

Chinese Imports and Industrialization in Africa: Evidence from Ethiopia

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Motivation

- Industrialization is a priority for African countries
 - Creation of "good jobs" an urgent concern for African governments
 - Progress being made but slowly

Industrialization agenda

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- Increased competition with China linked with manufacturing employment losses
 - China shock literature [Autor et al. (2013); Acemoglu et al. (2015); Iacovone et al. (2013); Blyde et Fentanes (2019)] China shock
 - Focus in **rich countries**

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 - Focus in **rich countries**
- Little is known about the impact of China on manufacturing employment in SSA
 - Increased trade with China since the early 2000s (6% to 30%) Chinese exports to Africa
 - Existing literature: employment losses in industrial sector in rich countries

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- Despite evidence of negative effects in HIC, the theoretical relationship between Chinese exports and employment is **ambiguous**
 - Competition could hurt domestic industries
 - Access to inputs can benefit domestic industries

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 - Competition could hurt domestic industries
 - Access to inputs can benefit domestic industries
- African economies may respond to the China shock differently as compared to advanced economies
 - Poor industrial base: China slowing them down? *OR* competition less salient?
 - Poor access to manufacturing inputs (in 2002, **72%** firms reported issues accessing inputs)
 - potential to boost industrialization?

This paper

How did exposure to Chinese imports affect manufacturing employment in Ethiopia?

- Estimate causal effect of Chinese imports on manufacturing employment
 - Relate the variation in manufacturing industries employment to the variation in industry exposure to Chinese imports
 - Instrument Chinese imports to Ethiopia with the Chinese imports to other SSA economies
- Distinguish between competition and inputs channels
 - Classify imported goods as final or intermediate goods
 - Identify the inputs channel using the national input-output table
- Analyze the mechanisms linking Chinese imports and Ethiopian manufacturing employment
 - Effect on productivity, capacity utilization, skills upgrading, and reallocation
 - Heterogeneous impacts by firm size, labor intensity, and ownership

Main Results

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1. Chinese imports led to *employment gains* in the Ethiopian manufacturing sector
 - Result *in contrast* with the experience in HIC
2. *Inputs channel* is the driving force of the positive employment effect.
 - High share of intermediate goods
 - Positive effect driven by intermediate goods *used* by domestic industries
3. Mechanisms : Inputs channel operating through
 - ↑ in TFP ; capacity utilization ; and share of skilled labor
 - Gains disproportionately benefit large firms and labor-intensive industries

Contributions

- Literature on the impact of Chinese import competition on domestic manufacturing employment
[(Autor et al., 2013; Acemoglu et al., 2016; Iacovone et al., 2013; Mion Zhu, 2013; Bloom et al., 2016; Adao et al., 2019).]
 - Examine the China shock in an African country
 - Separate out competition from the inputs channels
 - Document different results highlighting the importance of the inputs channel in this context
 - Closest to Edwards and Jenkins (2015)
- Literature on importing and productivity
[(Goldberg et al., 2010; Abreha, 2019; Goldberg et al., 2010; Redding et al., 2006; Nocke Yeaple, 2006; Topalova Khandelwal, 2011; Topalova, 2007; Amiti Konings, 2007; Kasahara Rodrigue, 2008).]
 - Evidence in low-income context
 - Complement this literature by using value of imports instead of tariffs
 - Highlight skills upgrading as a mechanism from access to better inputs
 - Examine capacity utilization

Outline

Background and context

Conceptual framework

Data

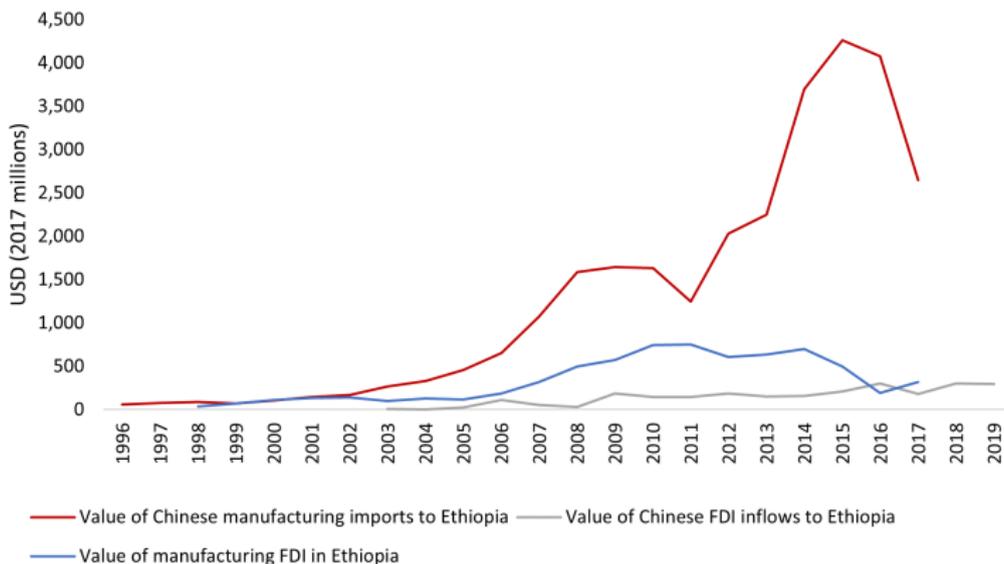
Empirical strategy

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Mechanisms and supporting evidence

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Chinese manufacturing imports and FDI to Ethiopia



- Share of Chinese imports increased from 6% to 28%
- Chinese imports exceed FDI by a factor of 30 on average

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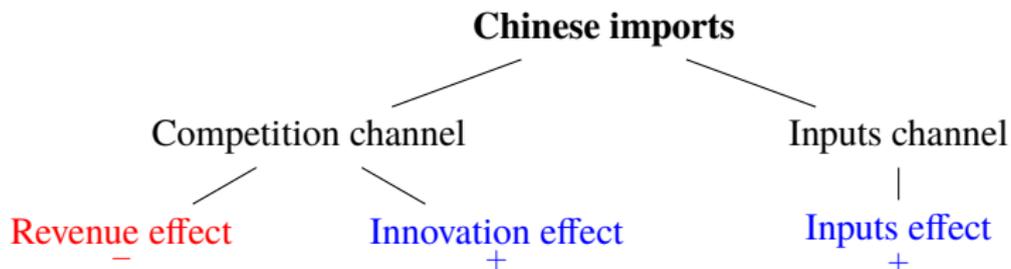
Simple monopolistic competition framework

- Suppose Firm's residual demand (market share) given by:

$$Q = S \left[\frac{1}{N} - b(P - \bar{P}) \right]$$

- S : total industry output
 - N : number of firms
 - P : domestic firms price
 - \bar{P} : Chinese firms price
 - b : product differentiation
- If $P = \bar{P}$, then $Q = S/N$

Possible channels and effects



Competition channel: revenue effect

$$Q = S \left[\frac{1}{N} - b(P - \bar{P}) \right]$$

- Domestic producers compete against Chinese producers
- Chinese comparative advantage \rightarrow Chinese firms produce at lower price
- If domestic firms set $\mathbf{P} > \bar{\mathbf{P}}$, then $Q < S/N \rightarrow \mathbf{Q} \downarrow$
- If $Q \downarrow$, then Employment \downarrow (for domestic firms)

Revenue effect: competition may \downarrow employment through \downarrow market shares

- Channel highlighted in [Autor et al. (2013), Acemoglu et al. (2016); Pierce and Schott (2016)]

Competition channel: innovation effect

$$Q = S \left[\frac{1}{N} - b(P - \bar{P}) \right]$$

- If domestic producers upgrade their technology to compete
- They can set $\mathbf{P} < \bar{\mathbf{P}}$, then $Q > S/N \rightarrow \mathbf{Q} \uparrow$
- If $Q \uparrow$, then Employment \uparrow (for domestic firms)

Innovation effect: competition may \uparrow employment through innovation

- Channel highlighted in [Bloom et al. (2016); Medina(2022); Yang et al. (2021)]

Inputs channel: inputs effect

$$Q = S \left[\frac{1}{N} - b(P - \bar{P}) \right]$$

- Domestic producers use Chinese inputs in their production process
- Access to imported inputs can increase employment through productivity \uparrow
 - Better quality (higher technology) inputs [Amiti and Konings (2007)]
 - Cheaper inputs [Grossman and Rossi-Hansberg (2008)]
 - Greater variety of inputs [Goldberg et al. (2010)]
- Inputs can be complementary to employment
 - Inputs complementary to labor [Atalay 2017]
 - Greater capacity utilization

