

THE GLOBAL PRODUCTION LINE POSITION OF CHINESE FIRMS

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Motivation

- Fragmentation of production across countries a key trend in international trade over last two decades
 - Rise in trade in intermediate inputs for further processing and assembly relative to trade in final consumer goods
 - Growing multinational activity and cross-border linkages
- Splicing of **global production chains** raises new policy questions
 - How should trade policy be designed?
 - What are the welfare and distributional consequences of global supply chains and policies that govern them?
 - How are firm growth, technology transfer to emerging economies and transmission of shocks across borders affected?

This Paper

- Understand where, how and why Chinese firms operate along the global production chain
- China provides ideal context to shed light on policy questions
 - Firms' participation in global production networks a driving force behind China's rise as world's largest exporter
 - Government policy actively encourages firms' engagement in global value chains (c.f. Manova and Yu 2013)

Overview

- Characterize Chinese firm's global production line position using detailed firm-level customs data, balance sheets and I-O tables
 - **GPLP** = upstreamness of firms' exports and imports
 - **Upstreamness** = number of production stages between an industry and final demand (c.f. Fally 2012; Antràs, Chor, Fally, Hillberry 2012)
- Uncover novel stylized facts about Chinese firms' GPLP
 - Aggregate evolution during 1992-2011 and over firms' life cycle
 - Variation across ownership types and trade regimes
 - Correlations with key firm characteristics: productivity, age, size, capital and skill intensity, total sales and exports

Contribution

- Growing interest in understanding global value chains
 - Costinot et al. (2013): cross-country productivity differences affect which production stages countries specialize in
 - Antràs and Chor (2013), Alfaro, Antràs, Chor, Conconi (2015): production line position influences firms' optimal sourcing strategy in-house vs. arms'-length
 - Manova and Yu (2013): credit constraints shape Chinese firms' choice of trade regime
 - Kee and Tang (2014): domestic value added of China's processing exports increased substantially from 2000 to 2006
- The stylized facts that we uncover can help inform models of the determinants and consequences of global value chains

Data

- Trade data (Chinese Customs Transaction Statistics)
 - Value and quantity of exports and imports
 - Firm-level data 2000-2011 (firm, country, HS8 product, regime)
 - City-level data 1997-1999 (city, country, HS8 product, regime)
 - Province-level data 1992-1996 (province, country, HS6 product, regime)
- Balance sheet data (Annual Survey of Industrial Firms)
 - All state-owned enterprises and all private companies with sales >5mil Chinese Yuan, 1999-2007
 - Firm attributes (age, ownership, primary GBT4 industry), size (output), inputs to production (employment, wage, fixed assets, interm inputs)

Data

- Matched CCTS-ASIF data, 2000-2007
 - Match on firm names and contact information (Wang and Yu 2012)
 - Large and representative matched sample: ~220,000 firm-year observations (exporter-importers) and ~70% of exports in ASIF
- Chinese Input-Output table
 - 135 IO sectors in 2007

Industry Upstreamness

- Following Fally (2012) and Antras et al. (2012), the upstreamness of industry i is defined as

$$U_i = 1 \times \frac{F_i}{Y_i} + 2 \times \frac{\sum_{j=1}^N d_{ij} F_j}{Y_i} + 3 \times \frac{\sum_{j=1}^N \sum_{k=1}^N d_{ik} d_{kj} F_j}{Y_i} + 4 \times \frac{\sum_{j=1}^N \sum_{k=1}^N \sum_{l=1}^N d_{il} d_{lk} d_{kj} F_j}{Y_i} + \dots$$

- Y_i = gross output of industry i
- F_i = final use of industry i
- d_{ij} = value of i needed to produce one yuan worth of j 's output
- d_{ij} adjusted for open economy and inventORIZATION
- Mean 3.16, st dev 1.12, range 1.00-5.86

10 Most and Least Upstream Industries

Social welfare (IO129)	1
Public administration and social organizations (IO135)	1.026
Construction (IO95)	1.058
Sports (IO133)	1.060
Public facilities management (IO123)	1.074
Education (IO126)	1.212
Convenience food manufacturing (IO18)	1.269
Health (IO127)	1.269
Software industry (IO107)	1.275
Resident services (IO124)	1.382

Nonferrous metal alloying and smelting (IO61)	4.877
Pipeline transportation (IO101)	5.023
Coking (IO38)	5.095
Ferrous metal mining industry (IO8)	5.114
Chemical fiber manufacturing (IO47)	5.162
Scrap waste (IO91)	5.256
Coal mining and washing industry (IO6)	5.345
Basic chemical raw materials manufacturing (IO39)	5.375
Oil and gas exploration industry (IO7)	5.508
Nonferrous metal mining industry (IO9)	5.861

