What is happening to global supply chains?

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Reshoring is all over the news

Reshoring as a Trending Choice for Manufacturers

API Innovation Center Announces New "Re-shoring" Strategy

The Supply Side: Reshoring interest picks up from manufacturers

U.S. Companies Are Reshoring Jobs From China at Record Levels

After decades of outsourcing jobs to China and Southeast Asia, U.S. companies are on pace to bring back 350,000 jobs

NEWS ANALYSIS

Will the CHIPS Act really bring back semiconductor production and tech jobs?

Biden and Intel Are 'Faking It Until They Make It' on Reshoring Chip Fabs

America should increase subsidies and tariffs to get the job done

Schneider, Deere Investing $76M in Reshoring Projects

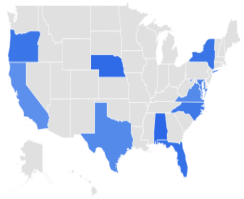
Oct. 13, 2022

The expansion work will take place in Louisiana, Kentucky and Nebraska.

Google searches at all time high

Nearshoring

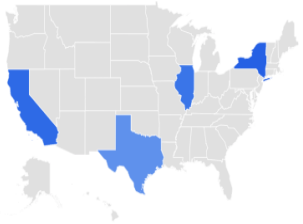
July 2020



1	District of Columbia	100
2	Alabama	93
3	Nebraska	90
4	Florida	83
5	New York	80

Deglobalization

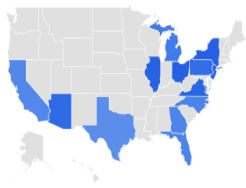
April 2022



1	New York	100
2	California	91
3	Illinois	80
4	Texas	54

Reshoring

August 2022

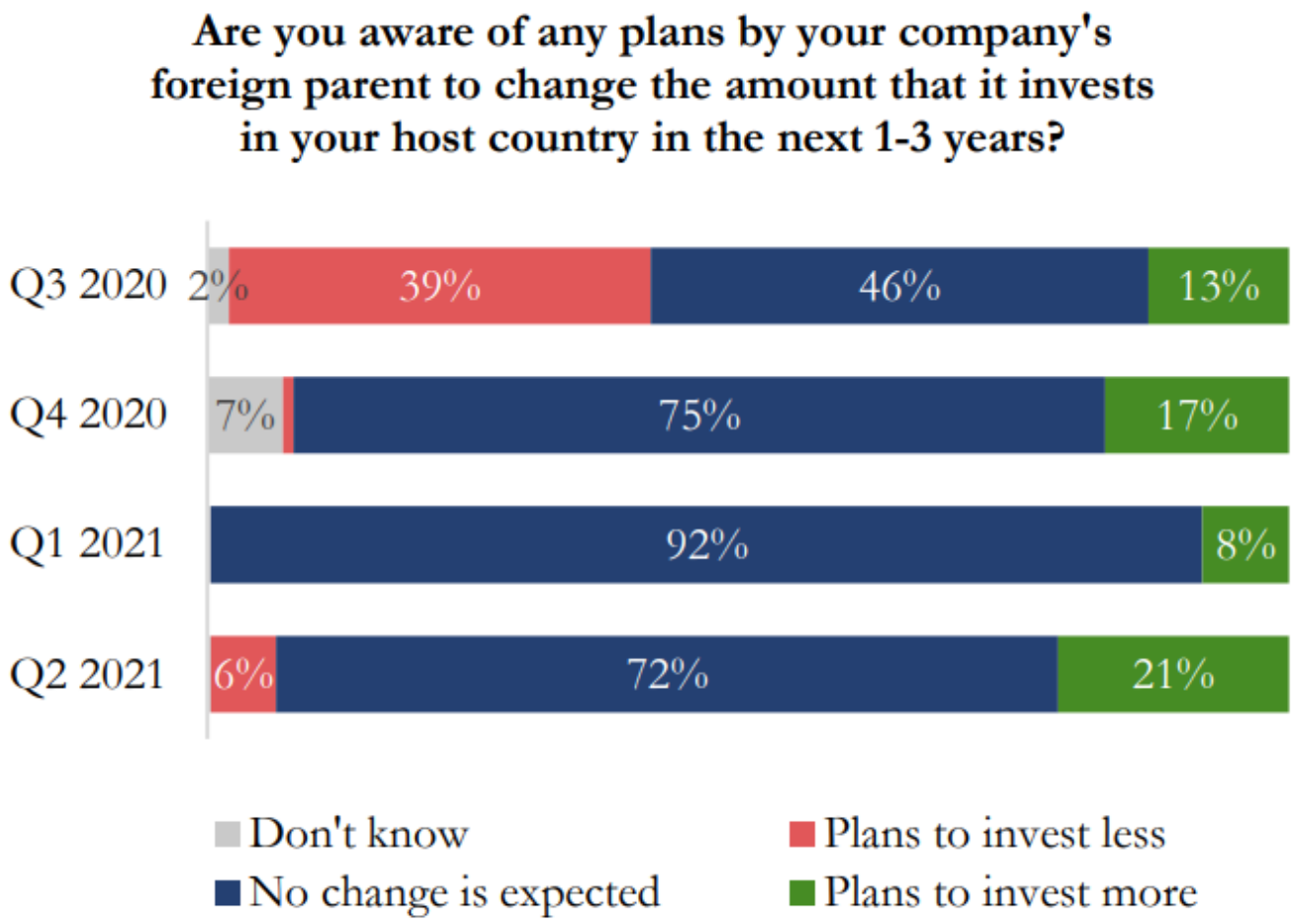


1	Ohio	100
2	New York	100
3	Illinois	98
4	New Jersey	98
5	Virginia	95

But talk is cheap

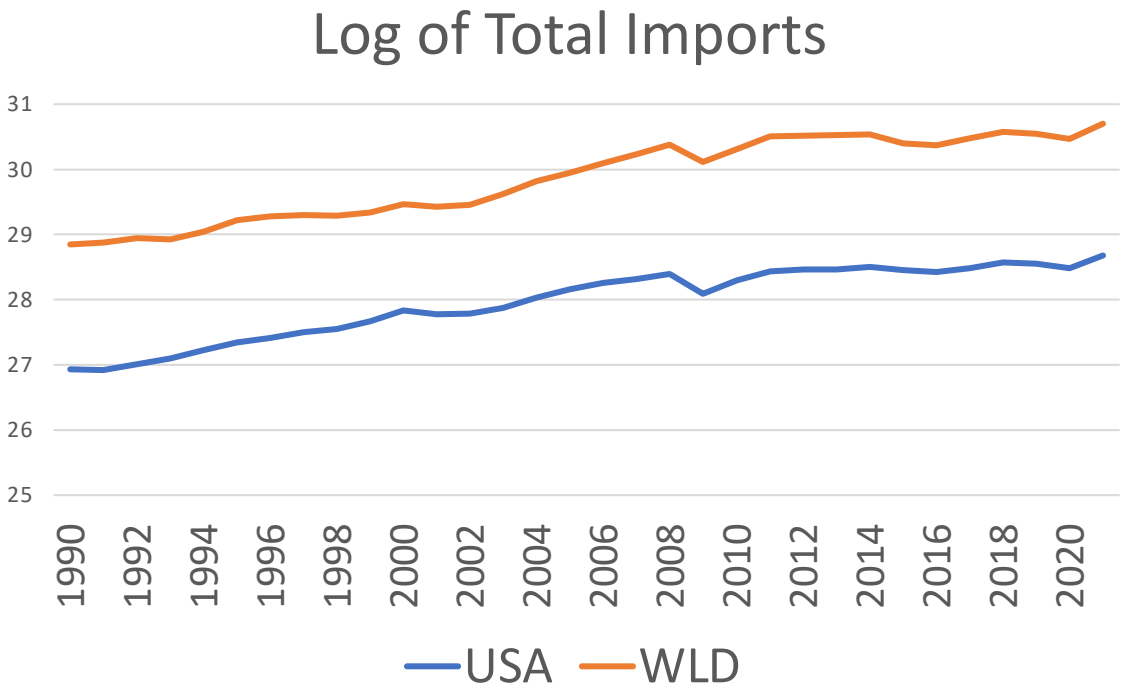
Foreign Investor Confidence:

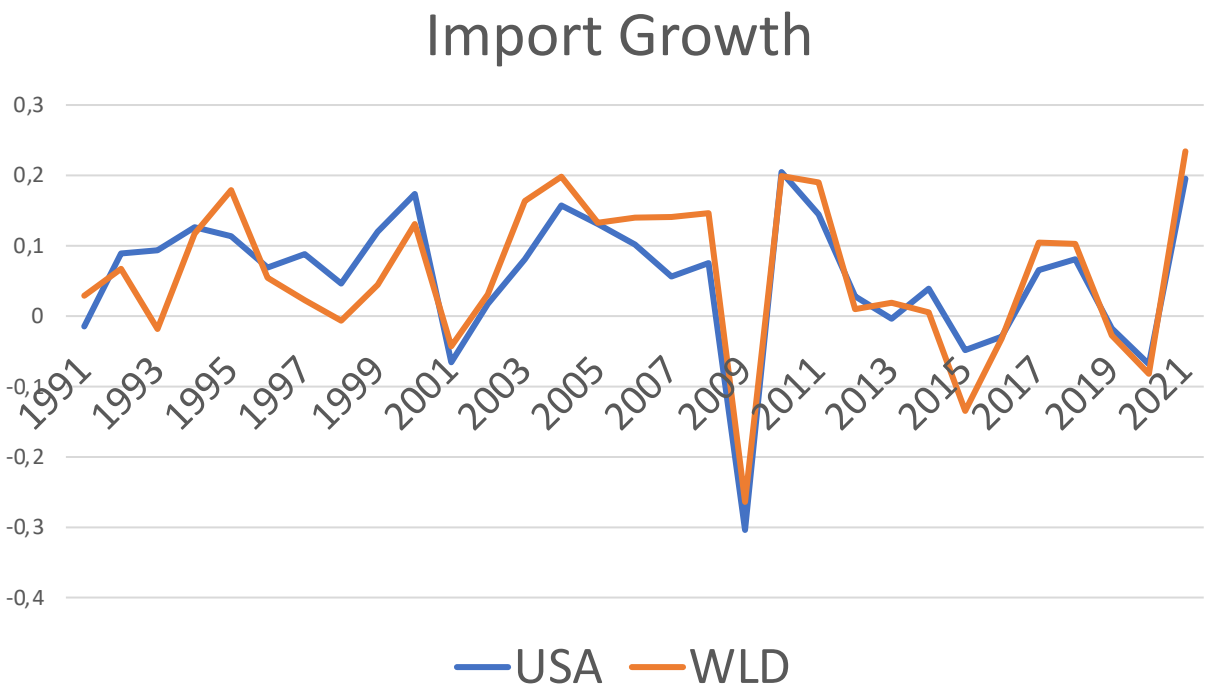
World Bank's Quarterly Pulse Survey of Foreign-Owned Companies in Developing Countries



“We looked into moving to Canada or Mexico, but already heavily invested in machinery elsewhere. Unsure which way wind is going to blow next.”

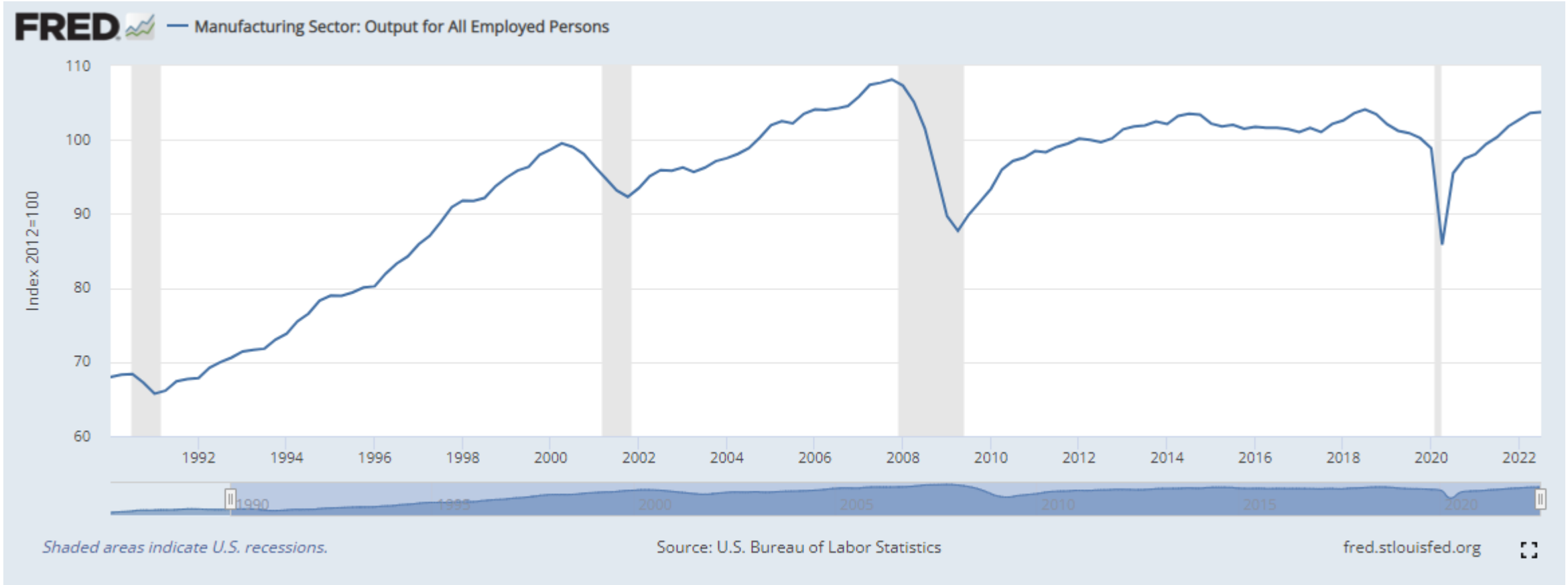
Deglobalization everywhere but in trade data