Inputs effect: imported inputs may \uparrow employment through \uparrow and/or complementarity

Separating out the competition from the inputs channels

- Distinguish between imports of final and intermediate goods
 - Map the 6-digit imports product codes to end-use categories from the Broad Economic Categories (BEC) classification.
 - Example of textile final goods: mattress, blankets, towels, and other similar goods imported for retail sale.
 - Example of textile intermediate goods: conveyor belt, staple fibre, woven fabrics and other similar unfinished fabrics used in textile production.
- Final goods
 - Isolate competition channel
 - Effect can be negative (revenue effect) or positive (innovation effect)
- Intermediate goods
 - Both competition and inputs channels (all three effects)
 - Input-output table to identify inputs effect off of intermediate goods

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- BACI Bilateral trade flows data (harmonized version of COMTRADE)
 - Observations: +5,000 HS96 products across +200 countries
 - Variables: importer, exporter, total trade value flows by year

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- Large and medium scale manufacturing establishment census (LMSM)
 - Formal manufacturing establishments using power-driven machinery
 - Minimum 10 employees Firm exits
 - Variables: capital, employment, sales, inputs, etc.

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 - Variables: capital, employment, sales, inputs, etc.
- Panel Industry-year: 22 industries (2-digits ISIC) from 2002 to 2017
 - Focus on industry manufacturing employment
 - Industry level variation in Chinese imports
 - Accounts for high entry and exits rates at the firm level driven by ID entry errors
Number of surveyed years Firm entry and exit rates

Chinese import exposure measure

Chinese import penetration:

- Contemporaneous industry Chinese imports relative to the initial size of the industry in the domestic market (absorption)

$$IPP_{it}^{China} = \frac{Imports_{it}^{China}}{Output_{i,1998} + Imports_{i,1998} - Exports_{i,1998}} \quad (1)$$

Where

- i = 2-digits ISIC Industry
- t = Year

Industry summary statistics

VARIABLES	(1) Mean	(2) Sd	(3) N
<i>Panel A: Trade variables</i>			
China import penetration	0.925	1.485	278
Share Chinese imports	0.25	0.199	278
<i>Panel B: Manufacturing variables</i>			
Permanent workers	7,783	9,518	278
Share of imported inputs	0.591	0.287	278
Ratio permanent workers/total workers	0.935	0.0710	278

Unit of observation: industry-year (years 2002-2017)

What does Ethiopia import from China?

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OLS estimating equation

$$Y_{it} = \beta_1 IPP_{it}^{China-E} + X'_{it}\beta_2 + \theta_t + \theta_i + \epsilon_{it} \quad (2)$$

Where

- Y_{it} : outcome for industry i (2 digits ISIC), year t (2002 to 2017)
- IPP_{it} = Chinese import penetration to Ethiopia for industry i in year t
- X'_{it} = industry-level time-varying controls Trade partners
- θ_t : year fixed effect
- θ_i : industry fixed effect
- ϵ_{it} : error term
- Standard errors clustered at the industry level; and block-bootstrap

Instrumental variable approach

- Potential for endogeneity
 - Correlation between Chinese imports and industry demand shocks in Ethiopia
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- Instrument : Chinese imports to other African countries
[Autor et al. (2013); Acemoglu et al. (2016)]
 - Country's GDP p.c. $\leq 2 * \text{Ethiopia's GDP p.c. (2004-2014)}$
 - No major conflict (WB "High institutional and social fragility")
 - List of countries ("*O*"): Chad, Eritrea, Gambia, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Rwanda, Sierra Leone, Togo, Uganda, Tanzania.   

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- IV measure:

$$IPP_{it}^{China_O} = \frac{Imports_{it}^{China_O}}{Output_{i,1998} + Imports_{i,1998} - Exports_{i,1998}} \quad (3)$$

Instrument identifying assumptions

- First stage

- Chinese imports to other African countries predict Chinese imports to Ethiopia
- F-Stat > 104.7

Results

- Exclusion restriction

- Imports demand shocks should not be correlated across countries
- "China shock" plausibly driven by productivity shocks in China
 - ▶ Increase in Chinese exports worldwide

Trade volume

- Tests

Details and results

- Plausibly exogenous initial demand
- Overidentification test
- Alternative instrument

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Impact of total imports on industry employment

Results on Log(employment)

	(1)	(2)	(3)	(4)
	OLS	First stage	2SLS	RF
Chinese IPP in Ethiopia	0.120*** (0.034)		0.152*** (0.050)	
Chinese IPP in SSA countries		0.302*** (0.025)		0.046*** (0.017)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
R ²	0.94	0.82	0.94	0.94
Observations	278	278	278	278
Kleibergen-Paap <i>F</i> -statistic		150.85		
Mean industry employment	7,783			
SD			0.23	

Estimated employment gains associated with 1 SD ↑ in IPP: **1,790**

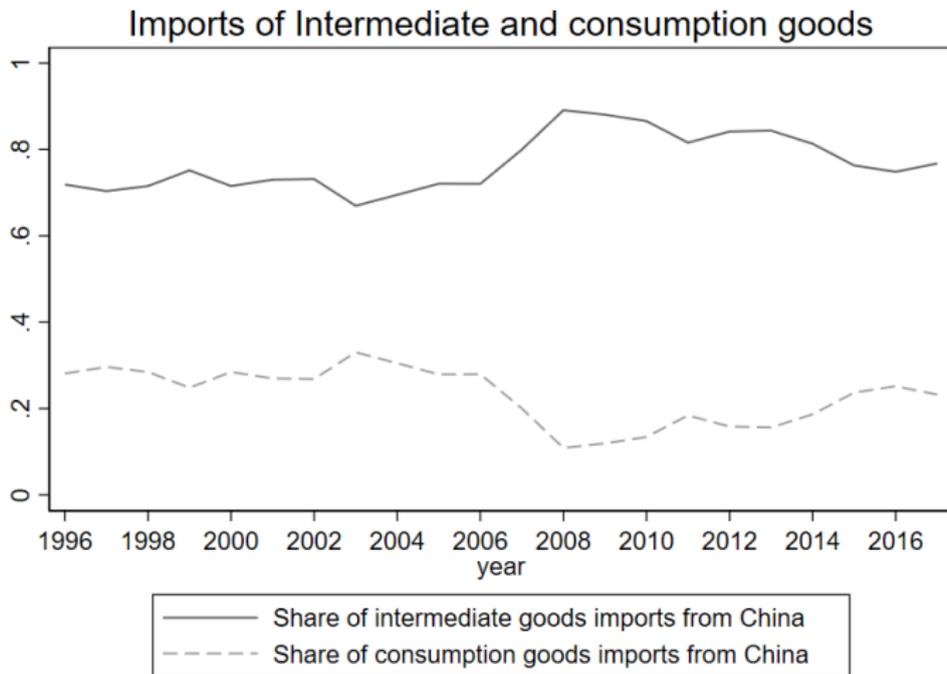
Robustness checks

Table with control covariates

Comparison with estimates in the literature

What is driving the positive impact?