Firm-level Upstreamness

- Measure the upstreamness of each firm's exports and imports as weighted average of industry upstreamness

$$U_{ft}^X = \sum_{i=1}^N \frac{X_{fit}}{X_{ft}} U_i, \quad U_{ft}^M = \sum_{i=1}^N \frac{M_{fit}}{M_{ft}} U_i,$$

- $X = \text{exports}$, $M = \text{imports}$
- $f = \text{firm}$, $i = \text{industry}$, $t = \text{year}$
- $U_i = \text{industry upstreamness}$

Firm-level Upstreamness

- Also measure the difference between each firm's export and import upstreamness

$$U_{ft}^X - U_{ft}^M = \sum_{i=1}^N \left(\frac{X_{fit}}{X_{ft}} - \frac{M_{fit}}{M_{ft}} \right) U_i, \quad (4)$$

- Capture span of production stages conducted by Chinese firms within China
- These production stages may not necessarily take place within firm boundaries
- production stages $\neq$ value added

Summary Statistics

Firm-Year Level, Entire Sample	2000-2011	2000	2011
Number of observations	2,290,090	81,995	310,869
Number of firms	570,897	81,995	310,869
Fraction, State-Owned Enterprise	0.05	0.18	0.03
Fraction, Joint Venture	0.13	0.38	0.09
Fraction, Foreign-Owned Enterprise	0.22	0.31	0.22
Fraction, Private Enterprise	0.60	0.13	0.66
Fraction, Trade Intermediary	0.22	0.13	---
Value of exports, Mean	5.96E+06 [8.68E+07]	3.97E+06 [4.15E+07]	7.45E+06 [1.07E+08]
Value of imports, Mean	7.04E+06 [1.75E+08]	3.59E+06 [5.20E+07]	1.11E+07 [2.87E+08]
Export upstreamness (U_X), Mean	3.285 [0.782]	3.245 [0.793]	3.309 [0.773]
Import upstreamness (U_M), Mean	3.606 [0.839]	3.564 [0.836]	3.624 [0.838]
$U_X - U_M$, Mean	-0.426 [0.902]	-0.462 [0.915]	-0.393 [0.882]

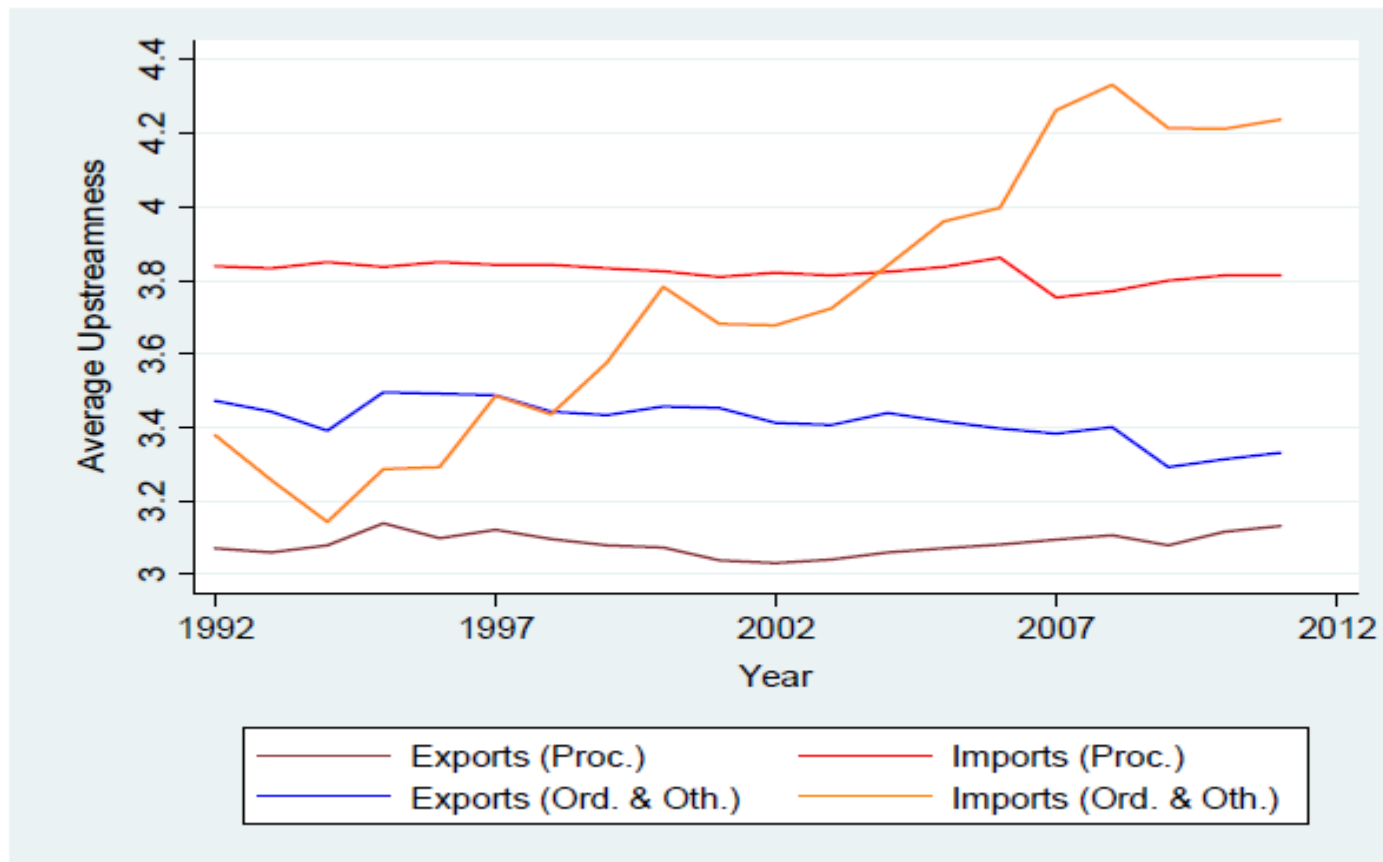
China's Production Line Position 1992-2011

