Are US-China Tariffs Reshaping Global Supply Chains?

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Google searches at all time high

Nearshoring

Deglobalization
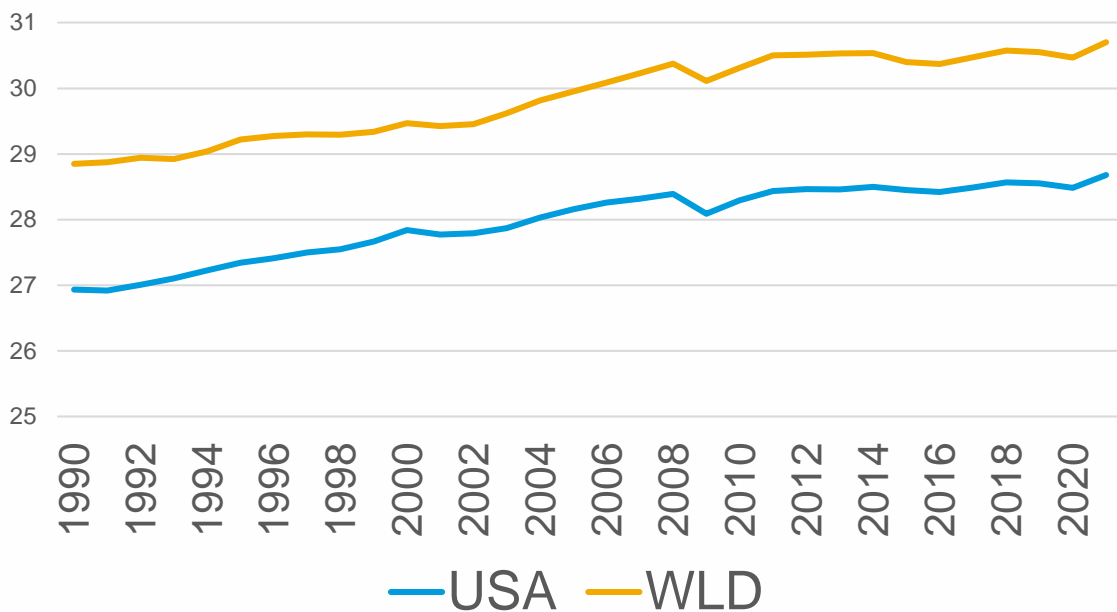
Reshoring

July 2020

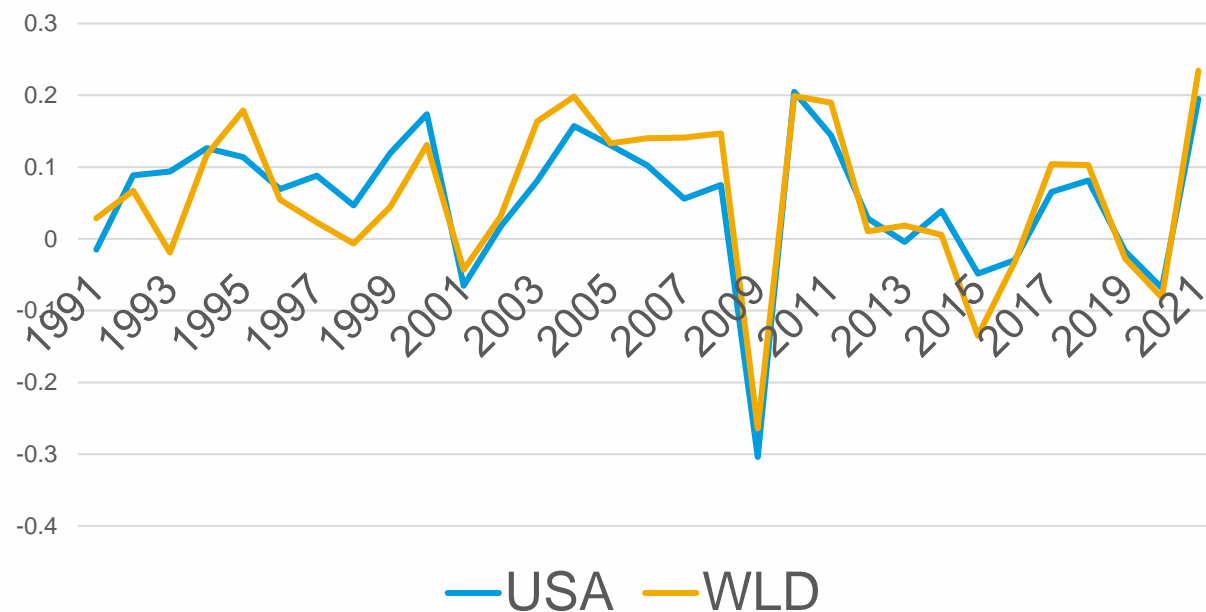April 2022

August 2022

Deglobalization everywhere but in (aggregate) trade data

Log of Total Imports

Import Growth

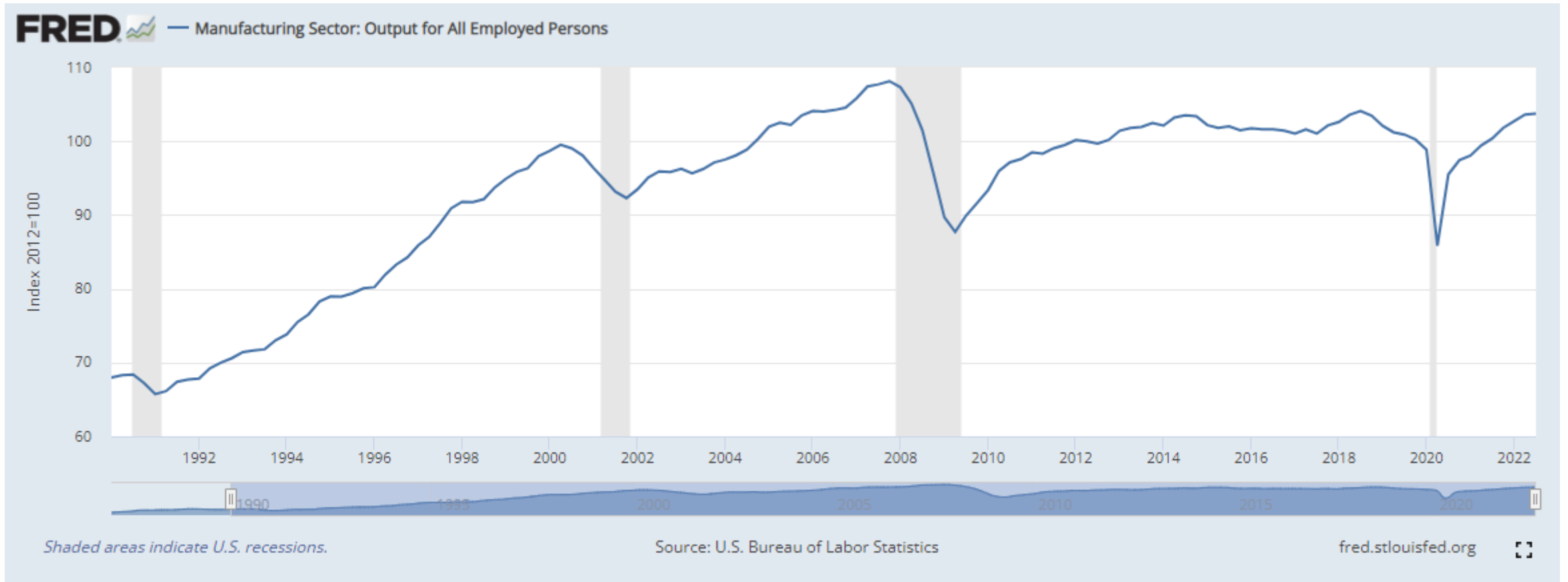
Source: World Bank

No evidence of reshoring in US manufacturing data

Manufacturing Sector: Output for All Employed Persons

Index 2012=100

Shaded areas indicate U.S. recessions.

Source: U.S. Bureau of Labor Statistics

fred.stlouisfed.org

This paper

Background: US imposed tariffs on 60 percent of imports from China in 2018-19

How are US tariffs on China affecting import patterns?

- Wait and see: Uncertainty about persistence of polices; trade is sticky—beachhead effects

- Seek new suppliers: Nearshoring, reshoring, friendshoring, diversification

We use granular US trade data between 2017 and 2022 to explore:

- whether US tariffs are reshuffling supply chains

- the extent to which this reshuffling is taking the form of reshoring, nearshoring, friendshoring and/or diversification

- what country characteristics matter in the reorganization of supply chains

Related literature

US consumers and importers have borne the brunt of the tariffs through higher prices (Amiti, Redding, and Weinstein, 2019; Fajgelbaum, Goldberg, Kennedy, and Khandelwal, 2020; Cavallo, Gopinath, Neiman, and Tang, 2021; Flaaen, Hortaçsu, and Tintelnot, 2020)

The tariffs reduced US export growth, employment, and real income in China and US (Handley, Kamal, and Monarch, 2020; Flaaen and Pierce 2019; Amiti et al. 2019; Fajgelbaum et al. 2020)

Fajgelbaum, Goldberg, Kennedy, Khandelwal, and Taglioni (2023) examine the impact of the US-China trade war on exports by third countries, finding that they largely increased exports to the US and to the rest of the world in response to the tariffs
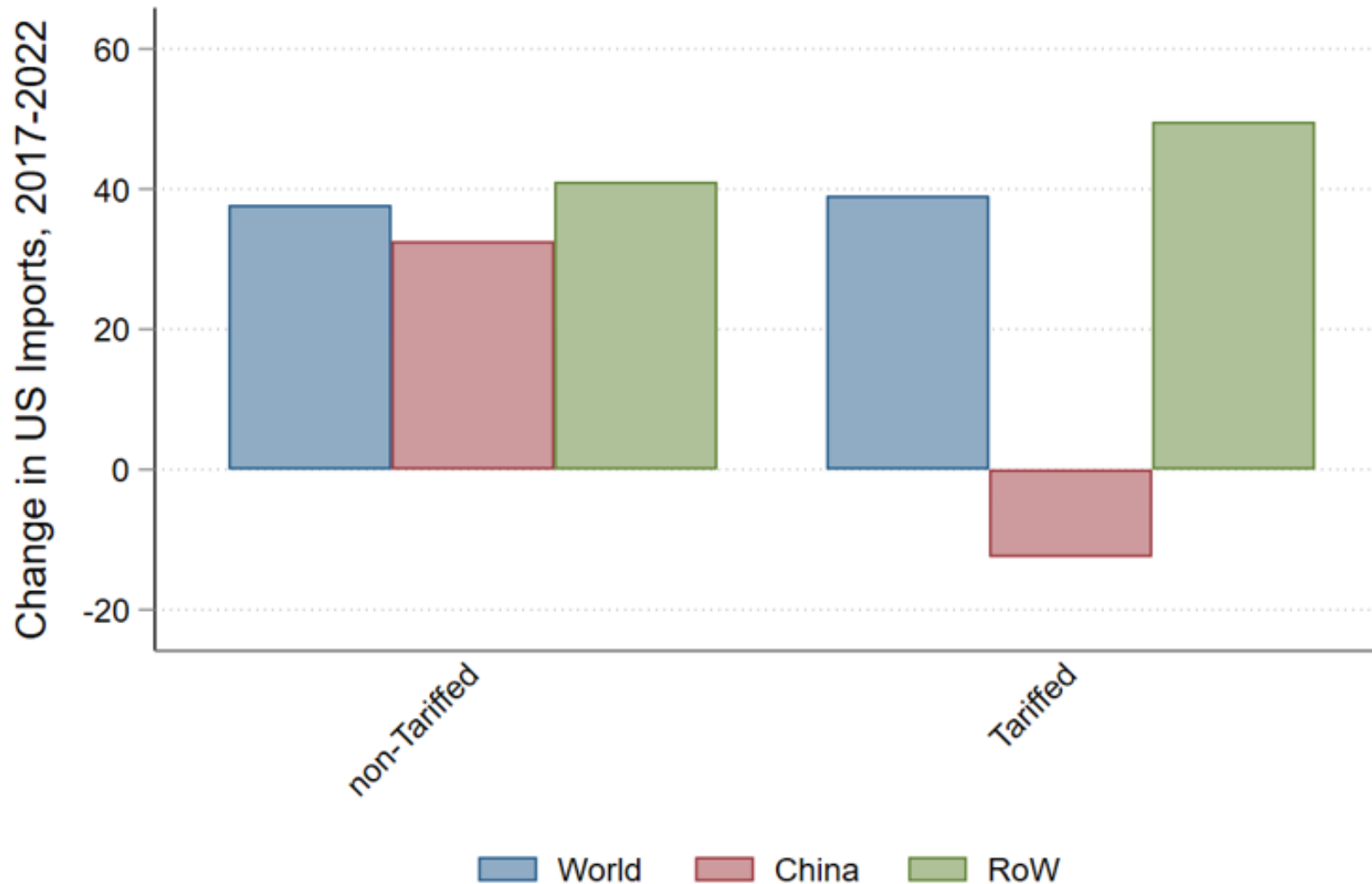
Decoupling is happening