78% of Chinese imports to Eth. are intermediate goods



Inputs share from ROW

Inputs in USA

Impact of *exposure* to final and intermediate imports

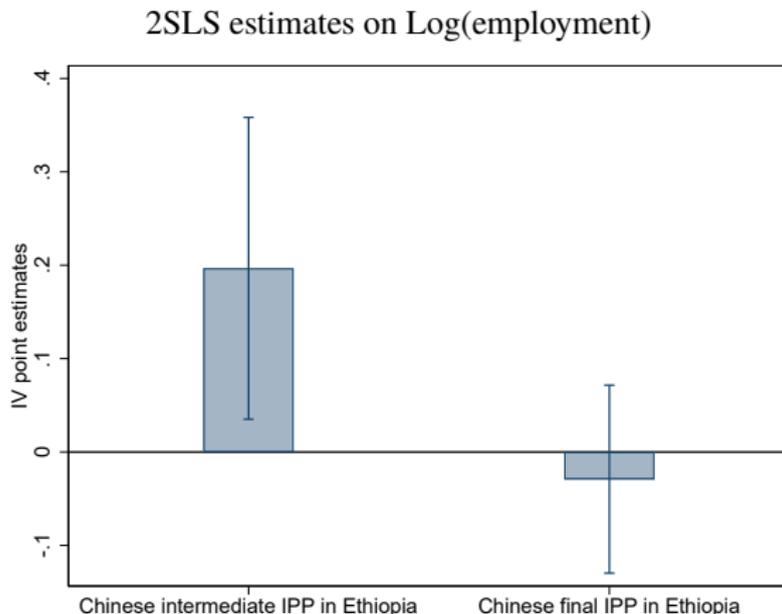
- Impact of direct exposure to intermediate and final goods imports

$$Y_{it} = \beta_1 IPP_I_{it}^{China} + \beta_2 IPP_F_{it}^{China} + X'_{it}\beta_3 + \theta_t + \theta_i + e_{it} \quad (4)$$

where

- IPP_I : IPP for intermediate goods
 - IPP_F : IPP for final goods
- Instruments computed as at the baseline

Positive impact driven by intermediate goods imports



Table

- No detectable effect on final goods imports (-0.029)
- Positive impact on intermediate goods imports (0.197)** \rightarrow 0.20 sd
- But direct *exposure* to intermediates could include both competition and inputs channels

Estimating the intermediate imports usage

- Allocate intermediate goods imports to industries
 - Based on the industry's input usage share in total intermediate usage.
 - Assumption : industry patterns of input usage are the same for imports as for Ethiopia's domestic goods.
 - Proxy: Kenya 2003 I-O table
- Equation

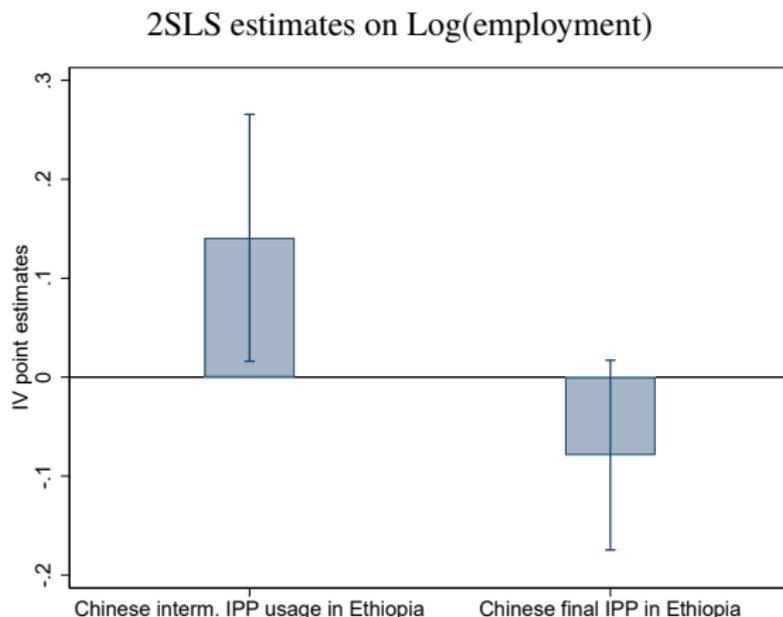
$$Imports_Usage_{it}^{China} = \sum_j \alpha_{ji} * intermediate_imports_{jt}^{China} \quad (5)$$

- ▶ i : input purchaser industry ("industries")
- ▶ j : the input supplier industry ("commodities")
- ▶ α_{ji} share of input j in industry i .

Illustration

- IPP and IV measured as usual

Positive impact of intermediate imports *usage*



Table

- No detectable effect on final goods imports (-0.07)
- Positive impact on intermediate imports usage (0.141)^{**} \rightarrow 0.34 sd
 - Only present for **firms using imported inputs**

Table

Inputs channel dominates: auxiliary evidence

- Positive estimate of input *exposure* likely captures inputs usage
 - High share of own input usage Own inputs usage
- Suggests little / in-existent competition in intermediate goods Inputs sourcing Domestic production
 - High reliance on imported inputs (60%)
 - Domestic production dominated by final goods overall (*Wheat flour, bread, cake, beer, edible oil, soap, shoes, pasta, macaroni, etc.*)

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Results consistent with the decline in shortage of raw materials

Results on the share of firms with difficulties accessing inputs

	(1)	(2)	(3)	(4)
	OLS	First stage	2SLS	RF
Chinese interm. IPP usage in Ethiopia	-9.473** (3.789)		-13.845*** (4.293)	
Chinese interm. IPP usage in SSA		0.667*** (0.030)		-9.237*** (3.065)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
R ²	0.91	0.94	0.91	0.91
Observations	275	275	275	275
Kleibergen-Paap <i>F</i> -statistic		484.47		
Dep. var Mean	7,350			

Note: Standard errors clustered at the 2-digits industry level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

- Outcome: share of firms reporting shortage of raw materials as main reason preventing them from operating at full scale

What is so special about China?

- Correlation between imported inputs in the same industry coming from China and those coming from ROW

$$\begin{aligned} Chinashare_{it} = & \beta_0 + \beta_1 Europeshare_{it} + \beta_2 Asiashare_{it} + \beta_3 Americashare_{it} \\ & + \theta_t + \theta_i + \epsilon_{it} \end{aligned}$$

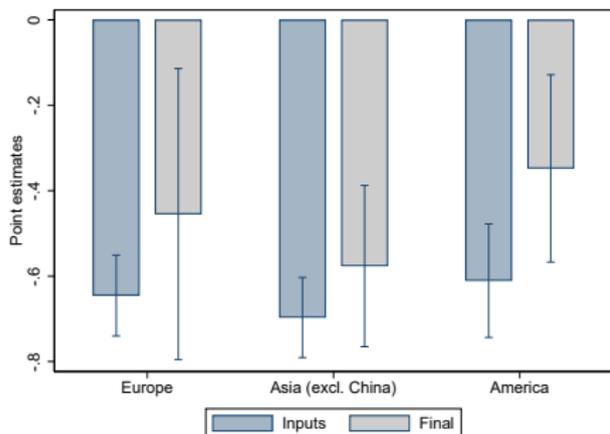
- Correlation between prices of Chinese imports and prices from ROW imports

$$price_{ict} = \beta_0 + \beta_1 China + \theta_t + \theta_i + \theta_c + \epsilon_{it}$$

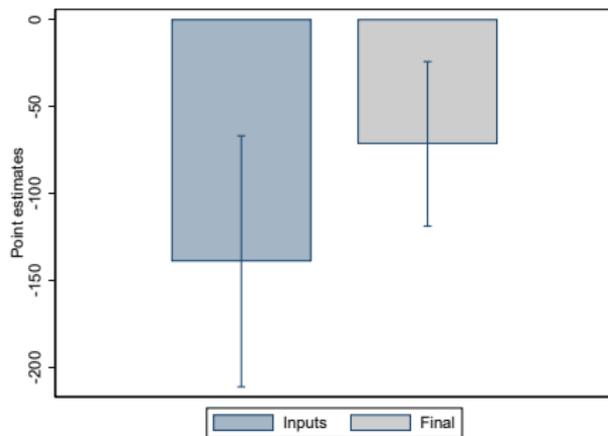
What is so special about China?

