European integration, trade, and globalization: Eastern Europe's response to Chinese competition

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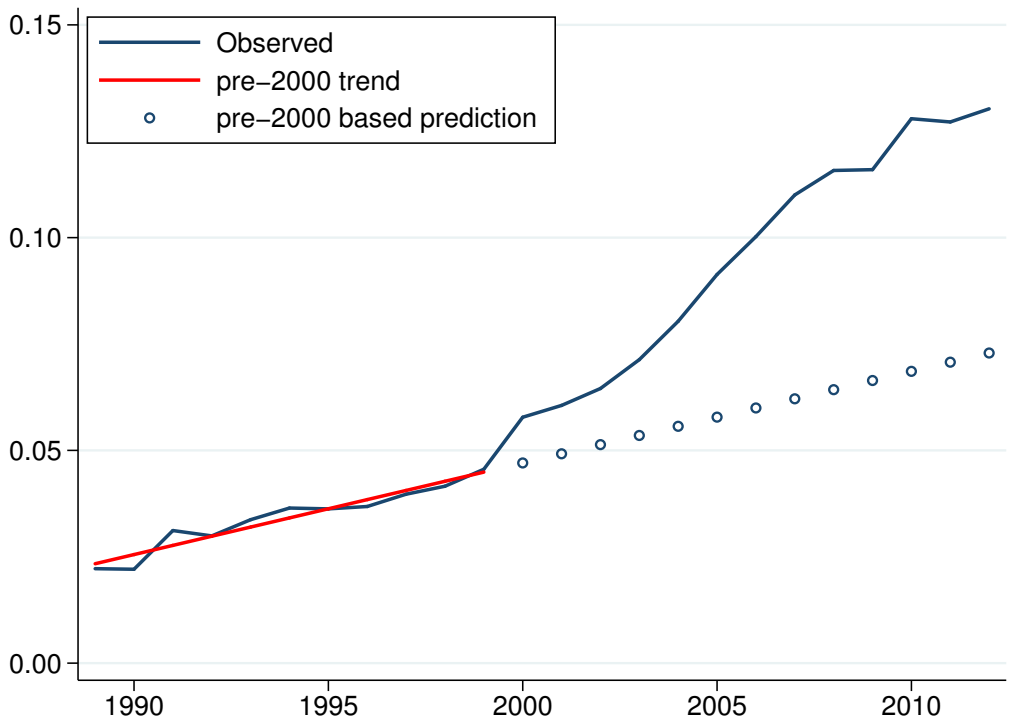
Introduction

Background: Chinese Expansion

Major **transitions** in the organization and geographical structure of international trade during the last 30 years

- Most relevant: **integration** of China in the global trading system

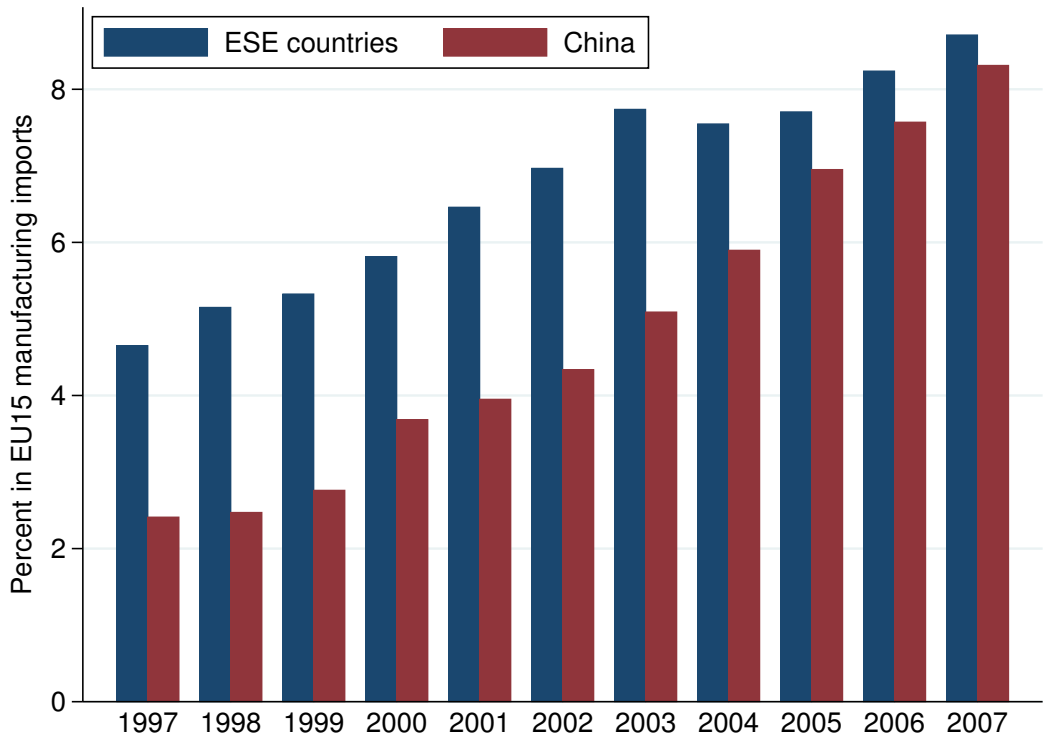


Note: UN Comtrade data, import market share for average HS6 manufacturing product.

Introduction

Background: European Integration

- Economic **integration** between EU15 and Eastern European (ESE) countries since the last decade of last century
- Significant trade **liberalizations** which increased trade flows between EU15 and ESE



Note: UN Comtrade data, aggregate import market share.