Source: World Bank

No evidence of reshoring in US manufacturing data



How would we expect firms to respond to shocks?

- Background: Demand and supply swings due to COVID; Trade conflict
  - Greater demand for goods, especially electronics
  - Supply shocks due to worker shortages and constrained transport
  - US-China trade conflict and tariffs
- Wait and see
  - Uncertainty about demand and polices
  - Capital has not been destroyed
- Redundancy/inventories to reduce risk
  - Costly, just in time means hours in some industries
  - Wasteful with perishables or volatile demand
  - 3D printing offers new solution
- Diversification of supplier base to manage risk
  - Costly because of customization and standards
  - Inefficient if there are scale economies or few suitable suppliers
  - At firm or country level?

Firm-level 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**		

Related literature

- Fajgelbaum and Khandelwal (2021) review literature on US-China tariffs
  - US consumers of imported goods have borne the brunt of the tariffs through higher prices
  - The trade war has lowered aggregate real income in both the US and China, although not by large magnitudes relative to GDP
- COVID & drastic reshaping
  - Javorcik 2020a, 2020b; Kilic and Marin 2020; Lund et al. 2020; UNCTAD 2020
- COVID not enough, require massive policy change
  - Antras 2021; Baldwin 2020

The effect of natural disasters on trade
w/ Mattoo, Mulabdic, and Ruta

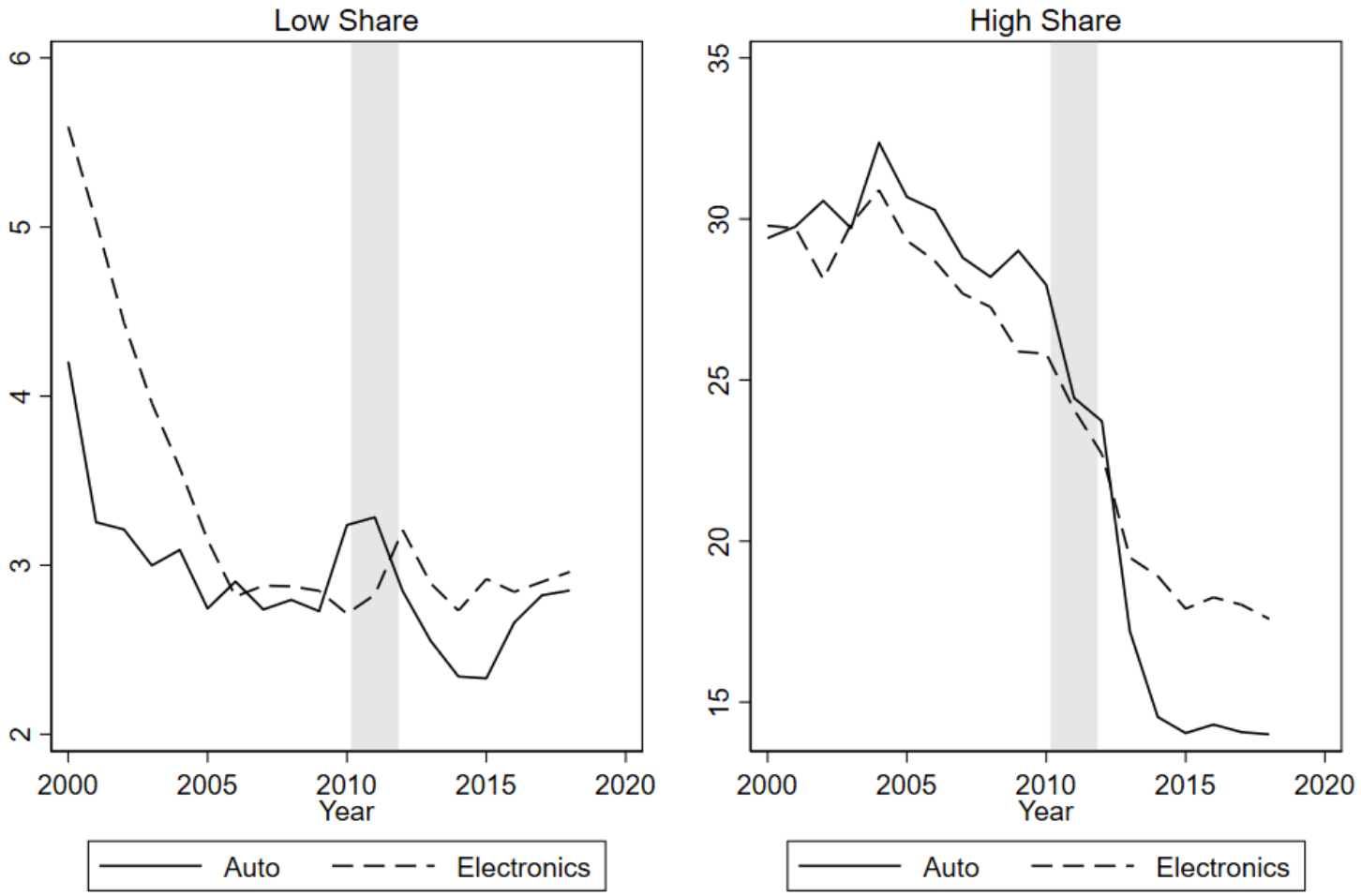
- Shock is the 2011 earthquake which disrupted supply chains
- Imports from 15 largest producers/exporters of autos, electronics, intermediates, and final goods
- Difference-in-differences—did importer-product pairs highly dependent on Japan see relatively sharp decline in imports from Japan?
  - Key variable is dependence on Japan across importers for specific products
  - For China: Key variable is tariff on China w/ focus on strategic products