Evidence that firms are substituting away from traditional trade partners and towards *cheaper* Chinese imports

Imports (qty) from China and ROW



Price differences



Mechanisms and supporting evidence

- Additional outcomes
 - **Total Factor Productivity**
 - ▶ Estimated following the Levinsohn and Petrin (2003) approach

Mechanisms and supporting evidence

- Additional outcomes
 - Total Factor Productivity
 - **Capacity utilization**
 - ▶ Actual production relative to maximum production at installed productive capacity (when fully used)

Mechanisms and supporting evidence

- Additional outcomes
 - Total Factor Productivity
 - Capacity utilization
 - **Skills intensity**
 - ▶ Ratio of skilled labor over total labor

Mechanisms and supporting evidence

- Additional outcomes
 - Total Factor Productivity
 - Capacity utilization
 - Skills intensity
 - **Within industry reallocation**
 - ▶ Within industry Firm entry and exit

Mechanisms and supporting evidence

- Additional outcomes
 - Total Factor Productivity
 - Capacity utilization
 - Skills intensity
 - Within industry reallocation
- Heterogeneous impacts
 - **Firm size**
 - ▶ Large firms (≥ 50 workers in initial 2 years)

Mechanisms and supporting evidence

- Additional outcomes
 - Total Factor Productivity
 - Capacity utilization
 - Skills intensity
 - Within industry reallocation
- Heterogeneous impacts
 - Firm size
 - **Labor intensity**
 - ▶ Above 50th percentile of ratio labor/capital expenses

Mechanisms and supporting evidence

- Additional outcomes
 - Total Factor Productivity
 - Capacity utilization
 - Skills intensity
 - Within industry reallocation
- Heterogeneous impacts
 - Firm size
 - Labor intensity
 - **Ownership**
 - ▶ Private or public owned firm

Mechanisms and supporting evidence

- Additional outcomes
 - Total Factor Productivity
 - Capacity utilization
 - Skills intensity
 - Within industry reallocation
- Heterogeneous impacts
 - Firm size
 - Labor intensity
 - Ownership
- Focus on intermediate imports

Mechanisms of the impact of Chinese imports

Inputs channel is operating through TFP, Capacity utilization and skills upgrading

	(1)	(2)	(3)	(4)	(5)
	TFP	Capacity utilization	Skills intensity	Entry	Exit
Chinese interm. IPP usage in Ethiopia	0.231*** (0.040)	0.191* (0.109)	0.038*** (0.009)	-0.030 (0.024)	-0.044 (0.037)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes	No
Controls	Yes	Yes	Yes	Yes	Yes
Observations	272	262	275	259	257
Dep. var Mean	1.94	0.73	0.31	0.30	0.26

Note: Table displays the 2SLS results on industry outcomes. Standard errors in parentheses are clustered at 2-digit industries in all specifications. All regressions include years, industry fixed effects and the industry controls. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Heterogeneous effects

Employment gains appear to disproportionately benefit large firms and labor-intensive industries.

2SLS Results on Log(employment) across samples

	(1)	(2)	(3)	(4)
	Large	Labor intensive	Private	Public
Chinese interm. IPP usage in Ethiopia	0.137*	0.232***	-0.113	0.059
	(0.072)	(0.073)	(0.169)	(0.144)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
R ²	0.90	0.90	0.91	0.71
Observations	258	252	261	215
Dep. var Mean	6,334	3,722	5,263	2,431
Joint <i>p</i> -value	0.00	0.00		

Note: Table displays the 2SLS results on industry outcomes. All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. Standard errors clustered at the 2-digits industry level. (total permanent employment across small firms / in total employment).

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"Import of capital goods from China is a win-win situation for Ethiopia." [Chakrabarty (2016)]

- **Findings and policy implications**

- Employment gains in Ethiopia's manufacturing in response to Chinese imports
- *In contrast* with experience in rich countries
- Explained by high share of intermediate goods
- Policies to facilitate access to intermediate inputs important for manufacturing development in low-income countries

- **Future work**

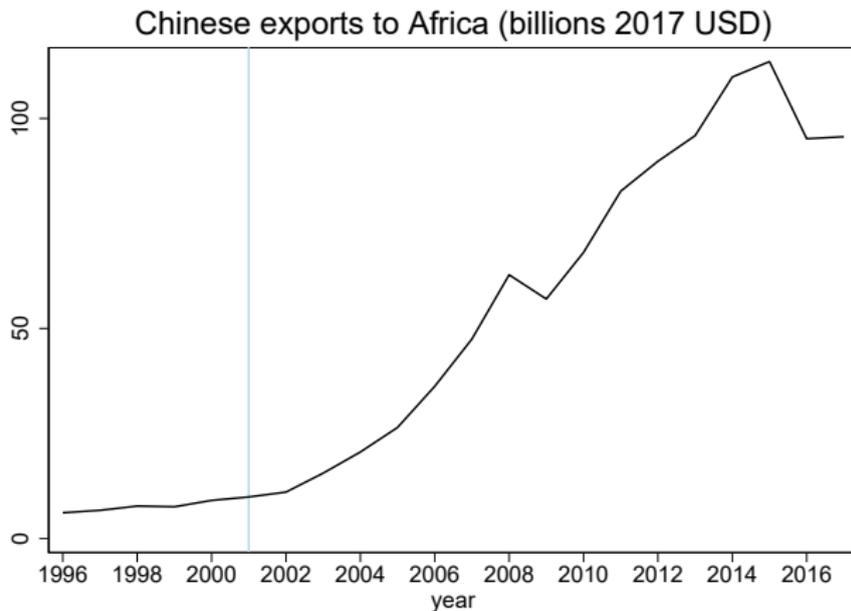
- Firm-level data analysis and domestic production classification
- Impact for informal small-scale manufacturing industries

Thank you for your comments!

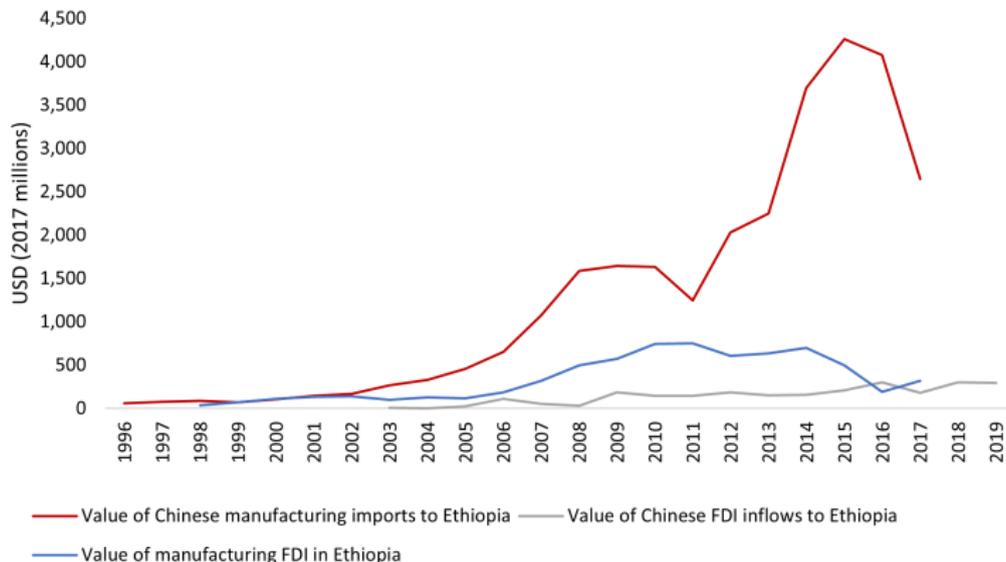
Further feedback can be sent to: Marina.Ngoma@tufts.edu