China's share of US imports declined by 5 percentage points from 2017 to 2022

China Share of US Imports
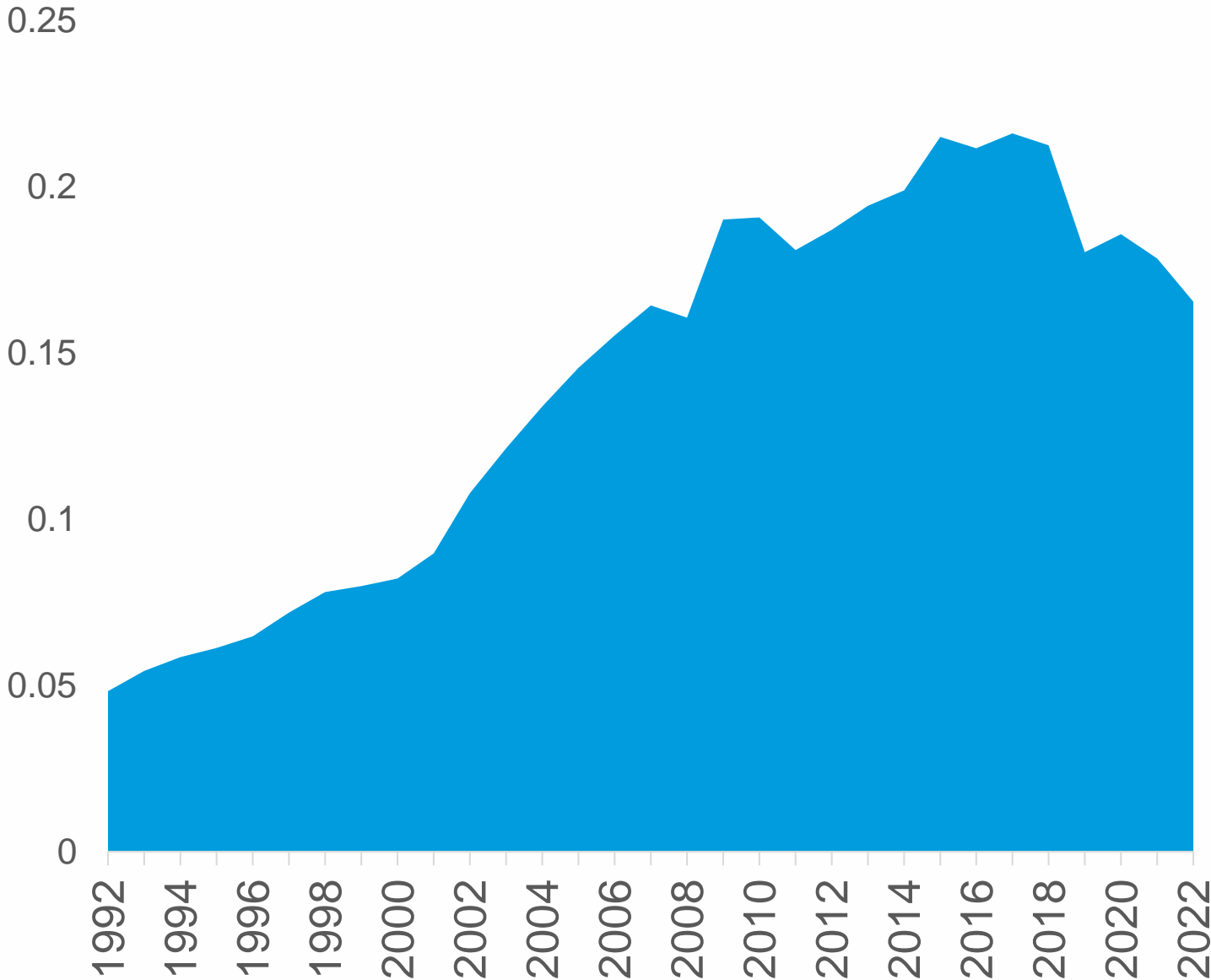
China decline was concentrated in tariffed goods

