

Trade Liberalization and Engagement in Global Value Chains

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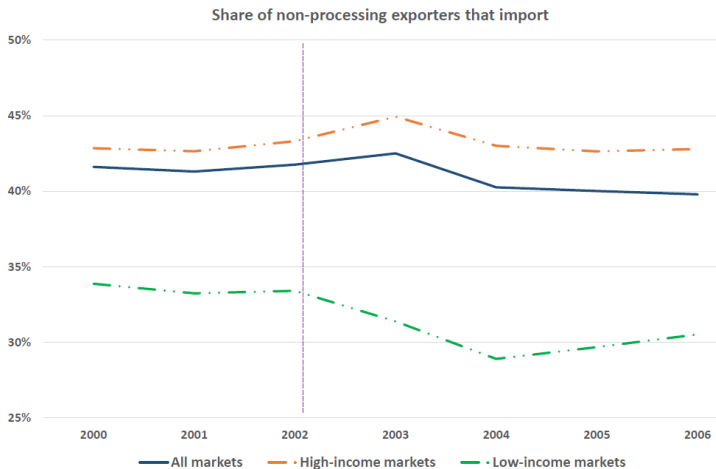
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Motivation

- Since its WTO accession in December 2001, China has unilaterally reduced tariffs on imports. Imports of intermediate inputs tripled between 2000 and 2006.
- China's role in global supply chain trade has increased enormously and become the hub in “Asian Factory” (Baldwin and Lopez-Gonzales, 2013).
 - China accounts for about 11% of global intermediate exports, and 13% of global intermediate imports.

Share of non-processing exporters that import



Questions

Does trade liberalization promote firms' participation in global value chains?

- How do input tariff reductions affect a firm's decision on the global sourcing of their intermediate inputs?
- What is the direct impact of intermediate import on a firm's decision about export and domestic sales?
- Does global sourcing of intermediate inputs by upstream firms facilitate export by downstream firms through the input-output linkage?

Matched firm-trade data from China for 2000-2006

- Firm survey data from the National Bureau of Statistics
 - all state enterprises and large- and medium-sized non-state enterprises in the manufacturing sector
 - contact information, employment, capital-labor ratio, value added, firm age, sales, export value, intermediate inputs, wages
- Trade data from Chinese Customs
 - import and export transactions at the 8-digit HS level (total value and quantity, trading partners, processing vs. ordinary)
 - contact information for the firm

Main empirical findings

- Import response to tariff cuts:
 - A 10 percentage point reduction in tariffs increases the total value of intermediate imports by 11.9%, and the unit value by 18%.
- Import, export and domestic sales:
 - Firms that import more intermediates significantly increase their domestic sales, but slightly reduce their export.
- Input-output linkage and export by downstream firms:
 - More domestic sales by importers in upstream industries significantly increase the value of export by firms in downstream industries.

Related literature

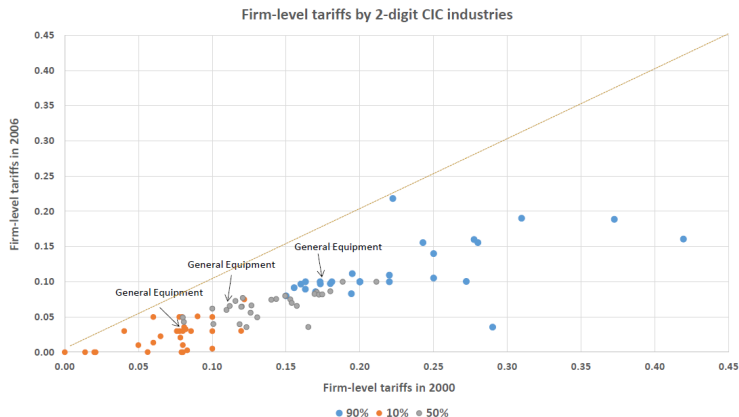
- Intermediate imports as a source of advanced technology for developing countries
 - import and firm productivity: Amiti and Konings (2007)
 - import and production scope: Goldberg et al. (2010)
- Input-output linkage
 - economic development: Jones (2011)
 - skill bias of technical change: Voigtländer (2014)
 - technology adoption and trade: Eslava, Fielder and Xu (2014)