- Exports systematically more downstream than imports
 - Export downstreamness stable over time, import upstreamness rising fast



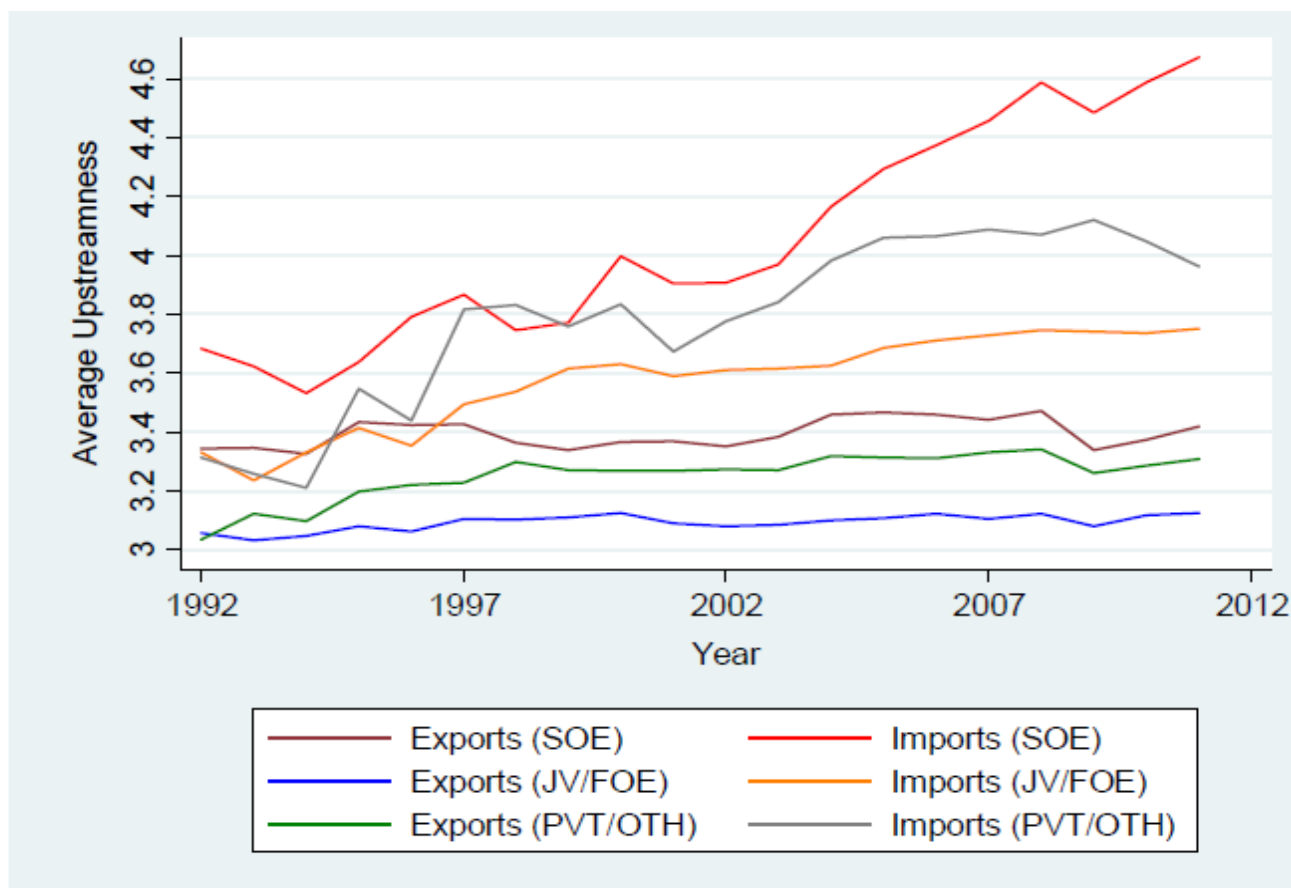
Broad Trends by Trade Regime