Biggest winners Vietnam & Taiwan
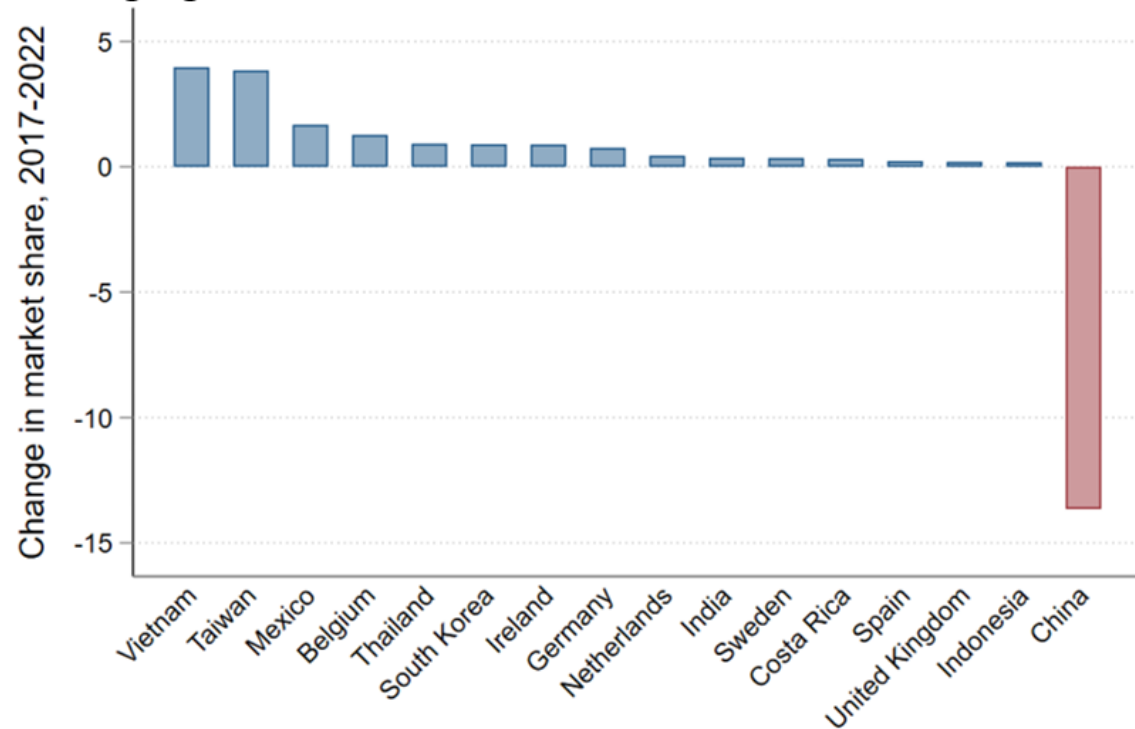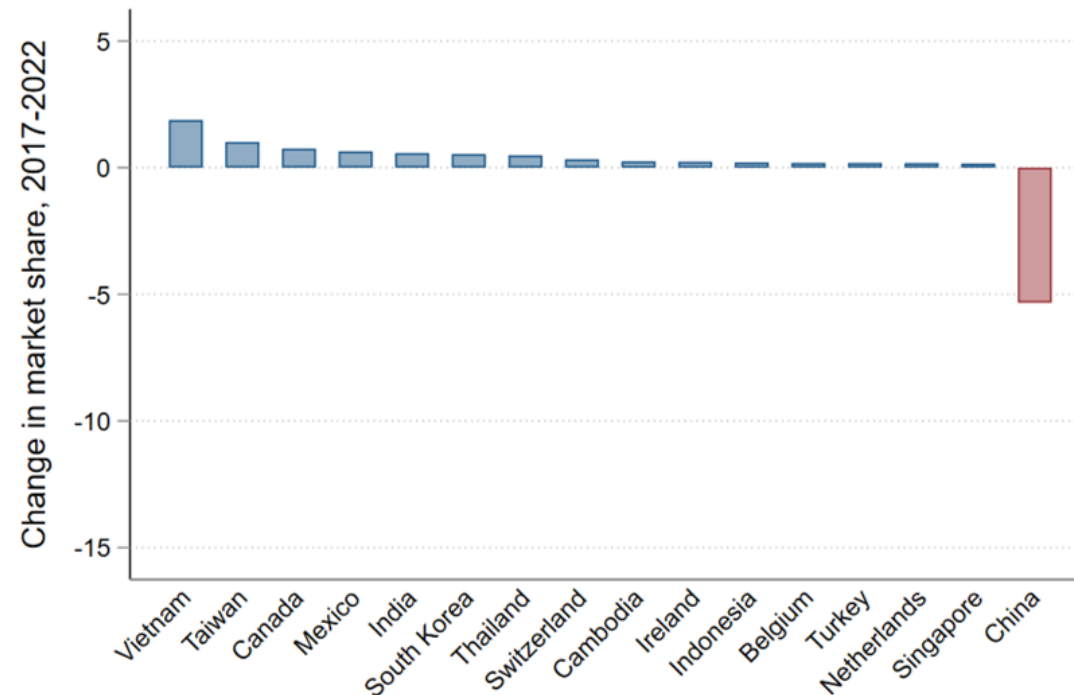
But dependence on China may still be an issue: Countries that export more to the US, import more from China