Backup slides

Increasing Chinese exports to Africa

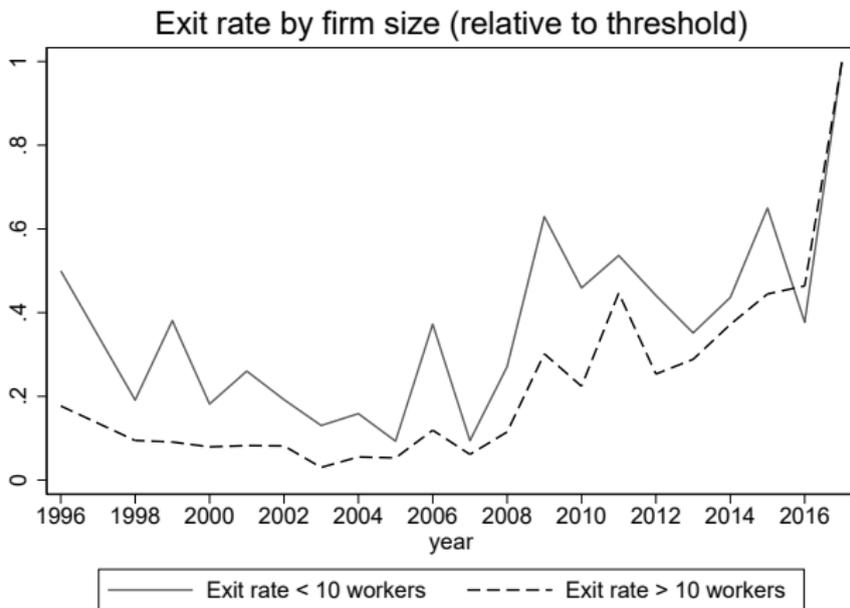


Chinese manufacturing imports and FDI to Ethiopia

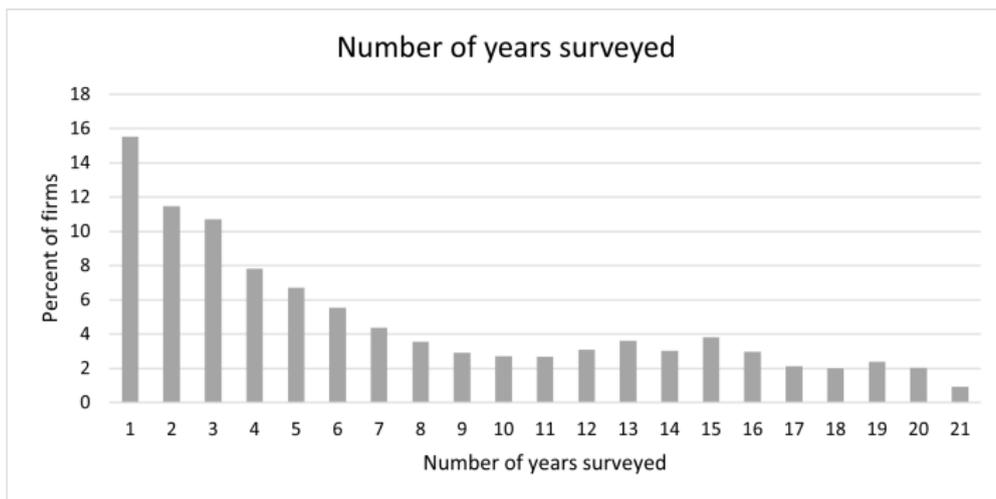


Notes: The value of Chinese FDI inflows includes all sectors, not just manufacturing. The value of manufacturing FDI in Ethiopia includes all sources of FDI, not just Chinese. Sources: (1) BACI database 1996-2017, CEPII; (2) The Statistical Bulletin of China's Outward Foreign Direct Investment covering 2003-2019 published by China's Ministry of Commerce (MOFCOM); (3) Ethiopia Central Statistical Agency's annual survey of Large and Medium Scale Manufacturing (LMSM) 1996-2017

Exit rates by firm size



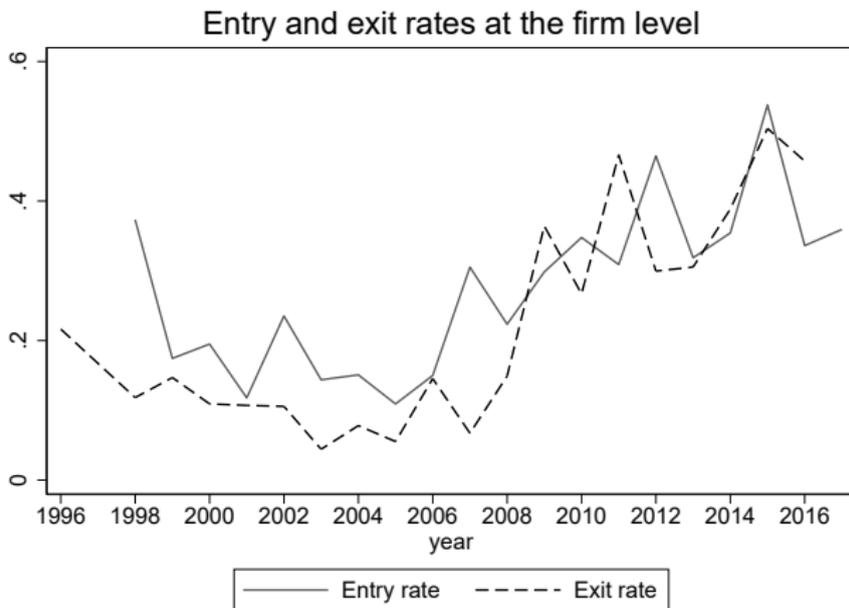
Number of years each firm was surveyed



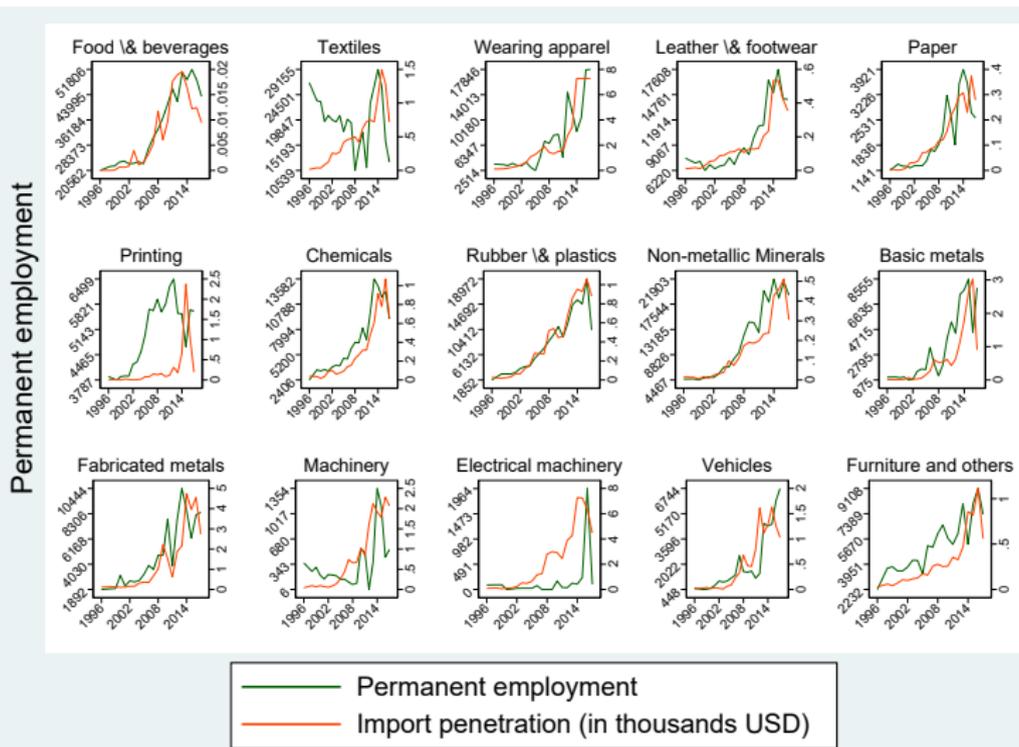
Total number of observations: 29,541

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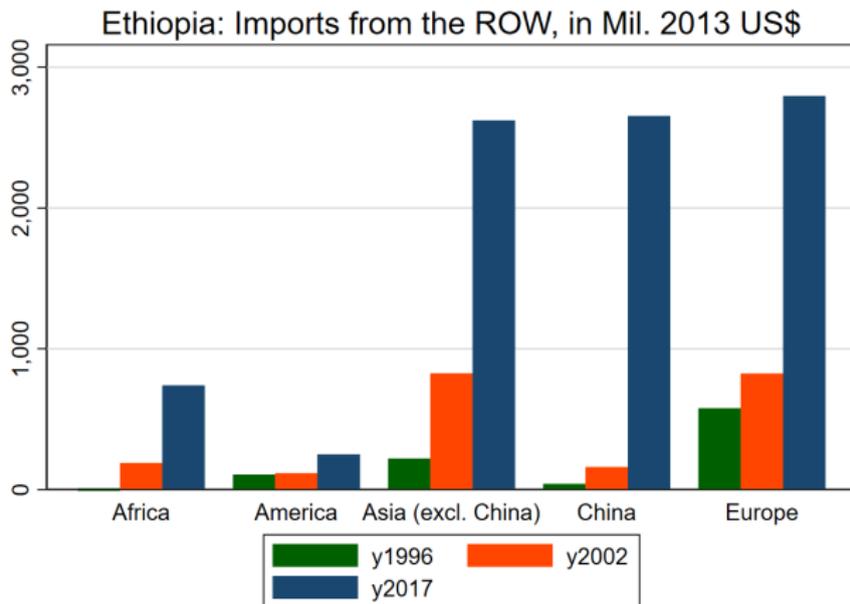
Entry and exit rates at the firm level



