China to those from the rest of World
  - In the pre-WTO period (1995-2001) to Post-WTO (2001-2007)
  - Of HS8 products with a lot water to those with a little
Reduction in trade policy uncertainty

Table 4: PNTR and procurement

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Within Importer-Product</th>
<th>Within Importer-Product</th>
<th>Within Importer-Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(Value per Shipment)</td>
<td>−0.07***</td>
<td>−0.05***</td>
<td>−0.17****</td>
</tr>
<tr>
<td></td>
<td>0.01</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>ln(Quantity per Shipment)</td>
<td>−0.13***</td>
<td>−0.04**</td>
<td>−0.04</td>
</tr>
<tr>
<td></td>
<td>0.02</td>
<td>0.02</td>
<td>0.10</td>
</tr>
<tr>
<td>ln(Price per Shipment)</td>
<td>0.04**</td>
<td>−0.04**</td>
<td>−0.11</td>
</tr>
<tr>
<td></td>
<td>0.02</td>
<td>0.02</td>
<td>0.09</td>
</tr>
<tr>
<td>ln(Weeks between Shipments)</td>
<td>−0.04</td>
<td>−0.06***</td>
<td>−0.56****</td>
</tr>
<tr>
<td></td>
<td>0.03</td>
<td>0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>ln(Overall Relationship Length)</td>
<td>0.10****</td>
<td>0.00</td>
<td>−0.54****</td>
</tr>
<tr>
<td></td>
<td>0.04</td>
<td>0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>Observations</td>
<td>752,600</td>
<td>1,011,700</td>
<td>324,300</td>
</tr>
<tr>
<td>Sample</td>
<td>mxhcp</td>
<td>mhcp</td>
<td>mcp</td>
</tr>
<tr>
<td>Fixed Effects</td>
<td>mxh,c,p</td>
<td>mh,c,p</td>
<td>h,c,p</td>
</tr>
</tbody>
</table>

- Results consistent with switching
- What about SPS in columns 2 and 3?
More definitive evidence on the mechanisms

- Evidence on whether switching occurs for existing relationships
- Do model predictions hold for imports that remain JS or AS?
  - JS: opposite effects
  - AS: no effects
- Evidence of a differential impact depending on complexity
  - Complexity affects inspection costs
  - Switching should increase in complexity
Tying this into the bigger picture

- Cool new paper delving into buyer-supplier relationships
- Key point: repeated interactions have future benefits
  ▶ These benefits can lead to more efficient results today
  ▶ Trade policy uncertainty diminishes value of future benefits
- Relational contracts important for ownership decisions
  ▶ Kukharskyy (JIE, 2016)
- How likely are trade wars?
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