Introduction

What we know

Effects on import competing industries: firms, workers → Mixed findings

- Effects on **firms** in 12 European countries (Bloom et al., 2016)
  - **Negative** impact on **employment** and firm survival
  - **Firms** switch into less exposed, more capital intensive industries
- Effects on **employment** in Germany (Dauth et al., 2014)
  - **Minor** employment effects, due to the preceding expansion of Eastern Europe
  - Negative effects are more than **offset** by new export opportunities

What are the effects on **competing** exporters? → no systematic results

- Dauth et al. (2014): Germany diverts sources of its imports
  - China **replaces** exports of Southern European countries (e.g., Italy, Greece)
  - Interactions with Eastern European exports **unanswered**
- Silgoner et al. (2015): Chinese competition had a **negligible** effect on ESE exports

Introduction

This study

We focus on two questions:

1. How **large** is the impact of Chinese competition on Eastern & Southeast European exports in the EU15?
   - Present first **systematic** evidence for this group of countries
   - Work on established identification methods to accommodate our data structure
   - Compare with related studies (Utar & Torres Ruiz, 2013: China vs Mexico in the US)

"We don't have big volumes of cheap products. In big volumes China has an advantage. But specialized production in small volumes, where logistics are important, are our market — that's where we have an advantage."

Rocio Ruiz, former Mexican Trade and Industry Minister
(Financial Times, 2003)

2. Is there a role for **geographic** proximity and the shipping time to deliver goods?
   - **Proximity** can be important (Evans and Harrigan 2005: regional supply networks)
   - Elasticity of trade/exports w.r.t. **shipping** times (Djankov et al. 2010)
   - Parts and components are more time sensitive (Hummels and Schaur, 2013)

$\Rightarrow$ Differential responses have strong policy implications

Introduction

Preview of findings

Product-level evidence: HS6-level exports by 16 ESE countries, 1997-2007

- About 12.81% reduction of ESE product-level exports in the EU15
- Displacement is 40% smaller in 'time-sensitive' industries
- Minor differences across exporters, EU membership does not improve resilience
- ESE ship to fewer destinations, but flows become less concentrated in a single destination

Firm-level evidence: HS6-level exports of Bulgarian firms, 2001-2006

- Export displacement is 3.21% at the firm-product level
- Minor/insignificant effects in time-sensitive industries
- Multi-destination exporters are less affected, effects on multi-product exporters are ambiguous

Implications:

- Effects of Chinese competition on ESE somewhat smaller than those on Mexican firms in the US (Utar and Torres Ruiz, 2013)
- Integration in regional production networks could shield against Chinese competition

Data and estimation framework

Main data sources

Product-level data: UN Comtrade statistics - BACI (Cepii)

- HS6 manuf. goods (HS Chapters 28-96)
- Imports by EU15 countries (BLX = 1 country)
- Focus on imports from 16 ESE countries (different stages of the EU integration process)
- Sample period: 1997-2007, unbalanced panel

$\Rightarrow$ f.o.b. value of exports from country i to EU15 destination j in product k and year t.

Firm-level data: Exporter Dynamics Database (EDD)

- Exports by Bulgarian firms to EU15 destinations
- HS6 manuf. products
- Information on value (USD) and quantity (kg)
- Sample period: 2001-2006, unbalanced panel

$\Rightarrow$ f.o.b. value of exports by firm f in product k and year t to EU15 destination j.

Set of Countries

Measurement and identification

China's market share as a measure of competition:

$$s_{jkt}^{CN} = \frac{M_{jkt}^{CN}}{M_{jkt}}$$

Bartik instrument: widely used in empirical studies on Chinese impact

- Cross-sectional variation across industries/sectors

$$China_{kt} = \underbrace{\frac{\sum_{n \neq j} M_{nkt}^{CN}}{\sum_{n \neq j} M_{nkt}}}_{\text{cross-product-time variation}}$$

n = non-EU15 high-income countries (AUS, CAN, NZL, NOR, CHE)

- Cross-sectional component for $n \neq j$ avoids capturing j's preferences
- Time-varying component captures smooth/continuous evolution of Chinese supply capacities
- Instrument varies only in kt, but we need jkt

Measurement and identification

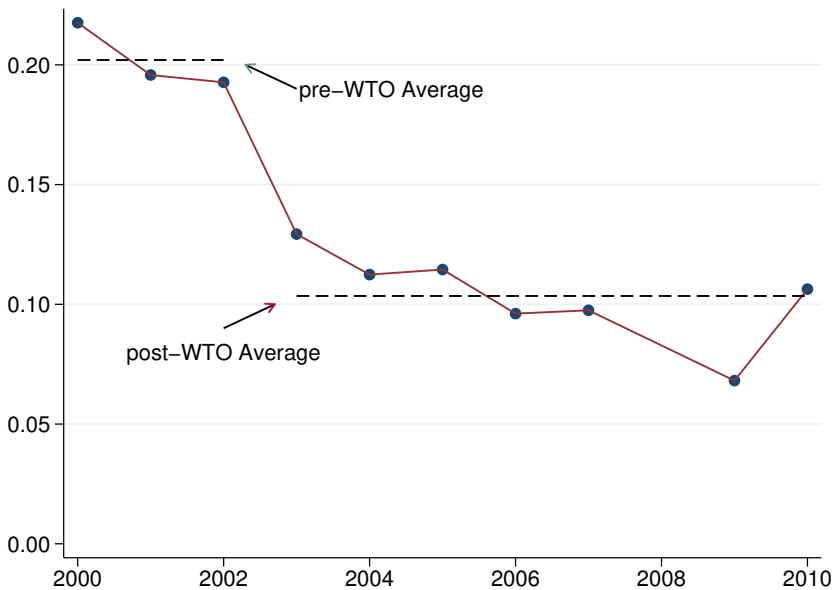
Augmented Instrumental Variable

Predict differential penetration of $China_{kt}$ across j:

$$IV_{jkt} = China_{kt} \times w_j$$

Weight w_{jb} based on information on *Hong Kong re-exports*

- GATT member since 1986, WTO since 1995 (also after handover to China in 1997)
- Important export-hub for Chinese goods, but mark-up for transportation/entrepôt services (Feenstra and Hanson 2004)



Source: World Bank Trade in Services Database.