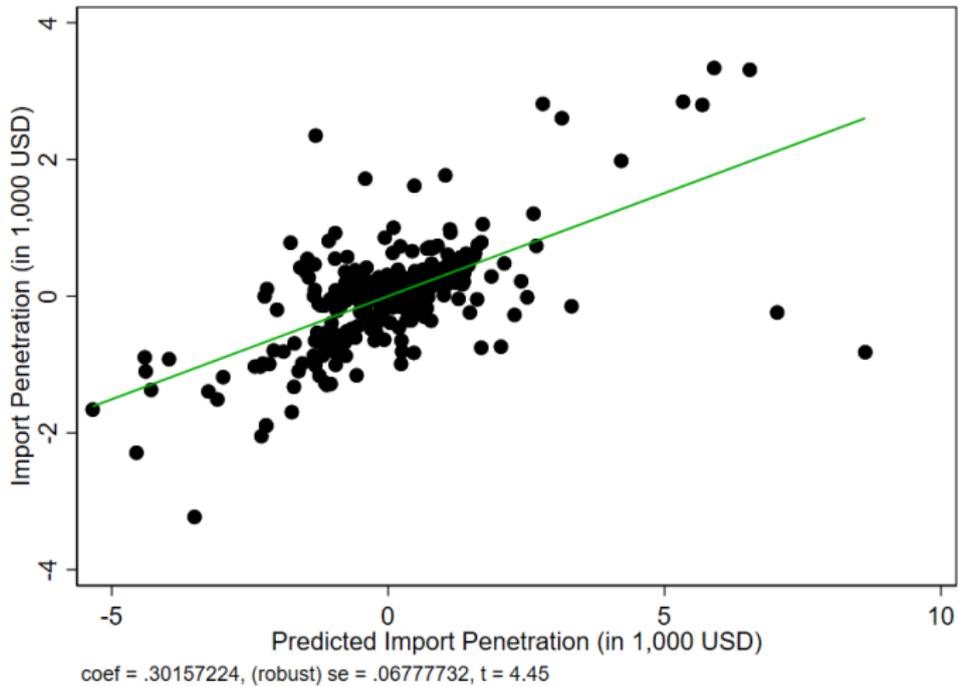
Chinese imports penetration and manufacturing employment, by industry



Ethiopian imports from China and the ROW



First stage



Impact of total Chinese imports using AADHP's instrument

	(1)	(2)	(3)	(4)
	OLS	First stage	2SLS	Reduced form
IPP	0.120** (0.047)		0.197 (0.136)	
IPP (IV)		3.461 (3.524)		0.680 (0.881)
Number of Observations	278	278	278	278
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
F-statistic		0.96		
Mean Dep.var	8.09			

Note: Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Impact of total Chinese imports using New Zealand, Spain, and Iceland

	(1)	(2)	(3)	(4)
	OLS	First stage	2SLS	Reduced form
IPP	0.120** (0.047)		0.117** (0.058)	
IPP (IV)		43.085*** (12.903)		5.022 (3.624)
Number of Observations	278	278	278	278
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
F-statistic		11.15		
Mean Dep.var	8.09			

Note: Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Industry control variables

	(1)	(2)	(3)	(4)	(5)	(6)
Chinese IPP in Ethiopia	0.164*** (0.048)	0.165*** (0.048)	0.153*** (0.051)	0.152*** (0.050)	0.160*** (0.056)	0.160*** (0.056)
Log(Imports from America)		-0.019 (0.042)	-0.014 (0.042)	-0.029 (0.042)	-0.037 (0.042)	-0.037 (0.042)
Log(Imports from Asia-C)			-0.065 (0.063)	-0.083 (0.062)	-0.090 (0.063)	-0.090 (0.063)
Log(Imports from Europe)				0.182*** (0.070)	0.194*** (0.072)	0.194*** (0.072)
Log(Initial Employment)					1.165*** (0.096)	1.012*** (0.075)
Log(Initial capital intensity)						0.190** (0.090)
Number of Observations	279	278	278	278	267	267
Year Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors clustered at the 2-digits industry level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Exclude one industry each time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Textile	Leather	Machinery	Chemicals	Coke	Computing	Wood	Food
Chinese IPP in Ethiopia	0.145*** (0.050)	0.149*** (0.052)	0.136*** (0.039)	0.154*** (0.053)	0.152*** (0.050)	0.152*** (0.050)	0.156*** (0.052)	0.150*** (0.053)
Log(Imports from America)	-0.022 (0.043)	-0.034 (0.045)	0.005 (0.033)	-0.030 (0.044)	-0.029 (0.042)	-0.029 (0.042)	-0.035 (0.044)	-0.031 (0.044)
Log(Imports from Asia-C)	-0.103 (0.063)	-0.090 (0.066)	-0.065 (0.048)	-0.088 (0.065)	-0.083 (0.062)	-0.083 (0.062)	-0.072 (0.069)	-0.088 (0.066)
Log(Imports from Europe)	0.151** (0.076)	0.197*** (0.073)	0.168*** (0.055)	0.180** (0.074)	0.182*** (0.070)	0.182*** (0.070)	0.187** (0.077)	0.190** (0.074)
Number of Observations	262	262	262	262	278	277	262	262
Year FE	Yes							
Industry FE	Yes							
Controls	Yes							
Mean Dep.var	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09

Note: Standard errors clustered at the 2-digits industry level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

- ▶ Top employment industries include: textile, leather
- ▶ Top imports industries include machinery, chemicals
- ▶ Top employment and imports industries include: wearing apparel
- ▶ Bottom employment industries include: coke and computing equipments
- ▶ Bottom imports industries include: wood
- ▶ Top employment and bottom imports industries include food and beverages

Results using different data samples

	(1)	(2)	(3)	(4)	(5)	(6)
	Post 2002	All years	ISIC excl	Restrict1	Restrict2	Restrict3
Chinese IPP in Ethiopia	0.152*** (0.039)	0.088** (0.040)	0.165*** (0.055)	0.138*** (0.034)	0.137*** (0.048)	0.147*** (0.044)
Log(Imports from America)	-0.029 (0.057)	0.021 (0.044)	-0.035 (0.073)	-0.005 (0.046)	-0.053 (0.052)	-0.058 (0.067)
Log(Imports from Asia-C)	-0.083* (0.050)	-0.068 (0.064)	-0.040 (0.076)	-0.079 (0.056)	-0.080* (0.048)	-0.070 (0.058)
Log(Imports from Europe)	0.182*** (0.053)	0.173** (0.071)	0.271*** (0.063)	0.173*** (0.050)	0.158*** (0.052)	0.197*** (0.066)
Number of Observations	278	356	237	277	272	278
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Column(1) excludes observations before 2002. Column(2) includes all years (1996-2017). Column(3) excludes the following industries due to lack or negligible imports and/or employment data: Tobacco products, Wood, Petroleum and nuclear fuel, Computing machinery, Communication equipment, and Medical equipment. Column(4) excludes firms where employment varies inconsistently (by more than 5*average over time). Column(5) Excludes firms that only show up once in the data. Employment and Imports are winsorized at 1%. Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Correlation between initial employment and future Chinese imports

	(1) ΔIPP 2002-2017	(2) ΔIPP 2002-2017	(3) Log(Employment)
Initial employment	-0.000*** (0.000)		
1996-2002 Employment growth		-0.004*** (0.000)	0.023*** (0.001)
IPP			0.165*** (0.058)
Initial employment*trend			-0.008* (0.004)
Log(Imports from America)			-0.034 (0.060)
Log(Imports from Asia-C)			-0.080 (0.050)
Log(Imports from Europe)			0.161*** (0.042)
Number of Observations	267	462	267
Year Fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes

Note: Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Alternative definitions of imports exposure

	(1)	(2)	(3)	(4)
IPP_absorption	0.152*** (0.050)			
IPP_employment		0.021*** (0.006)		
IPP_sales			0.045*** (0.013)	
Total imports (10,000 USD)				0.016** (0.007)
Number of Observations	278	267	267	278
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