- Aggregate trends driven by ordinary trade rather than processing trade



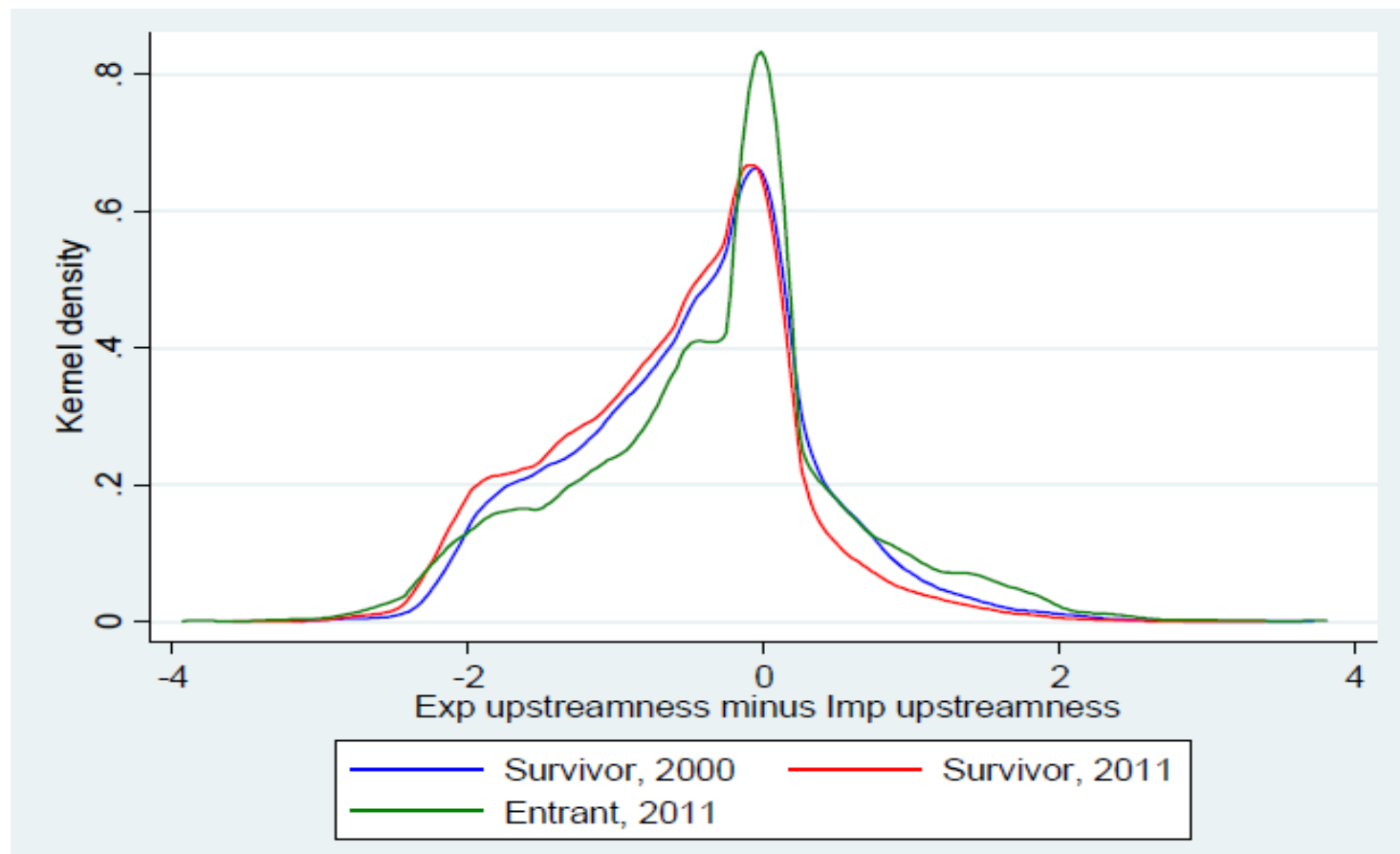
Broad Trends by Ownership Type

- Export and import upstreamness higher for SOEs than for private domestic companies than for foreign-owned firms