- Chinese imports of transport services from HK (share of total) decline after China's WTO entry
- Destination of HK re-exports proxy probability of Chinese expansion in j

define $w_j = \frac{REX^{HK}_{j\bar{b}}}{REX^{HK}_{EU\bar{b}}}$;

$\bar{b} = avg(1999 - 2001)$

Distribution across EU15

Empirical findings: *China's impact on ESE exports* Desc. Evidence

Results for (log) export revenues: product-level and firm-level estimations

Data set	(1) Product-level: ESE exports 1997-2007	(2)	(3) Firm-level: Bulgaria 2001-2006	(4)
	OLS	2SLS	OLS	2SLS
China (s_{jkt}^{CN})	-1.222**	-2.343**	-0.651	-1.172^{a}
	(0.036)	(0.158)	(0.786)	(0.598)
Import demand	0.569**	0.576**	0.363**	0.229**
	(0.006)	(0.006)	(0.094)	(0.025)
Observations	1,628,298	1,628,298	268,822	268,822
N. Clusters	44,669	44,669	15,738	15,738
Kleibergen-Paap (F-stat)		1,163.9		158.7
Exporter-importer-HS6 FE	✓	✓	✓	✓
Exporter-importer-year FE	✓	✓	✓	✓
Firm FE			✓	✓

Note: SE adjusted for clustering at product-destination level. Statistical significance: $^{a} = p < 0.1$, $^{*} = p < 0.05$, $^{**} = p < 0.01$.

- ESE pooled: $5.47 \times 1.222 = 6.68\%$ (OLS); $5.47 \times 2.343 = 12.81\%$ (IV estimation)
- Firm-level: $2.74 \times 1.172 = 3.21\%$ (IV)
- 2SLS coefficients are larger $\rightarrow$ OLS lower bound?

Other Specifications Other IV

Time-sensitivity

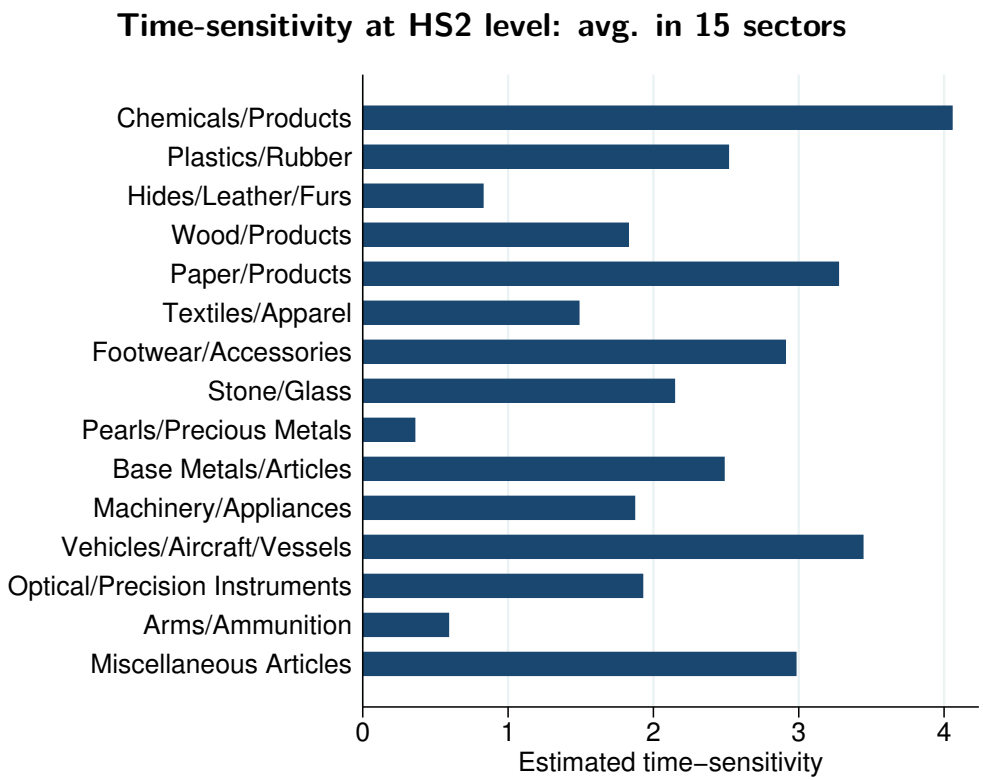
Measurement

$\Rightarrow$ Next question: Is there a role for geographic proximity?