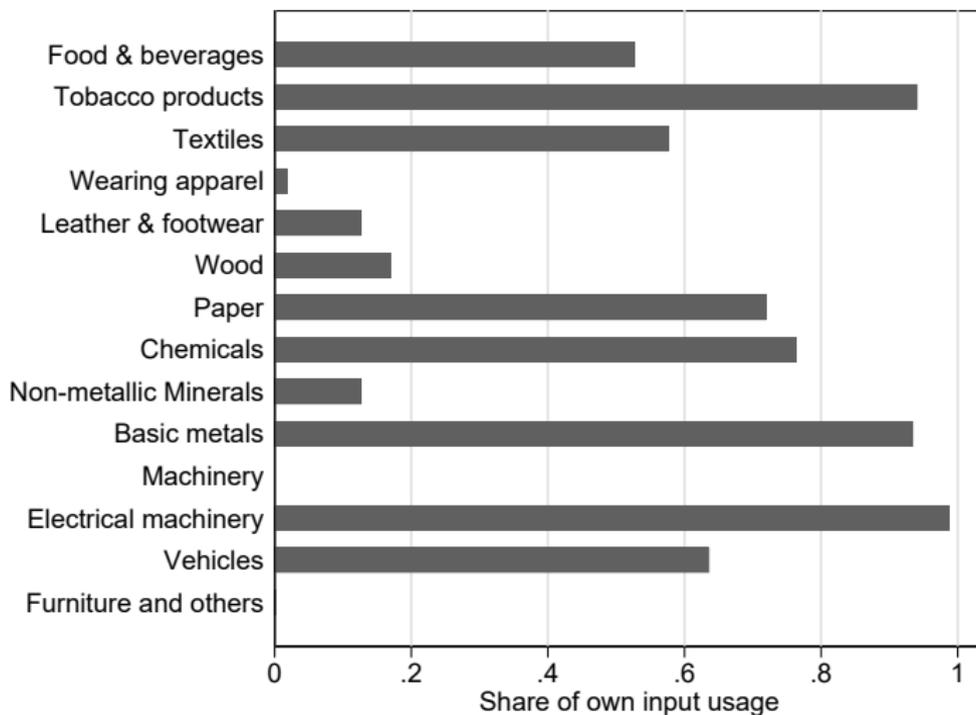
Note: Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Using lagged values of imports

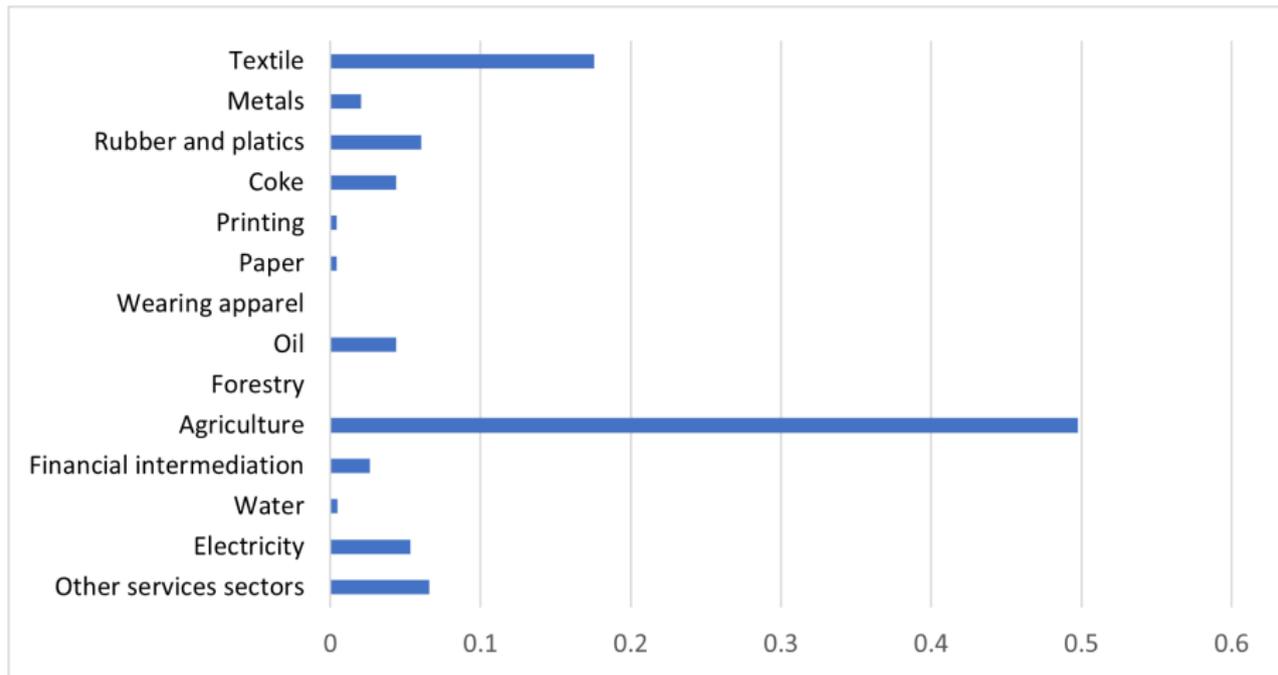
	(1)	(2)	(3)	(4)
IPP_absorption	0.094*** (0.033)			
IPP_employment		2.060*** (0.579)		
IPP_sales			4.534*** (1.334)	
Total imports (10,000 USD)				0.014** (0.007)
Number of Observations	278	267	267	278
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Note: Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Industry share of own input usage



Example: textile industry input shares



Impact of final and intermediate imports on employment

	(1)	(2)	(3)	(4)
	OLS	First stage-interm	First-stage-cons	2SLS
Chinese intermediate IPP in Ethiopia	0.184*** (0.052)			0.197** (0.082)
Chinese consumption IPP in Ethiopia	0.016 (0.013)			-0.029 (0.051)
Chinese consumption IPP in SSA countries		-0.047** (0.019)	0.978*** (0.067)	
Chinese intermediate IPP in SSA countries		0.355*** (0.034)	-0.217* (0.118)	
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
R ²	0.94	0.82	0.89	0.94
Observations	278	278	278	278
Kleibergen-Paap <i>F</i> -statistic		109.80	212.85	
Dep. var Mean	7,783			
SD-Intermediate				0.20
SD-Consumption				-0.12

Note: Standard errors clustered at the 2-digits industry level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Impact of final and intermediate imports *usage* on employment

	(1)	(2)	(3)	(4)
	OLS	First stage-interm	First-stage-cons	2SLS
Chinese interm. IPP usage in Ethiopia	0.099** (0.048)			0.141** (0.064)
Chinese consumption IPP in Ethiopia	0.007 (0.013)			-0.079 (0.049)
Chinese consumption IPP in SSA countries		-0.005 (0.017)	1.005*** (0.066)	
Chinese interm. IPP usage in SSA		0.615*** (0.035)	0.109 (0.138)	
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
R ²	0.94	0.95	0.89	0.93
Observations	278	278	278	278
Kleibergen-Paap <i>F</i> -statistic		310.82	231.39	
Dep. var Mean	7,783			
SD-Intermediate				0.34
SD-Consumption				-0.31

Note: Standard errors clustered at the 2-digits industry level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Overidentification test of the instruments

Overidentification test of instruments

	(1)	(2)	(3)
	First stage	2SLS	2SLS Overident
IPP(IV)	0.302*** (0.025)		
IPP		0.152*** (0.050)	0.143*** (0.043)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes
Controls	Yes	Yes	Yes
R ²	0.82	0.94	0.94
Observations	278	278	226
Kleibergen-Paap <i>F</i> -statistic	150.85		
<i>Overidentification tests p-values</i>			
J-Statistic			0.69
Sargan test			0.10
Basmann test			0.18

Note: Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Impact of intermediate imports usage on employment for firms using domestic vs imported inputs

2SLS results on Log(employment)

	(1) Imported input	(2) Domestic input	(3) Interaction
Chinese interm. IPP usage in Ethiopia	0.143** (0.058)	0.091 (0.234)	-0.036 (0.094)
Chinese interm. IPP usage in SSA			
Share imported inputs * Chinese interm. IPP in SSA			0.345*** (0.111)
Share imported inputs			0.436** (0.186)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes
Controls	Yes	Yes	Yes
R ²	0.93	0.82	0.95
Observations	275	181	278
Joint p-value			0.00

Note: Clustered standard errors in parentheses (at the industry level). All regressions include years and industry fixed effects. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Estimates of Chinese imports on manufacturing employment in the literature

- United States and Europe
 - Overall negative impact on employment from competition
 - Implied employment loss range from 3.6% to 14% [Acemoglu et al. (2016), Bernard et al. (2006), Bloom et al. (2016), Iacovone et al. (2013), Mion and Zhu (2013)]
- Africa
 - Manufacturing employment decline by 8.2% in South Africa [Edwards & Jenkins (2015)]