Trade liberalization in China

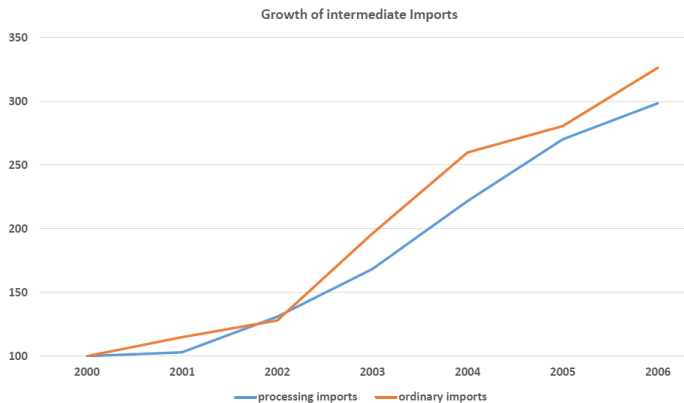
- “Dual track” trading regime: an open trade regime for foreign firms and processing traders, and a restrictive regime for ordinary traders. Feenstra (1998) called it “one country, two systems.”
- China joined the WTO in December 2001. As a commitment to the WTO accession, China agreed to lower its average tariff levels on industrial products to 8.9%, and to eliminate all quotas, licenses, and other non-tariff barriers to imports of manufacturing goods by 2005.

Trade liberalization in China

Firm-level tariffs: $\tau_{it} = \sum_{g=1}^{G_i} \tau_{gt} / G_i$



Growth of intermediate imports



Import response to tariff cuts

Table 4: Intermediate imports in response to tariff cuts

| | log_m | log_p | log_q | entry | exit |
|--------------------------------|-----------------------|------------------------|------------------------|---------------------------|--------------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Tariff x Ordinary import dummy | -1.189*** (0.193) | -1.800*** (0.102) | 0.611*** (0.203) | -0.320*** (0.0131) | 0.270*** (0.0271) |
| Ordinary import dummy | -0.849*** (0.0243) | 0.478*** (0.0163) | -1.327*** (0.0289) | 0.0468*** (0.00151) | 0.0959*** (0.00313) |
| Log (real exchange rate) | -0.0911** (0.0396) | -0.204*** (0.0271) | 0.113** (0.0447) | -0.0608*** (0.00767) | -0.0173** (0.00764) |
| Domestic firm | 0.240*** (0.0261) | 0.0521** (0.0207) | 0.188*** (0.0295) | 0.0124*** (0.00244) | 0.0961*** (0.00411) |
| Log(TFP) | 0.118*** (0.00771) | 0.0535*** (0.00812) | 0.0644*** (0.00950) | -0.00218*** (0.000587) | -0.00174 (0.00110) |
| Log(labor) | 0.0994*** (0.0109) | 0.102*** (0.00997) | -0.00250 (0.0120) | 0.00889*** (0.000675) | -0.0131*** (0.00126) |
| Log(capital/labor) | 0.169*** (0.00685) | 0.153*** (0.00584) | 0.0165** (0.00815) | 0.00102* (0.000573) | 0.00857*** (0.000897) |
| Log(average wage) | 0.177*** (0.0128) | 0.225*** (0.0132) | -0.0479*** (0.0158) | 0.00381*** (0.00120) | -0.0261*** (0.00191) |
| Log(age) | -0.132*** (0.0142) | -0.0782*** (0.0127) | -0.0539*** (0.0168) | -0.0606*** (0.00182) | -0.00526** (0.00205) |
| product FE | yes | yes | yes | yes | yes |
| country FE | yes | yes | yes | yes | yes |
| year FE | yes | yes | yes | yes | yes |
| Observations | 3,349,174 | 3,349,174 | 3,349,174 | 6,573,405 | 3,019,992 |
| R-squared with FE | 0.240 | 0.617 | 0.483 | 0.0302 | 0.0749 |

Note : Robust standard errors in parentheses. Standard errors are clustered at the firm level.