- Avg. sea distance of Chinese shipments to EU15: $\approx 15,000$km
- Avg. transport time Guangzhou - Rotterdam (20kts/hr): ≈ 20 days

Proxy of time-sensitivity (Hummels and Schaur 2013, US data)

- HS2 level: time-sensitivity based on estimated mode-switching probability



Time-sensitivity I

Product-level estimates

ESE exports, product-level 1997-2007: effect at least 40% smaller in time-sensitive industries

	(1)	(2)	(3)	(4)	(5)	(6)
Time-sensitivity:	binary (median)		binary (median)		continuous (SD = 1)	
Sample/time-sens.:	low	high	full sample		full sample	
	OLS	OLS	OLS	2SLS	OLS	2SLS
Simple measure						
China's market share	-1.121**	-1.019*	-1.520**	-3.081**	-1.006**	-1.660**
	(0.044)	(0.057)	(0.043)	(0.163)	(0.041)	(0.183)
× time-sensitivity			0.858**	2.547**	0.841**	2.476**
			(0.069)	(0.212)	(0.083)	(0.311)
Strict measure						
China's market share	-1.146**	-1.008*	-1.769**	-3.800**	-1.134**	-2.064**
	(0.046)	(0.052)	(0.046)	(0.180)	(0.036)	(0.158)
× time-sensitivity			1.154**	3.340**	0.597**	1.687**
			(0.066)	(0.201)	(0.042)	(0.128)

Note: Standard errors adjusted for clustering at the product-destination level. Statistical significance: $^{a} = p < 0.1$, $^{*} = p < 0.05$, $^{**} = p < 0.01$. All specifications include ijk FE, ijt FE, and control variable (import demand).

Checks

Time-sensitivity II

Firm-level estimates

Bulgarian exports, 2001-2006

	(1)	(2)	(3)	(4)	(5)	(6)
	Time Sensitivity Simple, OLS		Firm-level OLS Quartiles		Firm-level IV Quartiles	
Time-sens.	low	high				
China's market share	-1.567*	-0.135	-0.453**	-0.496**	-1.578*	-1.721**
	(0.639)	(0.985)	(0.175)	(0.175)	(0.619)	(0.620)
× High Q. time-sensitivity (*Simple*)			0.168		0.902	
			(0.215)		(0.654)	
× High Q. time-sensitivity (*Strict*)				0.240		1.246^a
				(0.216)		(0.661)
Firm FE	✓	✓	✓	✓	✓	✓

Note: Standard errors adjusted for clustering at the product-destination level. Statistical significance: $^a = p < 0.1$, $^* = p < 0.05$, $^{**} = p < 0.01$. All specifications include jk FE, jt FE, and control variable (import demand).

Results

Summary

First study investigating China's impact on ESE exports using panel data analysis

- **Finds** significant impact of Chinese competition on product and firm level trade flows from Eastern Europe in the EU15

Focus on ESE's **geographic** proximity and time advantage over China

- Substantially **smaller** displacement in time-sensitive industries

Differential effects across countries/firms suggest

- Similar effects across exporters, no significant advantage through EU membership
  Country-pair Candidate Vs Members
- Multi-destination firms are more resilient Multi firm

Policy Considerations

- Trade literature finds that (Chinese) competition selects more productive and technologically advanced European firms
- Mixed welfare effects of trade competition (Workers...)
- Our results point towards plausible strategies for policy makers:

1. Integration in regional production networks could shield from external competition
2. Investments in (physical and non-physical) infrastructure connecting European production chains are important
3. Other initiatives aimed at "connecting" European firms are also valuable
4. Evidence speaks to recent developments $\rightarrow$ *China Belt and Road initiative*

Thank you!

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Exporting countries in our product-level sample

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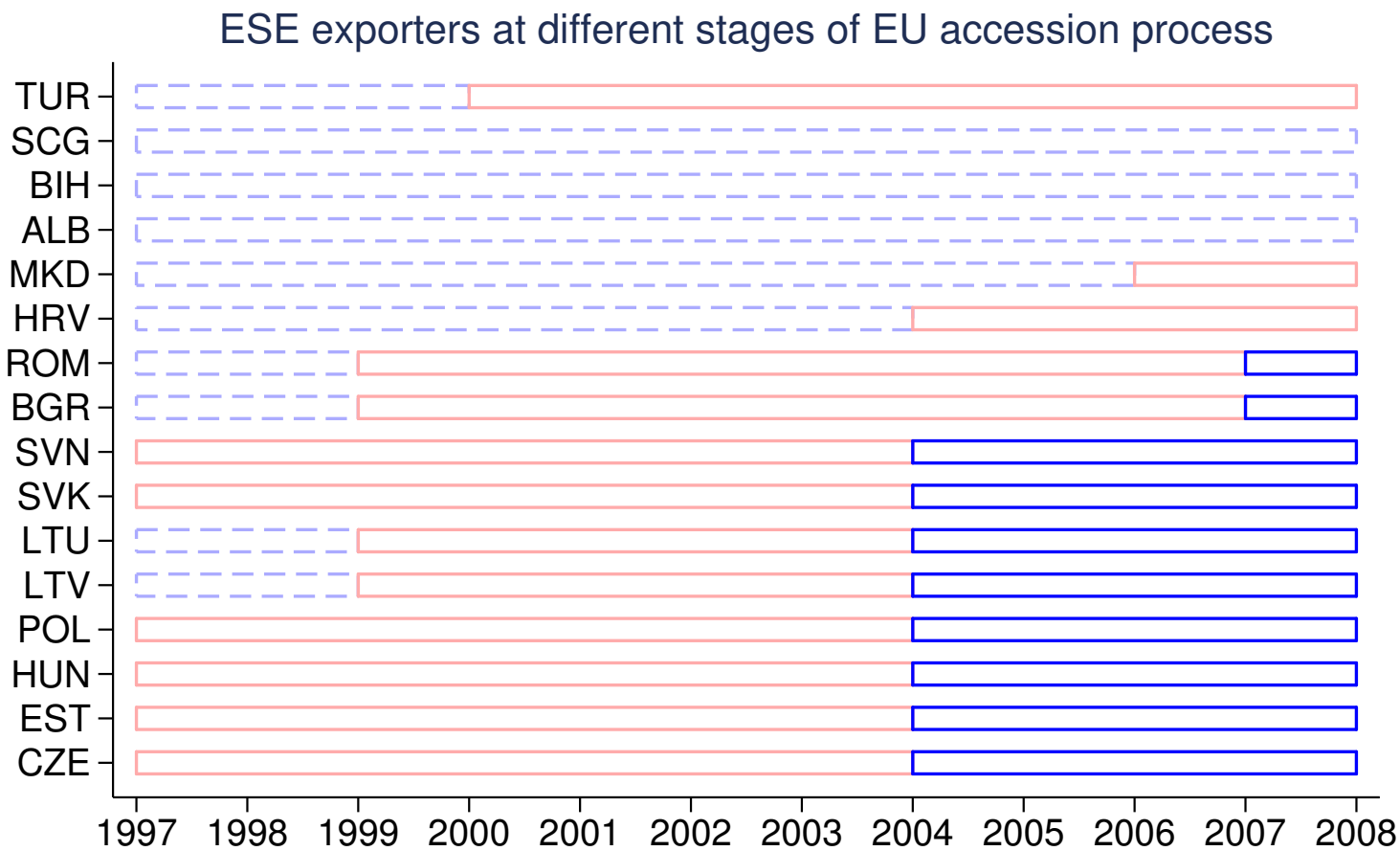