Entrant vs. Survivor Firms

- Entrants conduct fewer production steps than incumbents
 - Survivors expand span of productions stages over time



Estimation Approach

- Conditional correlations between firms' GPLP and firm characteristics in the cross-section and in the time-series

$$\{U_{ft}^X, U_{ft}^M, U_{ft}^X - U_{ft}^M\} = \alpha + \sum_{t=2001}^{2011} \beta_t YEAR_t + \Gamma Z_{ft} + \delta_c CITY_c + \varepsilon_{ft}, \quad (5)$$

$$\{U_{ft}^X, U_{ft}^M, U_{ft}^X - U_{ft}^M\} = \alpha + \sum_{t=2001}^{2011} \beta_t YEAR_t + \Gamma Z_{ft} + \delta_c CITY_c + \delta_i IND_i + \varepsilon_{ft}, \quad (6)$$

$$\{U_{ft}^X, U_{ft}^M, U_{ft}^X - U_{ft}^M\} = \alpha + \sum_{t=2001}^{2011} \beta_t YEAR_t + \Gamma Z_{ft} + \delta_f FIRM_f + \varepsilon_{ft}. \quad (7)$$

- $CITY_c$ = city FE
- IND_i = industry FE for firm's primary industry
- $FIRM_f$ = firm FE
- Z_{ft} = firm-year characteristics
- Conservatively cluster errors by firm

Time Trends

Dependent variable:	Export Upstreamness (U_X)			Import Upstreamness (U_M)			$U_X - U_M$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year, 2001	0.0016 [0.0023]	0.0024 [0.0015]	0.0005 [0.0018]	-0.0195*** [0.0033]	-0.0251*** [0.0033]	-0.0019 [0.0034]	0.0137*** [0.0041]	0.0137*** [0.0038]	0.0024 [0.0040]
Year, 2002	0.0103*** [0.0028]	0.0054*** [0.0018]	0.0016 [0.0021]	-0.0380*** [0.0037]	-0.0448*** [0.0037]	0.0070* [0.0038]	0.0343*** [0.0046]	0.0322*** [0.0042]	-0.0011 [0.0046]
Year, 2003	0.0089*** [0.0031]	0.0039** [0.0018]	-0.0004 [0.0022]	-0.0065* [0.0038]	-0.0208*** [0.0038]	0.0503*** [0.0039]	0.0290*** [0.0048]	0.0230*** [0.0043]	-0.0276*** [0.0048]
Year, 2004	0.0171*** [0.0032]	0.0050*** [0.0018]	-0.0027 [0.0023]	0.0138*** [0.0038]	-0.0023 [0.0038]	0.0879*** [0.0040]	0.0227*** [0.0049]	0.0123*** [0.0043]	-0.0576*** [0.0049]
Year, 2005	0.0182*** [0.0032]	0.0044** [0.0018]	-0.0049** [0.0024]	0.0483*** [0.0038]	0.0248*** [0.0038]	0.1286*** [0.0041]	0.0062 [0.0049]	-0.0050 [0.0043]	-0.0869*** [0.0051]
Year, 2006	0.0187*** [0.0033]	0.0022 [0.0018]	-0.0112*** [0.0024]	0.0561*** [0.0038]	0.0362*** [0.0038]	0.1517*** [0.0042]	0.0040 [0.0049]	-0.0113*** [0.0043]	-0.1061*** [0.0052]
Year, 2007	0.0281*** [0.0033]	0.0093*** [0.0018]	-0.0064*** [0.0025]	0.0703*** [0.0038]	0.0636*** [0.0038]	0.1962*** [0.0042]	-0.0076 [0.0050]	-0.0245*** [0.0043]	-0.1388*** [0.0053]
Year, 2008	0.0225*** [0.0033]	0.0048*** [0.0018]	-0.0130*** [0.0025]	0.0793*** [0.0038]	0.0747*** [0.0038]	0.2144*** [0.0043]	-0.0196*** [0.0050]	-0.0397*** [0.0043]	-0.1630*** [0.0053]
Year, 2009	0.0257*** [0.0034]	0.0081*** [0.0018]	-0.0127*** [0.0026]	0.1047*** [0.0039]	0.0923*** [0.0039]	0.2347*** [0.0044]	-0.0230*** [0.0050]	-0.0485*** [0.0043]	-0.1802*** [0.0055]
Year, 2010	0.0310*** [0.0034]	0.0102*** [0.0018]	-0.0120*** [0.0026]	0.0830*** [0.0039]	0.0749*** [0.0039]	0.2300*** [0.0044]	0.0063 [0.0050]	-0.0239*** [0.0043]	-0.1666*** [0.0055]
Year, 2011	0.0382*** [0.0034]	0.0127*** [0.0017]	-0.0105*** [0.0026]	0.0754*** [0.0039]	0.0715*** [0.0039]	0.2339*** [0.0044]	0.0206*** [0.0050]	-0.0147*** [0.0043]	-0.1659*** [0.0056]
Constant	3.2616*** [0.0031]	3.2159*** [0.0037]	3.2926*** [0.0022]	3.5559*** [0.0033]	3.3809*** [0.0136]	3.4534*** [0.0035]	-0.4310*** [0.0043]	-0.2111*** [0.0144]	-0.3173*** [0.0043]
Fixed effects	City	City, IO	Firm	City	City, IO	Firm	City	City, IO	Firm
Observations	1,846,666	1,846,666	1,846,666	1,348,126	1,059,210	1,348,126	904,702	904,702	904,702
R ²	0.0468	0.7542	0.8945	0.0445	0.1894	0.7608	0.0440	0.3191	0.7473