Trade in Electronics—HS 85
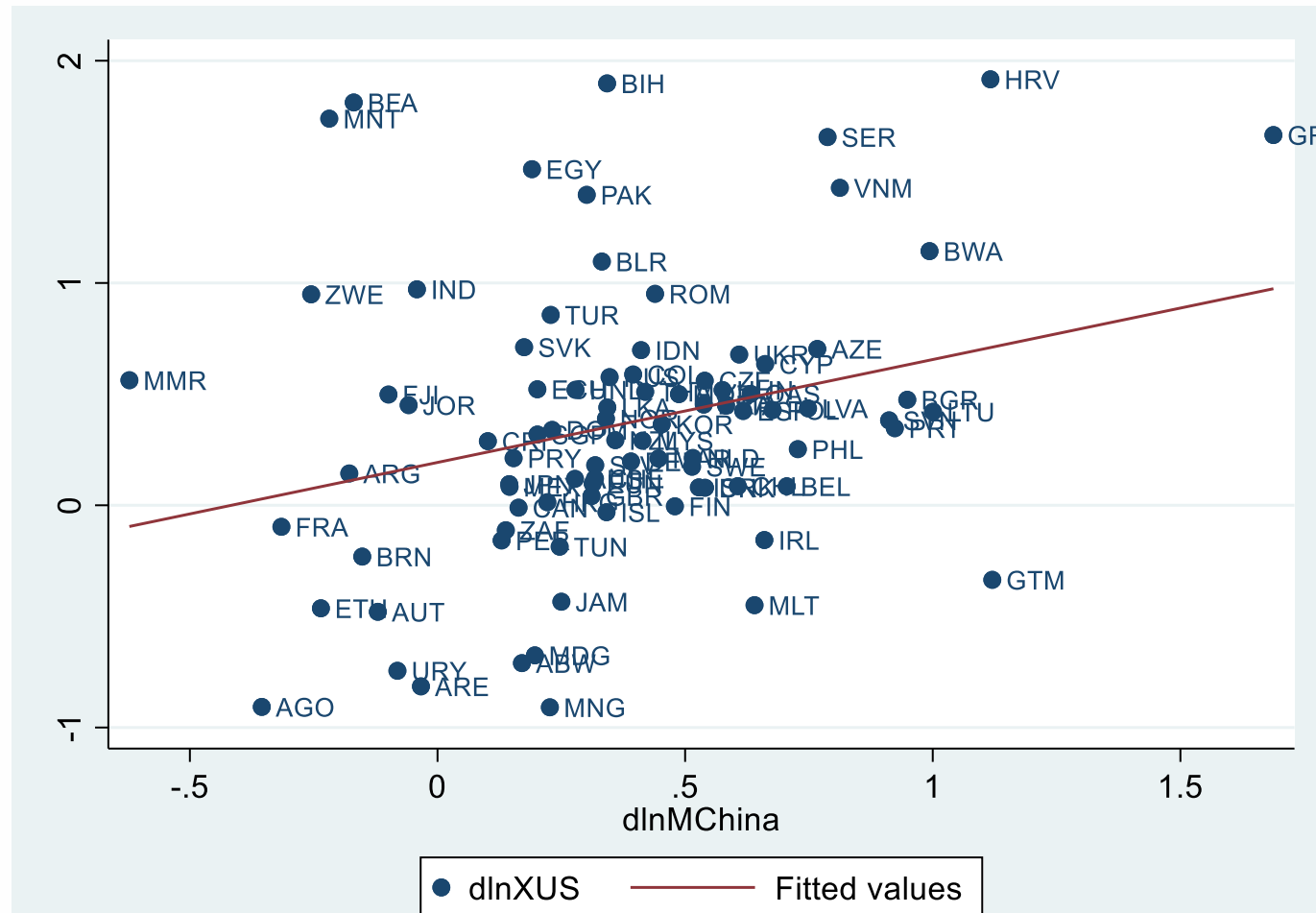
Methodology—focus on US product level imports

Imports from China: $\ln(M_{ik2022}) - \ln(M_{ik2017}) = \alpha_k + \beta_0 China_k + \beta_1 tariff_k + \beta_2 China*tariff_k + \varepsilon_{ik}$

Reshoring: $\ln(M_{k2022}) - \ln(M_{k2017}) = \alpha_k + tariff_k + \varepsilon_k$

Diversification: $\ln(HH_{k2022}) - \ln(HH_{k2017}) = \alpha_k + \beta_1 tariff_k + \varepsilon_{ik}$

Characteristics of new partners: $\ln(M_{ik2022}) - \ln(M_{ik2017}) = \alpha_i + \alpha_k + \beta_1 charactaristic_i*tariff_k + \varepsilon_{ik}$

M is US imports; i is exporter, k is 10-digit product

Data and Strategic Sector

Trade data from US customs at the 10-digit level (nearly 18,000 products)

Over 600 Advanced Technology Products defined by US Census

General definitions: Biotech; Life Sciences; Opto-Electronics; Information and Communications; Electronics; Flexible Manufacturing; Advanced Materials; Aerospace; Weapons; Nuclear Technology

Example: 30022000000 Vaccines for human medicine

Fall in 11 2-digit HS industries—make up about half of US trade

- 28 INORGANIC CHEMICALS; PRECIOUS METALS; OF RARE EARTH METALS
- 29 ORGANIC CHEMICALS
- 30 PHARMACEUTICAL PRODUCTS
- 38 CHEMICAL PRODUCTS N.E.C
- 84 NUCLEAR REACTORS, BOILERS, MACHINERY AND MECHANICAL APPLIANCES; PARTS
- 85 ELECTRICAL MACHINERY AND EQUIPMENT AND PARTS;
- 87 VEHICLES; AND PARTS AND ACCESSORIES
- 88 AIRCRAFT, SPACECRAFT AND PARTS THEREOF
- 90 OPTICAL, PHOTOGRAPHIC, MEDICAL INSTRUMENTS AND APPARATUS; PARTS
- 93 ARMS AND AMMUNITION; PARTS AND ACCESSORIES
- 98 SPECIAL CLASSIFICATION PROVISIONS

Shift away from taxed Chinese imports

	(1) All	(2) All	(3) All	(4) All	(5) Strategic	(6) Other
I(China)	-0.440***	0.025	0.079*			
	(0.014)	(0.041)	(0.043)			
I(tariff list)		0.039**				
		(0.015)				
I(China) x I(tariff list)		-0.519***	-0.538***	-0.536***	-0.616***	-0.451***
		(0.044)	(0.045)	(0.045)	(0.071)	(0.057)
Observations	213,334	213,334	211,809	211,799	73,348	138,432
R-squared	0.003	0.004	0.110	0.134	0.128	0.141
Product FE	NO	NO	YES	YES	YES	YES
Country	NO	NO	NO	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners. China is a dummy variable for trade with China. Tariff-list is a dummy variable for being on the list of China tariffs. Robust standard errors are in parentheses.