Dashed line: no EU membership candidate status,
Light solid line: attained candidate status,
Dark solid line: full EU member.

Data and estimation framework: *summary statistics* back

ESE Product-level data (1997-2007): about 15% of potential trade flows

Focus on within-variation: i.e. flows with > 1 observation in ijk and ijt
258,569 ijk triplets and 1.6 million observations in total ($\approx$ 6 obs. per ijk)

	Dimension	Mean	Std Dev	Min	Max
China's market share (s_{jkt}^{CN})	overall	0.070	0.126	0	0.987
	between		0.117	0	0.983
	within		0.055	-0.554	0.844
log ESE exports ($\ln X_{ijkt}$)	overall	3.846	2.331	0	14.578
	between		1.883	0	14.273
	within		1.211	-5.837	11.940

Bulgarian firm-level data (2001-2006): about 9,097 firms per year on average

Focus within-variation: i.e. flows with > 1 observation for each f and jk
124,280 fjk triplets and 211,724 observations in total ($\approx$ 1.7 obs. per fjk)

	Dimension	Mean	Std Dev	Min	Max
China's market share (s_{jkt}^{CN})	overall	0.108	0.142	0	0.975
	between		0.144	0	0.948
	within		0.029	-0.374	0.590
log firm exports ($\ln X_{fjkt}$)	overall	7.724	3.153	-0.782	20.411
	between		2.908	-0.782	19.703
	within		0.962	-1.890	15.166

Distribution of HK re-exports across EU15

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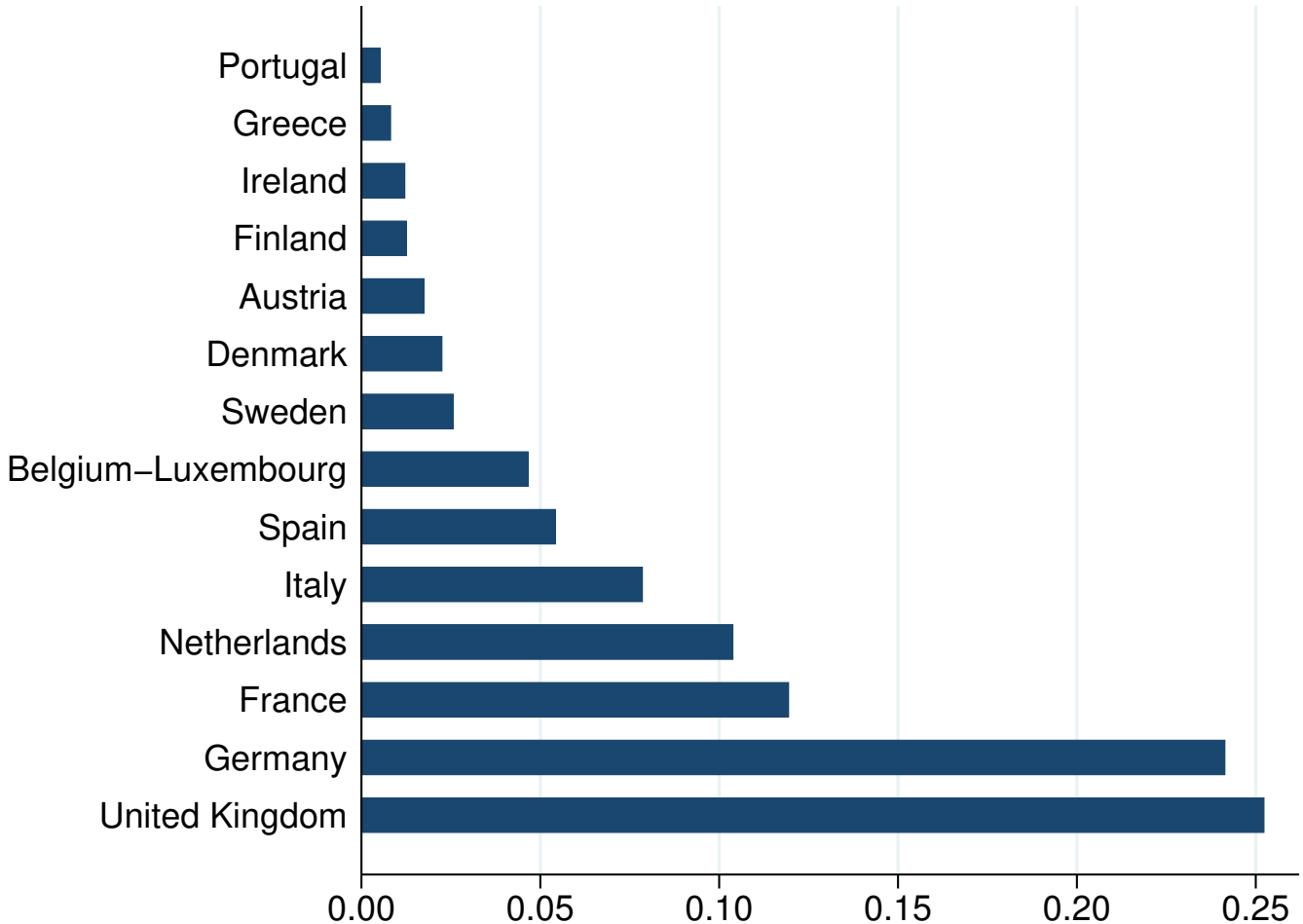