*** p<0.01, ** p<0.05, * p<0.1

Import response to tariff cuts - core input

Table 5: Imports of core intermediate inputs in response to tariff cuts

| | log_m | log_p | log_q | entry | exit |
|--------------------------------|-----------------------|-------------------------|-----------------------|--------------------------|--------------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Tariff x Ordinary import dummy | -1.703*** (0.219) | -0.988*** (0.106) | -0.715*** (0.227) | -0.206*** (0.0163) | 0.229*** (0.0435) |
| Ordinary import dummy | -1.035*** (0.0258) | 0.220*** (0.0133) | -1.255*** (0.0283) | 0.0187*** (0.00157) | 0.0773*** (0.00404) |
| Log (real exchange rate) | -0.0900* (0.0503) | -0.146*** (0.0256) | 0.0561 (0.0551) | -0.0193** (0.00774) | -0.0166 (0.0123) |
| Domestic firm | -0.223*** (0.0209) | 0.110*** (0.0145) | -0.333*** (0.0253) | 0.0129*** (0.00171) | 0.0918*** (0.00466) |
| Log(TFP) | 0.179*** (0.00701) | 0.0414*** (0.00538) | 0.137*** (0.00882) | -0.00115* (0.000690) | -0.00843*** (0.00163) |
| Log(labor) | 0.194*** (0.00870) | 0.0636*** (0.00633) | 0.130*** (0.0105) | 0.00413*** (0.000740) | -0.00127 (0.00186) |
| Log(capital/labor) | 0.215*** (0.00663) | 0.0648*** (0.00487) | 0.150*** (0.00796) | 0.000884 (0.000625) | -0.000721 (0.00146) |
| Log(average wage) | 0.245*** (0.0120) | 0.151*** (0.00914) | 0.0938*** (0.0141) | -0.000579 (0.00129) | -0.0280*** (0.00297) |
| Log(age) | -0.167*** (0.0128) | -0.0427*** (0.00901) | -0.125*** (0.0149) | -0.0486*** (0.00134) | -0.000747 (0.00311) |
| product FE | yes | yes | yes | yes | yes |
| country FE | yes | yes | yes | yes | yes |
| year FE | yes | yes | yes | yes | yes |
| Observations | 335,845 | 335,845 | 335,845 | 655,599 | 285,505 |
| R-squared with FE | 0.270 | 0.758 | 0.540 | 0.0505 | 0.0956 |

Note : Robust standard errors in parentheses. Standard errors are clustered at the firm level.

*** p<0.01, ** p<0.05, * p<0.1

Import, export and domestic sales

Table 6: Imports, exports, and domestic sales

| | Log(export) | Log(domestic sales) | Exports/ Total sales |
|----------------------|-------------------------|------------------------|--------------------------|
| | (1) | (5) | (6) |
| Intermediate imports | -0.0232*** (0.00327) | 0.0315*** (0.00365) | -0.0107*** (0.000781) |
| Domestic firm | -0.474*** (0.0129) | 0.511*** (0.0148) | -0.194*** (0.00305) |
| Log(TFP) | 0.296*** (0.00417) | 0.491*** (0.00423) | -0.0292*** (0.000956) |
| Log(labor) | 0.583*** (0.00541) | 0.488*** (0.00554) | 0.0307*** (0.00122) |
| Log(capital/labor) | 0.117*** (0.00520) | 0.349*** (0.00551) | -0.0435*** (0.00119) |
| Log(average wage) | 0.149*** (0.00963) | 0.110*** (0.0105) | 0.0301*** (0.00221) |
| Log(age) | -0.234*** (0.00623) | -0.138*** (0.00628) | -0.0168*** (0.00143) |
| Industry FE | yes | yes | yes |
| year FE | yes | yes | yes |
| Observations | 138,561 | 142,260 | 173,126 |
| R-squared | 0.282 | 0.473 | 0.198 |

Note : Robust standard errors in parentheses. Standard errors are clustered at the firm level.