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

Some evidence total tariffed imports declined, but not in goods China exited

	(1) All	(2) Strategic	(3) Other	(4) All	(5) Strategic	(6) Other
I(tariff list)	-0.055*	-0.067	-0.051	-0.074**	-0.115**	-0.048
	(0.031)	(0.048)	(0.041)	(0.035)	(0.057)	(0.044)
Observations	16,357	4,699	11,658	16,355	4,699	11,656
R-squared	0.000	0.000	0.000	0.029	0.010	0.035
HS2 FE	NO	NO	NO	YES	YES	YES

	(7) All I(tariff list)	(8) Strategic I(tariff list)	(9) Other I(tariff list)	(10) All I(tariff list)	(11) Strategic I(tariff list)	(12) Other I(tariff list)
I(Δ China share > median)	0.004	0.058*	-0.019	0.024	0.076**	0.001
	(0.018)	(0.030)	(0.022)	(0.019)	(0.029)	(0.023)
Observations	12,732	3,779	8,953	12,731	3,779	8,952
R-squared	0.000	0.001	0.000	0.034	0.011	0.041
HS2 FE	NO	NO	NO	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022. Tariff-list is a dummy variable for being on the list of China tariffs. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.5 percentage points). Robust standard errors are in parentheses.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Limited change in diversification: Average Herfindahl Indexes across products and time

Tariffed goods more diversified supplier base

Herfindahl Index
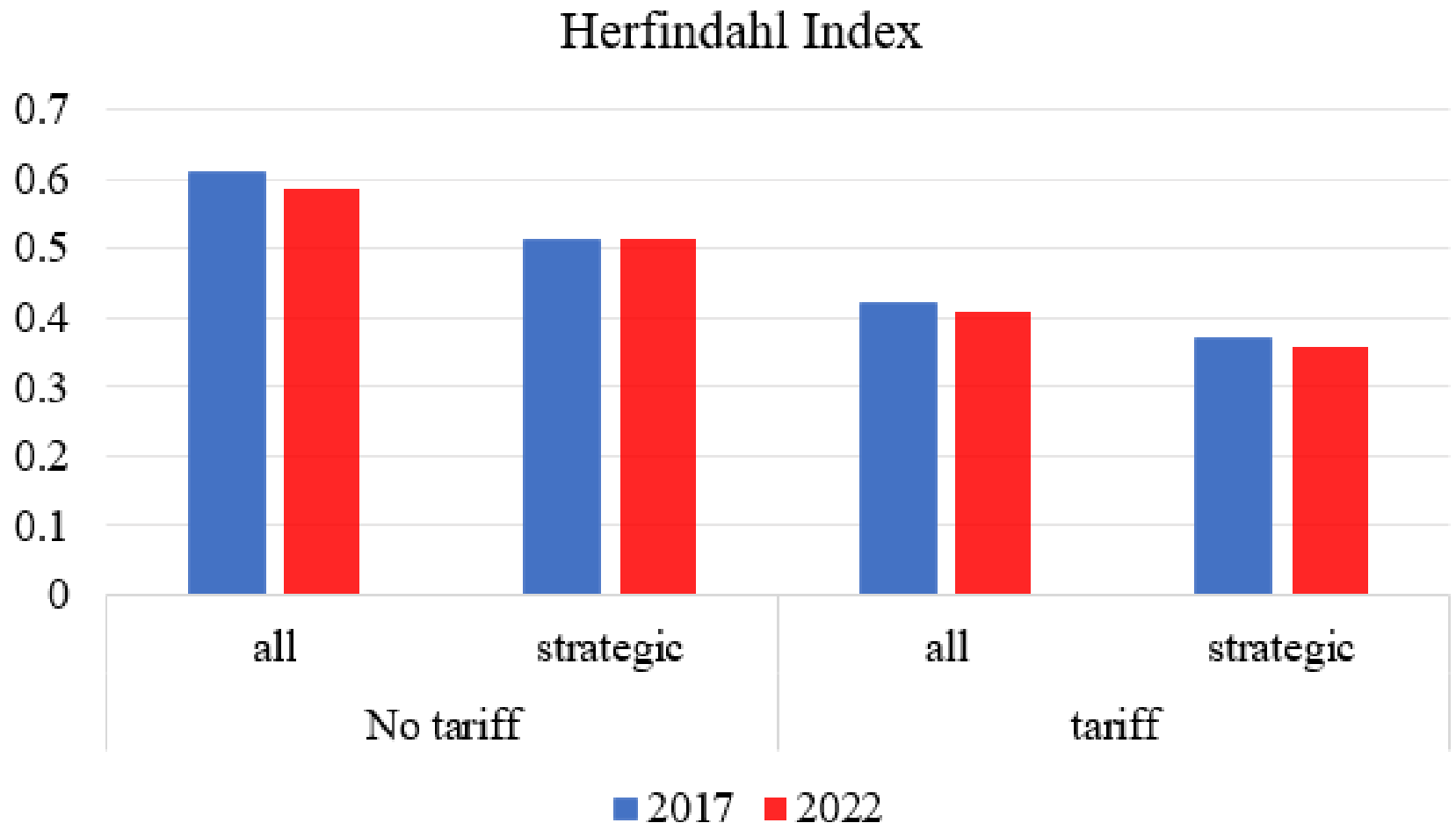
Who gains when China exits?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	dependent variable: export growth to the US on full sample subject to US-China tariffs						
I(ΔChina share> median) x …							
… x (log of Pop.)	0.018** (0.008)	0.030*** (0.007)	0.026*** (0.007)	0.027*** (0.008)	0.026*** (0.007)	0.028*** (0.007)	0.023** (0.009)
… x (log of GDPpc)	-0.050*** (0.016)	-0.072*** (0.015)	-0.033* (0.019)	-0.079*** (0.015)	-0.081*** (0.015)	-0.077*** (0.014)	-0.025 (0.023)
… x I(Border)	0.105* (0.063)						0.111* (0.065)
… x (log of distance)	0.074* (0.040)						0.059 (0.042)
… x I(RCA>1)		0.078*** (0.018)					0.086*** (0.021)
… x (UN voting)			0.041*** (0.015)				0.019 (0.018)
… x (Export similarity to China)				0.065 (0.111)			-0.274** (0.138)
… x (Intra-industry trade w/China)					0.084** (0.033)		0.090** (0.040)
… x (RTA w/USA)						-0.009 (0.022)	
I(RCA>1)		-0.090*** (0.013)					-0.086*** (0.015)
Intra-industry trade w/China					-0.031 (0.024)		-0.028 (0.028)
Observations	140,276	163,657	166,575	169,759	168,117	169,759	134,797
R-squared	0.134	0.128	0.124	0.128	0.128	0.128	0.133
Country FE	YES	YES	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES	YES	YES