Source: UN Comtrade statistics, own calculations. Fractions denote share in total HK re-exports in years 1999-2001.

Measurement and identification: *comparative descriptive analysis*

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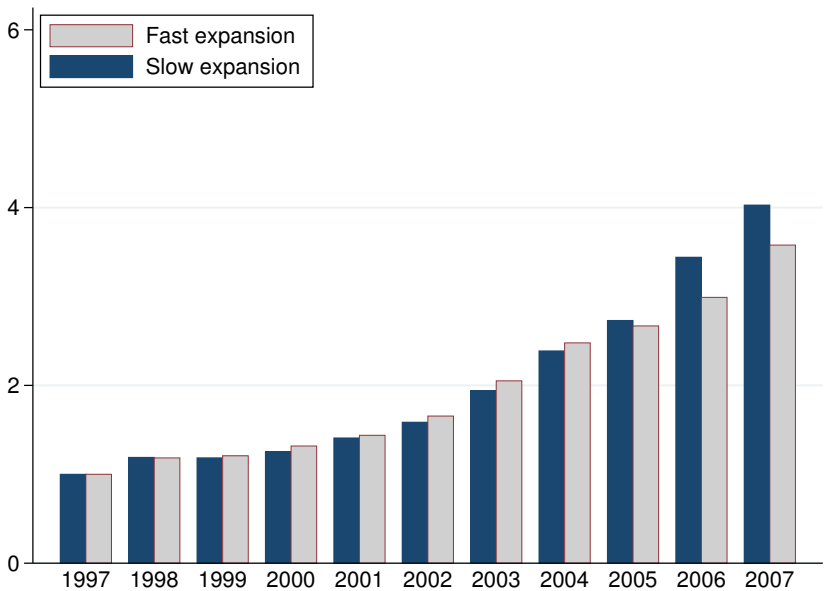
Both our measures suggest differential performance of ESE exports to EU15

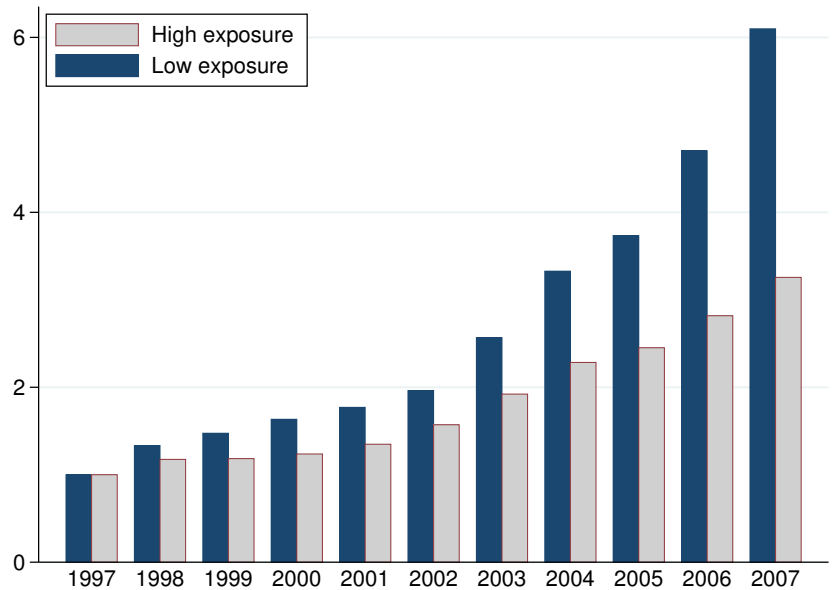
- Baseline measure s_{jkt}^{CN}: faster Chinese expansion $\rightarrow$ slower ESE export growth
- Augmented Bartik IV_{jkt}: higher exposure $\rightarrow$ slower ESE export growth

(a) Baseline measure



Note: $expansion_{jk} = \Delta s_{jk,97-07}^{CN}$, top vs. bottom quartile

(b) Augmented Bartik



Note: $exposure_{jk} = s_{nkb}^{CN} \times w_{j}^{HK,\bar{b}}$, top vs. bottom quartile

Empirical findings: *robustness checks* back

Product-level data, pooled ESE exporters 1997-2007

⇒ robust to alternative clustering, aggregation, and controlling for product-portfolio dynamics.

	(1) OLS	(2) 2SLS	(3) K-P F-Stat
Baseline	-1.222** (0.036)	-2.343** (0.158)	1,163.9
1. Cluster products	-1.222** (0.058)	-2.343** (0.240)	444.9
2. Aggregate EU15	-1.529** (0.108)	-2.044** (0.267)	411.0
3. Add FE kt	-0.661** (0.032)	-2.026** (0.548)	191.0
4. Add FE kt + tariff$_{ikt}$	-0.661** (0.032)	-2.040** (0.549)	191.1
5. Add FE ikt	-0.646** (0.036)	-2.293** (0.590)	178.2

Note: Table shows estimated β (standard errors) for alternative specifications. First row shows baseline, row 2 and 3 have 3,903 and 3,921 clusters, respectively.