Time Trends

- **Across firms**, average export and import upstreamness increase over 2000-2011 period
 - Cumulative growth in export (import) upstreamness: 0.038 (0.075)
- **Within firms over time**, export upstreamness declines moderately, while import upstreamness rises sharply
 - Cumulative change within a representative firm is -0.015 for exports and 0.234 for imports
 - Gap between a firm's export and import upstreamness widens quickly over time

Time Trends

- Chinese companies **conduct more production stages** within China as they become more experienced in global trade
 - They do so by importing more upstream inputs and exporting slightly more downstream products
 - To do: adding new sectors vs. reallocation across sectors
 - To do: exporters' value added & share of imported inputs; non-exporters' upstreamness → more stages within firm vs. outsourcing to other Chinese firms
- Important role for the **extensive margin** of firm activity
 - Export entrants export more upstream than continuing exporters
 - Import entrants import more downstream than continuing importers

Firm Size, Trade Regime & Ownership

Dependent variable:	Export Upstreamness (U_X)			Import Upstreamness (U_M)			$U_X - U_M$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Exports	-0.0058*** [0.0005]	-0.0025*** [0.0002]	-0.0054*** [0.0004]	0.0047*** [0.0006]	0.0102*** [0.0005]	0.0232*** [0.0007]	-0.0204*** [0.0007]	-0.0139*** [0.0006]	-0.0302*** [0.0010]
Processing Trade (share in total exports)	-0.0059 [0.0042]	-0.0109*** [0.0016]	-0.0071** [0.0033]	0.2762*** [0.0041]	0.2332*** [0.0035]	0.0938*** [0.0049]	-0.2950*** [0.0049]	-0.2449*** [0.0037]	-0.1038*** [0.0059]
Foreign-Owned	-0.0943*** [0.0038]	-0.0102*** [0.0015]	---	-0.0905*** [0.0043]	-0.0504*** [0.0037]	---	0.0441*** [0.0050]	0.0467*** [0.0038]	---
Joint Venture	-0.0779*** [0.0046]	-0.0121*** [0.0016]	---	-0.0345*** [0.0050]	-0.0093** [0.0042]	---	-0.0099* [0.0060]	0.0000 [0.0044]	---
State-Owned	0.0899*** [0.0060]	0.0103*** [0.0033]	---	0.0498*** [0.0068]	0.0206*** [0.0061]	---	0.0591*** [0.0075]	0.0016 [0.0067]	---
Year dummies, Constant?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	City	City, IO	Firm	City	City, IO	Firm	City	City, IO	Firm
Observations	1,846,666	1,846,666	1,846,666	1,348,126	1,348,126	1,348,126	904,702	904,702	904,702
R ²	0.0509	0.7543	0.8946	0.0522	0.2116	0.7380	0.0636	0.3305	0.7489

Firm Size, Trade Regime & Ownership

- Firms with larger export revenues export more downstream, import more upstream, and conduct more production stages in China
 - Both across and within firms
- Firms that pursue more processing trade export more downstream, import more upstream, and conduct more production stages in China
 - Both across and within firms
- Foreign-owned firms operate more downstream than private domestic firms, and perform fewer production steps in China
 - SOEs operate more upstream than private domestic firms but span same number of production steps