Competition vs inputs channels on intermediate imports

- Do domestic industries compete on the intermediate goods market?
 - End use category not observable in the manuf. dataset
 - But auxiliary evidence suggests the majority of goods produced locally are final goods. (*Wheat flour, bread, cake, door, edible oil, soap, shoes, pasta, macaroni, etc.*)
- Domestic supply chain linkages
 - High share of own industry input usage [Figure](#)
 - Larger share of manufacturing inputs are domestically sourced from the agricultural and services sectors [Example](#)
 - Rest from international markets

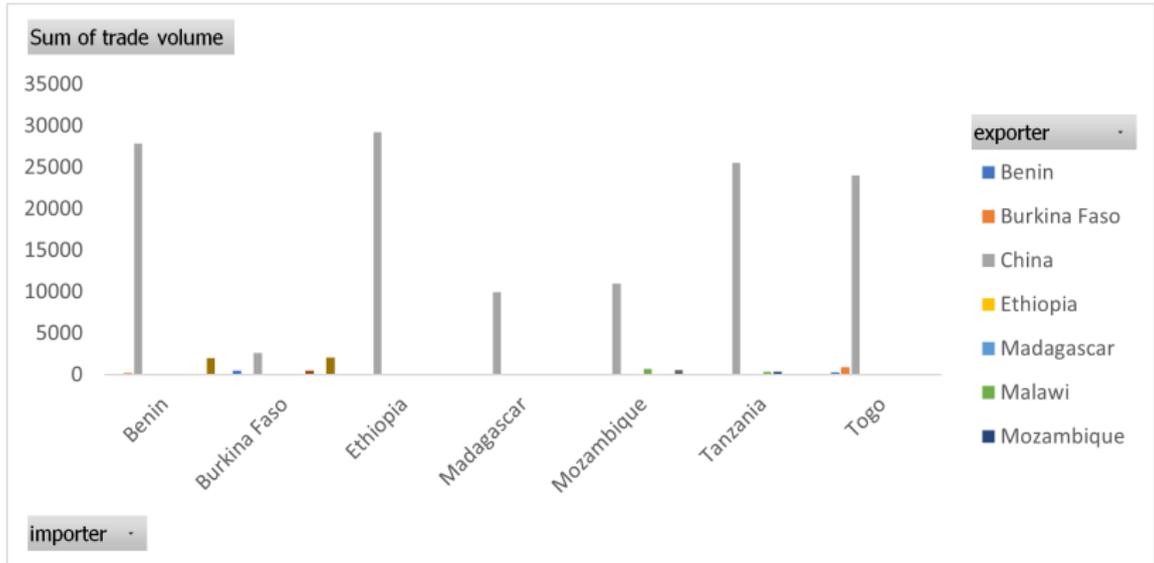
Instrumental variable: ADHP countries

■ Instrument countries



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Trade flows between IV countries and China



Back

Instrumental variable checks

- Endogeneity of the Chinese imports
 - Initial employment uncorrelated with future growth in imports
 - Employment growth and future imports growth: v.small coefficient
 - Control for initial employment*trend
 - **Results:** similar estimates [Table](#)

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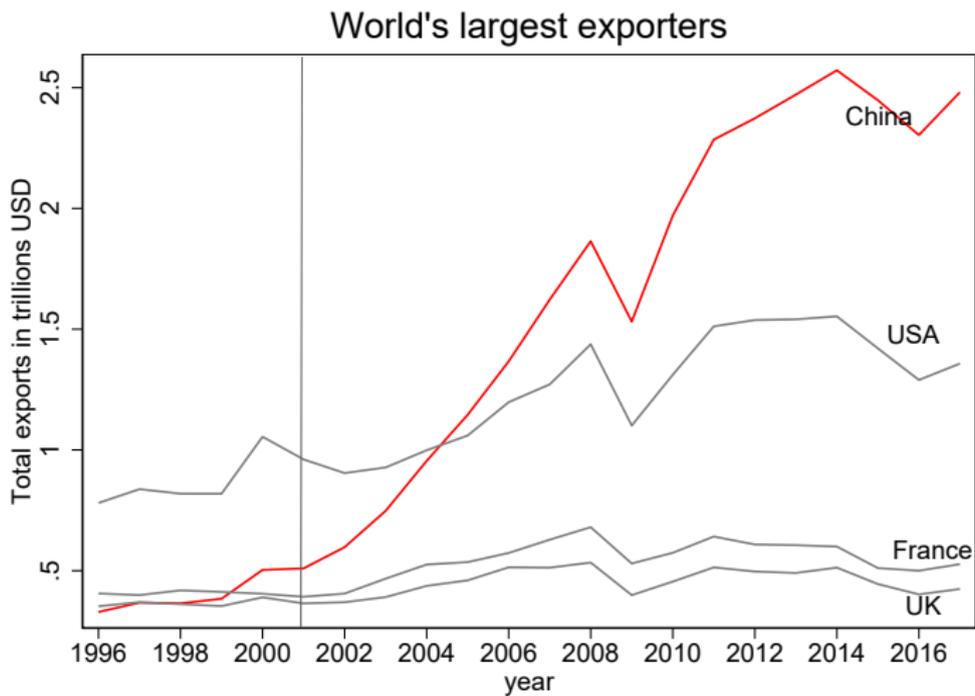
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- Alternative instruments
 - Regional proximity of IV countries → endogenous imports
 - Use same instrument as ADH (2013) and AADHP (2016): Chinese imports to 8 HICs
 - **Results:** similar results, but does not pass the weak instrument test. A subset of the 3 economies passes the test. [Table](#)

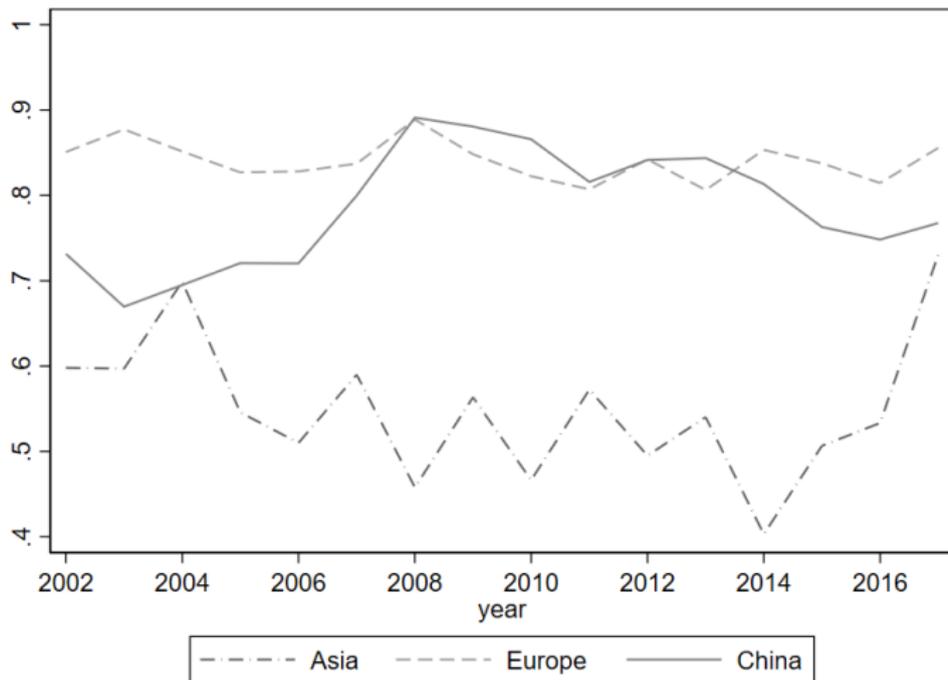
More robustness checks

- Excluding one industry each time
 - Are specific industries driving the results?
 - Top importers, top employers, bottom importers, bottom employers
 - **Results:** estimates not driven by specific industries [Table](#)
- More sample adjustments
 - Include the full sample of years
 - Restrict to 2015-2017
 - Exclude firms where employment varies inconsistently after winsorizing
 - Exclude firms that show up only once in the data
 - **Results:** similar estimates, [Table](#)
- Alternative IPP measures
 - IPP with initial employment
 - IPP with initial output
 - Total imports
 - **Results:** same sign, different magnitudes [Table](#)
- Lagged values of import exposure [Results](#)
 - **Results:** same sign, different magnitudes.

China shock



Intermediate imports share from China and the Rest of the World



Intermediate Chinese imports share to Ethiopia and USA