Firm-level data, Bulgarian exporters 2001-2006

⇒ robust to inclusion of time-varying firm-level controls.

Specification	(1) Baseline	(2) Firm size, Large Firms	(3) Firm seniority
OLS	-0.651 (0.786)	-1.773** (0.185)	-0.607 (0.778)
Bartik IV	-1.172^a (0.598)	-2.121** (0.377)	-1.967**(0.622)
MFA IV	-1.793* (0.684)	-1.297* (0.553)	-1.533* (0.664)

Note: Table shows estimated β (standard errors) for alternative specifications. First column shows baseline. Column (2) interaction with dummy for large firm (= export revenues at the product level in t higher than the mean), column (3) for firm seniority (= years exporting a product).

Empirical findings: *alternative instruments* back

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Data/sample	Product-level ESE 1997-2007							Firm-level Bulgaria 2001-2006	
Instrument	Baseline	US PNTR		MFA Quotas I		MFA Quotas II		MFA Quotas II	
Estimation:	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
China (s_{jkt}^{CN})	-2.343**		-2.807**		-2.648**		-5.011**		-1.793*
	(0.158)		(0.398)		(0.314)		(0.329)		(0.684)
US PNTR		-1.119**							
		(0.167)							
MFA Quota fill rate				-1.161**		-2.597**		-0.708**	
				(0.126)		(0.127)		(0.259)	
Import demand	0.576**	0.560**	0.579**	0.530**	0.578**	0.554**	0.593**	0.206**	0.239**
	(0.006)	(0.006)	(0.007)	(0.010)	(0.012)	(0.006)	(0.007)	(0.023)	(0.025)
Observations	1,628,298	1,628,298	1,628,298	399,507	399,507	1,628,298	1,628,298	268,822	268,822
N. Clusters	44,669	44,669	44,669	9,866	9,866	44,669	44,669	15,738	15,738
Kleibergen-Paap (F-stat)	1163.9		337.6		213.4		341.1		100.9
Importer-HS6 FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Importer-year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE								✓	✓

Note: Standard errors adjusted for clustering at product-destination level. Statistical significance: $^{a} = p < 0.1$, $^{*} = p < 0.05$, $^{**} = p < 0.01$.

Note on measurement

- US PNTR: $(\tau_k^{col2} - \tau_k^{MFN}) \times D_t(= 1|year \geq 2002) \times w_j$
- MFA Quota: $Fillrate_k \times D_{kt}(= 1|removed) \times w_j$
  - MFA Quotas I = only T&C subsample (i.e., HS Chapters 50-63)

Robustness: time-sensitivity and other industry characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS Baseline specification				IV (red. form)	
	Interm. inputs	Skill-intensity	Contracting intensity	Combined	Combined	Placebo
China (s_{jkt}^{CN})	-1.858**	-1.807**	-1.818**	-2.343**	-5.104**	-1.083**
	(0.049)	(0.046)	(0.077)	(0.106)	(0.370)	(0.336)
× time-sensitivity	0.998**	1.026**	1.167**	0.925**	2.986**	-0.102
	(0.069)	(0.069)	(0.069)	(0.072)	(0.235)	(0.224)
× intermediate input	0.508**			0.719**	1.648**	0.656*
	(0.073)			(0.095)	(0.283)	(0.255)
× skill-intensity		0.570**		0.520**	0.994**	0.898*
		(0.089)		(0.090)	(0.289)	(0.360)
× contracting-intensity			0.057	0.484**	1.324**	0.322
			(0.075)	(0.098)	(0.311)	(0.258)
Observations	1,628,298	1,628,298	1,628,298	1,628,298	1,628,298	767,418
N. Clusters	44,669	44,669	44,669	44,669	44,669	38,703
Kleibergen-Paap F-stat					72.3	86.5

Note: Standard errors in parentheses clustered at product-destination level. Statistical significance: ^{a} $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. All specifications include ijt and ijk FEs, control variable (import demand) suppressed.

- Time-sensitivity not mixed up with other industry characteristics
- Column (6): export response of low-wage Asian exporters
  - these countries have no competitive advantage in time-sensitive industries (Bangladesh, Cambodia, India, Indonesia, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam)