Age

Dependent variable:	Export Upstreamness (U_X)			Import Upstreamness (U_M)			$U_X - U_M$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Exports	-0.0283*** [0.0015]	-0.0079*** [0.0011]	-0.0064*** [0.0015]	-0.0139*** [0.0013]	-0.0015 [0.0011]	0.0116*** [0.0018]	-0.0144*** [0.0015]	-0.0064*** [0.0014]	-0.0179*** [0.0023]
Processing Trade (share in total exports)	0.0685*** [0.0093]	-0.0294*** [0.0061]	-0.0002 [0.0067]	0.3885*** [0.0077]	0.3174*** [0.0066]	0.1658*** [0.0104]	-0.3199*** [0.0091]	-0.3468*** [0.0081]	-0.1660*** [0.0121]
Log (1+Age)	-0.0016 [0.0049]	-0.0097*** [0.0031]	-0.0062 [0.0059]	0.0516*** [0.0043]	0.0474*** [0.0035]	0.1248*** [0.0120]	-0.0532*** [0.0050]	-0.0571*** [0.0042]	-0.1311*** [0.0133]
Log Average wage	0.1211*** [0.0025]	0.0336*** [0.0017]	0.0001 [0.0014]	0.0029 [0.0021]	-0.0199*** [0.0018]	-0.0127*** [0.0026]	0.1183*** [0.0025]	0.0535*** [0.0023]	0.0128*** [0.0029]
Log Capital per worker	0.0111** [0.0052]	-0.0002 [0.0032]	-0.0007 [0.0017]	-0.0106** [0.0044]	-0.0120*** [0.0034]	0.0057* [0.0032]	0.0217*** [0.0049]	0.0118*** [0.0043]	-0.0064* [0.0036]
Year dummies,									
Constant?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ownership Dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	City	City, GBT	Firm	City	City, GBT	Firm	City	City, GBT	Firm
Observations	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008
R ²	0.0925	0.5785	0.9555	0.0775	0.3022	0.7969	0.1079	0.3057	0.8253

Factor Intensity

Dependent variable:	Export Upstreamness (U_X)			Import Upstreamness (U_M)			$U_X - U_M$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Exports	-0.0283*** [0.0015]	-0.0079*** [0.0011]	-0.0064*** [0.0015]	-0.0139*** [0.0013]	-0.0015 [0.0011]	0.0116*** [0.0018]	-0.0144*** [0.0015]	-0.0064*** [0.0014]	-0.0179*** [0.0023]
Processing Trade (share in total exports)	0.0685*** [0.0093]	-0.0294*** [0.0061]	-0.0002 [0.0067]	0.3885*** [0.0077]	0.3174*** [0.0066]	0.1658*** [0.0104]	-0.3199*** [0.0091]	-0.3468*** [0.0081]	-0.1660*** [0.0121]
Log (1+Age)	-0.0016 [0.0049]	-0.0097*** [0.0031]	-0.0062 [0.0059]	0.0516*** [0.0043]	0.0474*** [0.0035]	0.1248*** [0.0120]	-0.0532*** [0.0050]	-0.0571*** [0.0042]	-0.1311*** [0.0133]
Log Average wage	0.1211*** [0.0025]	0.0336*** [0.0017]	0.0001 [0.0014]	0.0029 [0.0021]	-0.0199*** [0.0018]	-0.0127*** [0.0026]	0.1183*** [0.0025]	0.0535*** [0.0023]	0.0128*** [0.0029]
Log Capital per worker	0.0111** [0.0052]	-0.0002 [0.0032]	-0.0007 [0.0017]	-0.0106** [0.0044]	-0.0120*** [0.0034]	0.0057* [0.0032]	0.0217*** [0.0049]	0.0118*** [0.0043]	-0.0064* [0.0036]
Year dummies, Constant?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ownership Dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	City	City, GBT	Firm	City	City, GBT	Firm	City	City, GBT	Firm
Observations	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008
R ²	0.0925	0.5785	0.9555	0.0775	0.3022	0.7969	0.1079	0.3057	0.8253