Trade Linkages are important for strategic goods

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I(ΔChina share > median) x …							
… x (log of Pop.)	0.004	0.014	0.015	0.007	0.014	0.016	-0.003
	(0.015)	(0.014)	(0.013)	(0.014)	(0.013)	(0.013)	(0.016)
… x (log of GDPpc)	0.020	-0.070**	-0.015	-0.065**	-0.073**	-0.053*	-0.043
	(0.034)	(0.031)	(0.036)	(0.030)	(0.031)	(0.029)	(0.041)
… x I(Border)	0.434***						0.480***
	(0.115)						(0.121)
… x (log of distance)	0.294***						0.305***
	(0.075)						(0.080)
… x I(RCA>1)		0.112***					0.098***
		(0.031)					(0.036)
… x (UN voting)			0.026				-0.021
			(0.025)				(0.029)
… x (Export similarity to China)				0.394**			0.042
				(0.189)			(0.230)
… x (Intra-industry trade w/China)					0.128**		0.145**
					(0.055)		(0.066)
… x (RTA w/USA)						-0.055	
						(0.038)	
I(RCA>1)		-0.117***					-0.104***
		(0.021)					(0.024)
Intra-industry trade w/China					-0.091**		-0.109**
					(0.040)		(0.045)
Observations	47,513	55,790	56,339	57,333	57,212	57,333	46,208
R-squared	0.124	0.121	0.118	0.122	0.122	0.122	0.124
Country FE	YES	YES	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES	YES	YES

dependent variable: export growth to the US on strategic products subject to US-China tariffs

		dependent variable: export growth to the US on other goods subject to US-China tariffs					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I(ΔChina share > median) x ...							
... x (log of Pop.)	0.028***	0.036***	0.033***	0.038***	0.034***	0.037***	0.035***
	(0.010)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)	(0.011)
... x (log of GDPpc)	-0.065***	-0.076***	-0.035	-0.082***	-0.085***	-0.084***	-0.012
	(0.019)	(0.017)	(0.024)	(0.018)	(0.017)	(0.016)	(0.028)
... x I(Border)	0.017						0.022
	(0.076)						(0.079)
... x (log of distance)	0.016						0.008
	(0.047)						(0.050)
... x I(RCA>1)		0.061***					0.077***
		(0.023)					(0.027)
... x (UN voting)			0.050**				0.031
			(0.020)				(0.023)
... x (Export similarity to China)				-0.052			-0.373**
				(0.137)			(0.175)
... x (Intra-industry trade w/China)					0.043		0.030
					(0.043)		(0.051)
... x (RTA w/USA)						0.010	
						(0.028)	
I(RCA>1)		-0.075***					-0.083***
		(0.017)					(0.019)
Intra-industry trade w/China					0.016		0.027
					(0.031)		(0.036)
Observations	92,760	107,863	110,231	112,421	110,900	112,421	88,586
R-squared	0.141	0.135	0.130	0.135	0.134	0.135	0.141
Country FE	YES	YES	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES	YES	YES

Size, stage of development and RCA matter for other goods

Transshipment may be occurring in strategic goods

	(1) All	(2) Strategic	(3) Other
I(Δ China share 17-22 > median) x …			
… x (Intra-industry trade w/China)	0.093**	0.153**	0.028
	(0.042)	(0.066)	(0.055)
… x (Growth China Imports HS6)	0.009	0.040**	0.001
	(0.008)	(0.016)	(0.010)
Observations	118,448	43,373	75,070
R-squared	0.135	0.123	0.145
Country FE	YES	YES	YES
Product FE	YES	YES	YES

The standardized coefficients show a bigger effect (roughly 6 times) of intra-industry trade as compared with growth in HS6

Conclusions

Trade is shifting away from China in tariffed goods

Strong imports, flat US manufacturing, and limited effect of tariffs on total imports suggests reshoring is not prevalent

Some evidence of nearshoring to Canada and Mexico

Trade in strategic goods is shifting to countries with strong trade links to China

Signs of transshipment from China in strategic goods

Other goods follow more of a gravity model, flowing to large, developing countries with RCA in the product

Summary Statistics

Strategic industries	Tariffed	Share 2017	Share 2022	Share 2017	Share 2022
		World		China	
0	0	3.5	3.9	10.1	15.0
0	1	32.3	35.2	24.1	20.5
1	0	10.3	10.2	13.2	18.1
1	1	34.2	30.7	28.2	22.5
Not in regressions		19.7	20.0	24.3	23.9

East Asian Countries are becoming more dependent on China as a source on intermediates

China's share in EAP intermediate imports

68.2

52.5

EAP's share in US final goods imports (RHS)