back

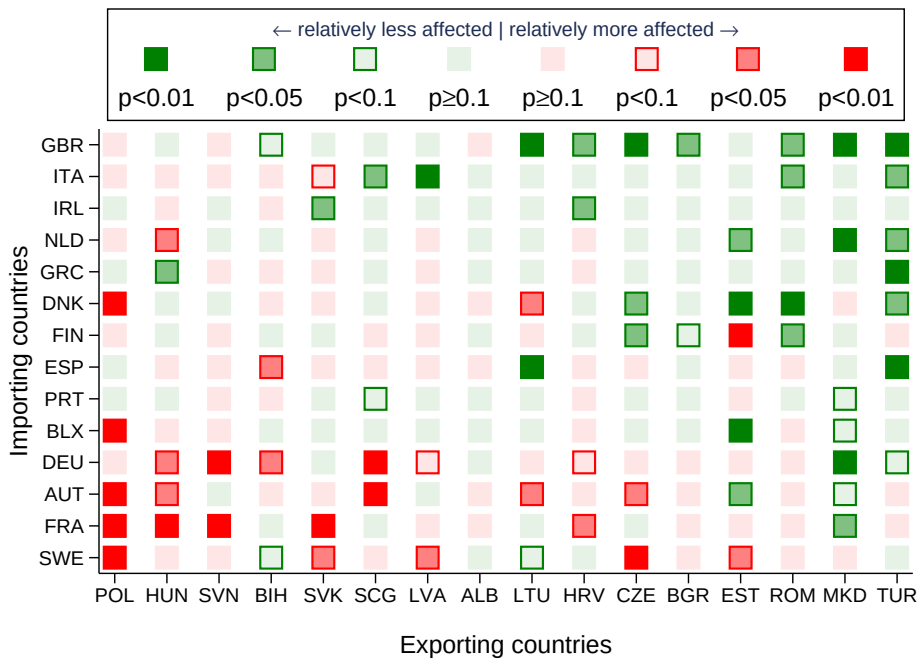
Heterogeneous effects

Country-pair specific coefficients

Interact Chinese competition with country-pair specific indicator I_{ij} back

$$\ln X_{ijkt} = \alpha + \beta s_{jkt}^{CN} + \beta^{ij}(s_{jkt}^{CN} \times I_{ij}) + \gamma \ln M_{jkt} + \mu_{ijk} + \mu_{ijt} + \nu_{ijkt}$$

- $\hat{\beta}^{ij}$ indicates *differential response* for ij, estimate for each ij-combination



$\Rightarrow$ no sign. deviations in $\approx 75\%$ of ij-pairs; SEE less affected than EEC?

Heterogeneous effects: *EEC vs SEE and EU membership*

Dep. var.: log export revenue	(1)	(2)	(3)	(4)	(5)	(6)
	EEC vs. SEE exporters			EU membership		
	OLS	Bartik IV	Bartik IV	OLS	Bartik IV	Bartik IV
China (s_{jkt}^{CN})	-0.919**	-1.250**	-3.338**	-0.591**	-3.117**	-3.310
	(0.046)	(0.206)	(0.846)	(0.052)	(0.850)	(2.165)
× EEC_i	-0.525**	-1.814**	1.774[a]	0.088	3.493**	3.475**
	(0.057)	(0.258)	(1.051)	(0.071)	(1.223)	(1.202)
× $EU\text{-member}_{it}$				-0.292**	-1.514**	-1.518**
				(0.060)	(0.493)	(0.490)
× $EU\text{-candidate}_{it}$						0.219
						(1.881)
Observations	1,628,298	1,628,298	1,516,895	1,516,895	1,516,895	1,516,895
N. Clusters	44,669	44,669	42,795	42,795	42,795	42,795
Kleibergen-Paap (F-stat)		512.2	81.1		36.6	6.3
Exporter-HS6-year FE			✓	✓	✓	✓

Note: Standard errors in parentheses clustered at product-destination level. Statistical significance: [a] $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. All specifications include ijt and ijk FEs, control variable (import demand) suppressed.

⇒ EEC countries (esp. upon EU entry) seem to suffer more, but causality unclear

- IV estimates very imprecise and low F-statistic
- reallocation of resources away from China-competing export lines?

back

Heterogeneous effects

Multi-product and multi-destination firms

Firms face trade-off between size/productivity and flexibility back

- theory: Thesmar and Thoenig (2000), more recent: Macedoni and Xu (2018)
- related: standardization vs customization (Holmes and Stevens 2014)
  - small firms serving niche markets with customized products less affected by China

Assess differential response of

- multi-product exporters: sell > 1 HS6 good to any destination in t_0
- multi-destination exporters: sell one HS6 good to > 1 destination in t_0

	(1)	(2)	(3)	(4)
	multi-destination		multi-product	
	OLS	2SLS	OLS	2SLS
China's market share (jkt)	-2.377**	-9.351**	-1.051	-2.684**
	(0.870)	(1.199)	(1.001)	(0.944)
$\times$ Multi-destination$_{ft_0}$	1.741**	4.239**		
	(0.345)	(0.295)		
$\times$ Multi-product$_{ft_0}$			0.399	1.508*
			(0.589)	(0.687)
Observations	268,822	268,822	268,822	268,822
N. Clusters	15,738	15,738	15,738	15,738
Kleibergen-Paap (F-stat)		31.8		79.3

Note: Standard adjusted for clustering at product-destination level. Statistical significance: $^{a} = p < 0.1$, $^{*} = p < 0.05$, $^{**} = p < 0.01$. All regressions include product-destination, importer-year, and firm fixed effects. Log import demand included as control variable (not displayed).

Additional results

Geographical diffusion of ESE exports

New geographic patterns of ESE exports?

- use aggregated sample of i's exports to $\sum j$ =EU15
- extensive margin: number of exits from and entries into destinations
- intensive margin: share of exports shipped to main destination market (defined at t_0)

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	Entries		Exits		Share main	
	OLS	Bartik IV	OLS	Bartik IV	OLS	Bartik IV
China's market share	0.013	-0.012	0.300*	1.784**	-0.084**	-0.900**
	(0.044)	(0.164)	(0.121)	(0.552)	(0.019)	(0.089)
Observations	209,495	209,495	209,495	209,495	209,495	209,495
N. Cluster	3,283	3,283	3,283	3,283	3,283	3,283
Kleibergen-Paap (F-stat)		225.7		225.7		225.7

Note: Standard errors in parentheses adjusted for clustering at the product-level. Statistical significance: $^{a} = p < 0.1$, $^{*} = p < 0.05$, $^{**} = p < 0.01$. All specifications include ik-FE, it-FE, and control variable (import demand).

(i) no impact on entries, but more exits → fewer markets are served

(ii) less exports to main destination → remaining exports more evenly spread

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