*** p<0.01, ** p<0.05, * p<0.1

Intensity of domestic sales by ordinary importers in upstream industries

- The intensity of domestic sales by ordinary importers in upstream industries is $\sigma_{it} = \sum_j a_{ij} S_{jt}$
 - $a_{ij} = X_{ij} / \sum_j X_{ij}$ is the intermediate input share, where X_{ij} represents industry i 's input purchase from industry j .
 - S_{jt} is the ratio of domestic sales by ordinary importers over domestic sales by all firms in industry j in year t .

Intensity of domestic sales by ordinary importers in upstream industries

Intensity of domestic sales by ordinary importers

| | S_{it} (own industry) | | σ_{it} (upstream industries) | |
|------|-------------------------|---------|-------------------------------------|---------|
| | mean | std dev | mean | std dev |
| 2000 | 0.198 | 0.115 | 0.127 | 0.077 |
| 2001 | 0.209 | 0.125 | 0.132 | 0.074 |
| 2002 | 0.215 | 0.124 | 0.138 | 0.077 |
| 2003 | 0.228 | 0.125 | 0.148 | 0.082 |
| 2004 | 0.224 | 0.143 | 0.142 | 0.077 |
| 2005 | 0.221 | 0.144 | 0.136 | 0.072 |
| 2006 | 0.215 | 0.132 | 0.134 | 0.069 |

Input-output linkage and export by downstream firms

Table8: Input-output linkage and export by downstream firms

| | Log(export) | Log(export) | Log(export) |
|---|-------------------------|-------------------------|-------------------------|
| | (1) | (2) | (3) |
| Domestic sales by upstream importers | 1.113*** (0.186) | | |
| Domestic sales by upstream importers (exclude own industry) | | 1.653*** (0.154) | |
| Domestic sales by importers in own industry | | | 0.398*** (0.0770) |
| Intermediate imports | -0.0181*** (0.00330) | -0.0160*** (0.00331) | -0.0199*** (0.00332) |
| Own industry import intensity | -5.245*** (0.248) | -5.185*** (0.247) | -5.262*** (0.250) |
| Domestic firm | -0.457*** (0.0129) | -0.449*** (0.0129) | -0.465*** (0.0130) |
| Log(TFP) | 0.299*** (0.00413) | 0.298*** (0.00413) | 0.299*** (0.00413) |
| Log(labor) | 0.575*** (0.00547) | 0.573*** (0.00546) | 0.576*** (0.00548) |
| Log(capital/labor) | 0.119*** (0.00512) | 0.118*** (0.00511) | 0.120*** (0.00513) |
| Log(average wage) | 0.147*** (0.00952) | 0.141*** (0.00953) | 0.151*** (0.00954) |
| Log(age) | -0.235*** (0.00620) | -0.233*** (0.00620) | -0.236*** (0.00621) |
| Industry FE | yes | yes | yes |
| Year FE | yes | yes | yes |
| Observations | 138,431 | 138,431 | 138,431 |
| R-squared | 0.288 | 0.290 | 0.287 |

Note : Robust standard errors in parentheses. Standard errors are clustered at the firm level.

*** p<0.01, ** p<0.05, * p<0.1

Conclusion

We provided evidence that trade liberalization promotes engagement in global value chains through the input-output linkage along domestic value chains.

- Ordinary importers substantially increase their intermediate imports in response to tariff cuts: a 10 percentage point reduction in tariffs increases the total value of intermediate imports by 11.9%, and the unit value by 18%.
- Firms that import more intermediates increase their domestic sales significantly.
- More domestic sales by importers in upstream industries significantly increase the value of export by firms in downstream industries.