15.3

10.0

33.1

24.2

Trade tensions

COVID-19

China's share in US final goods imports

percent

percent
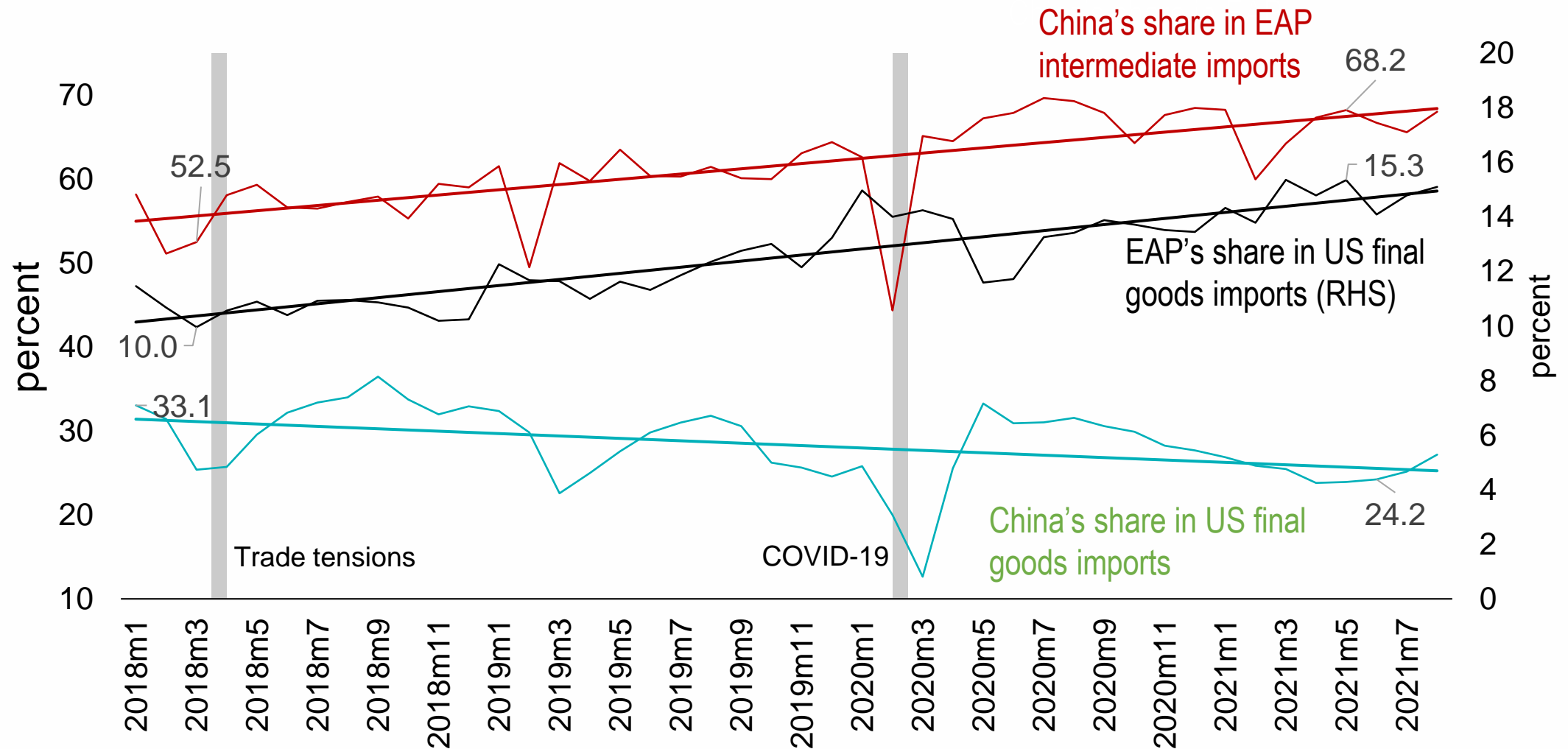
Source: Khan and Mattoo (forthcoming), based on customs trade data from China, European Union, Japan and the U.S.

Increased diversification when China exited

	(1) All	(2) Strategic	(3) Other	(4) All	(5) Strategic	(6) Other
I(tariff list)	-0.007	-0.036*	0.017	-0.019	-0.039*	-0.007
	(0.011)	(0.019)	(0.013)	(0.012)	(0.021)	(0.015)
Observations	16,357	4,699	11,658	16,355	4,699	11,656
R-squared	0.000	0.001	0.000	0.023	0.006	0.031
HS2 FE	NO	NO	NO	YES	YES	YES
	(7) All	(8) Strategic	(9) Other	(10) All	(11) Strategic	(12) Other
I(Δ China share > median)	-0.086***	-0.047***	-0.102***	-0.072***	-0.041***	-0.086***
	(0.008)	(0.014)	(0.009)	(0.008)	(0.014)	(0.010)
Observations	12,732	3,779	8,953	12,731	3,779	8,952
R-squared	0.009	0.003	0.013	0.034	0.008	0.044
HS2 FE	NO	NO	NO	YES	YES	YES

But not if you exclude China

	(1) All	(2) Strategic	(3) Other	(4) All	(5) Strategic	(6) Other
I(tariff list)	0.004	0.006	-0.000	-0.009	-0.014	-0.006
	(0.014)	-0.021	(0.019)	(0.016)	(0.025)	(0.021)
Observations	16,089	4,627	11,462	16,087	4,627	11,460
R-squared	0.000	0.000	0.000	0.011	0.002	0.015
HS2 FE	NO	NO	NO	YES	YES	YES

	(7) All	(8) Strategic	(9) Other	(10) All	(11) Strategic	(12) Other
I(Δ China share > median)	0.095***	0.094***	0.095***	0.105***	0.100***	0.107***
	(0.008)	(0.015)	(0.010)	(0.008)	(0.015)	(0.010)
Observations	12,554	3,740	8,814	12,553	3,740	8,813
R-squared	0.011	0.011	0.011	0.025	0.014	0.029
HS2 FE	NO	NO	NO	YES	YES	YES

Anecdotal evidence of diversification does not necessarily improve country-level risk

Work here focuses on country level risk
Example: Assume two identical US firms with different input sourcing

	Firm 1	Firm 2	Country level HHI period 1	Country level HHI period 2
Before	China (100%)	Mexico (100%)	0.5	0.5
After	China (50%) Mexico (50%)	Mexico (50%) China (50%)	0.5	0.5
Firm level HHI period 1	1	1		
Firm level HHI period 2	0.5	0.5		