Size

Dependent variable:	Export Upstreamness (U_X)			Import Upstreamness (U_M)			$U_X - U_M$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<u>Firm Size measure:</u>									
Log Total Exports	-0.0283*** [0.0015]	-0.0079*** [0.0011]	-0.0064*** [0.0015]	-0.0139*** [0.0013]	-0.0015 [0.0011]	0.0116*** [0.0018]	-0.0144*** [0.0015]	-0.0064*** [0.0014]	-0.0179*** [0.0023]
Observations	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008
R ²	0.0925	0.5785	0.9555	0.0775	0.3022	0.7969	0.1079	0.3057	0.8253
Log Output	0.0014 [0.0026]	-0.0031* [0.0017]	-0.0032* [0.0019]	-0.0265*** [0.0022]	-0.0138*** [0.0018]	0.0159*** [0.0033]	0.0279*** [0.0026]	0.0107*** [0.0022]	-0.0191*** [0.0037]
Observations	215,888	215,888	215,888	215,888	215,888	215,888	215,888	215,888	215,888
R ²	0.0876	0.5783	0.9556	0.0779	0.3026	0.7969	0.1083	0.3059	0.8252
Log Employment	-0.0516*** [0.0032]	-0.0240*** [0.0021]	-0.0049* [0.0027]	-0.0596*** [0.0026]	-0.0325*** [0.0022]	0.0131*** [0.0046]	0.0079** [0.0031]	0.0085*** [0.0027]	-0.0181*** [0.0051]
Observations	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008	216,008
R ²	0.0920	0.5790	0.9555	0.0828	0.3040	0.7968	0.1069	0.3056	0.8251
Other controls:	From CCTS: Export processing trade share; Ownership dummies From NBS: Log(1+age); Log capital per worker; Log average wage								
Year dummies, Constant?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	City	City, GBT	Firm	City	City, GBT	Firm	City	City, GBT	Firm

Productivity

Dependent variable:	Export Upstreamness (U_X)			Import Upstreamness (U_M)			$U_X - U_M$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<u>Productivity measure:</u>									
Log real VA per worker	0.0334*** [0.0029]	0.0166*** [0.0018]	0.0003 [0.0011]	0.0071*** [0.0025]	0.0103*** [0.0020]	0.0062*** [0.0021]	0.0263*** [0.0028]	0.0063*** [0.0024]	-0.0059** [0.0023]
Observations	206,978	206,978	206,978	206,978	206,978	206,978	206,978	206,978	206,978
R ²	0.0910	0.5825	0.9566	0.0760	0.3034	0.7999	0.1083	0.3078	0.8284
Levinsohn-Petrin	-0.0173*** [0.0026]	-0.0023 [0.0017]	-0.0007 [0.0011]	-0.0420*** [0.0022]	-0.0120*** [0.0018]	0.0072*** [0.0021]	0.0247*** [0.0025]	0.0097*** [0.0022]	-0.0079*** [0.0023]
Observations	206,851	206,851	206,851	206,851	206,851	206,851	206,851	206,851	206,851
R ²	0.0901	0.5821	0.9566	0.0797	0.3036	0.8000	0.1085	0.3078	0.8284
Levinsohn-Petrin (by ownership type)	-0.0092*** [0.0026]	-0.0012 [0.0017]	-0.0006 [0.0011]	-0.0259*** [0.0022]	-0.0114*** [0.0018]	0.0074*** [0.0020]	0.0167*** [0.0026]	0.0103*** [0.0022]	-0.0080*** [0.0023]
Observations	206,851	206,851	206,851	206,851	206,851	206,851	206,851	206,851	206,851
R ²	0.0897	0.5821	0.9566	0.0774	0.3036	0.8000	0.1080	0.3079	0.8284
Other controls:	From CCTS: Export processing trade share; Ownership dummies From NBS: Log(1+age); Log capital per worker; Log average wage								
Year dummies, Constant?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fixed effects	City	City, GBT	Firm	City	City, GBT	Firm	City	City, GBT	Firm

Firm Characteristics

- **Within firms over time**, older age, larger size, higher productivity, higher capital intensity and lower skill intensity associated with
 - More upstream imports
 - (Weakly) more downstream exports
 - Conducting more production stages in China
- Patterns sometimes reversed in the **cross-section** of firms
 - To do: explore role of firm entry and exit → sample selection vs. omitted firm characteristics?

Conclusion

- We establish new stylized facts about the position that Chinese firms occupy in global production chains
 - There is a sharp increase in the upstreamness of China's imports 1992-2011, whilst that of exports remains stable
 - Relative to domestic firms, FIEs operate more downstream and conduct fewer production stages in China
 - Relative to ordinary exporters, processing exporters conduct more production stages in China
 - Firms import more upstream and conduct more production stages in China as they age, grow and become more productive

Next Steps

- Next: develop theoretical model that rationalizes results and generates further testable predictions
 - Primitive firm attribute (productivity) determines firm choices and outcomes
 - Firm choices: GPLP, production technology (trade regime, factor intensity), production inputs (labor, domestic & imported inputs)
 - Firm outcomes: output, exports, value added, profits