- Imports of products with a high dependence on Japan fell, what happened?
  - Reshoring: Overall imports in products dependent on Japan should also fall
  - Nearshoring: Distance should matter more for these products
  - Diversification: Diversification in these products should increase at faster pace
- Was there a difference between intermediate and final goods?
  - Intermediates could be more affected because of production holdups
  - Intermediates could be less affected because customization and relationships key
- Which countries benefitted?
  - FTA partners? Neighbors? Main exporters? Developing Countries? Large countries? Etc.

The effect of natural disasters on trade

w/ Mattoo, Mulabdic, and Ruta

- Following the earthquake, reliance on Japan dropped sharply – for the producers most dependent on Japan
- Less-exposed importers return to near pre-crisis operations after the shock

Country share of imports from Japan in auto and electronics (average)



Source: Import data from United Nations Comtrade.

Methodology—focus on importers dependent on Japan

Japan:

$$\ln\left(Y_{ikt}^{\mathrm{JPN}}\right) = \alpha_{ik} + \theta_{it} + \sigma_{kt} + \beta I\left(\text{High Share JPN } 2011_{ikt}\right) + \varepsilon_{ikt}$$

Diversification:

$$\mathrm{HHI}_{ikt} = \alpha_{ik} + \theta_{it} + \sigma_{kt} + \beta I\left(\text{High Share JPN } 2011_{ikt}\right) + \varepsilon_{ikt}$$

Reshoring:

$$\ln\left(Y_{ikt}^{\mathrm{TOT}}\right) = \alpha_{ik} + \theta_{it} + \sigma_{kt} + \beta I\left(\text{High Share JPN } 2011_{ikt}\right) + \varepsilon_{ikt}$$

Characteristics of new partners:

$$\ln\left(Y_{ijkt}\right) = \alpha_{ijk} + \theta_{it} + \mu_{jt} + \beta_1 I\left(\text{High Share JPN } 2011_{ikt}\right) + \beta_2 I\left(\text{High Share JPN } 2011_{ikt}\right) \times \mathrm{Char}_{(i)j(k)t} + \varepsilon_{ikt}$$

i is importer, *k* is 6-digit product, *j* is exporter

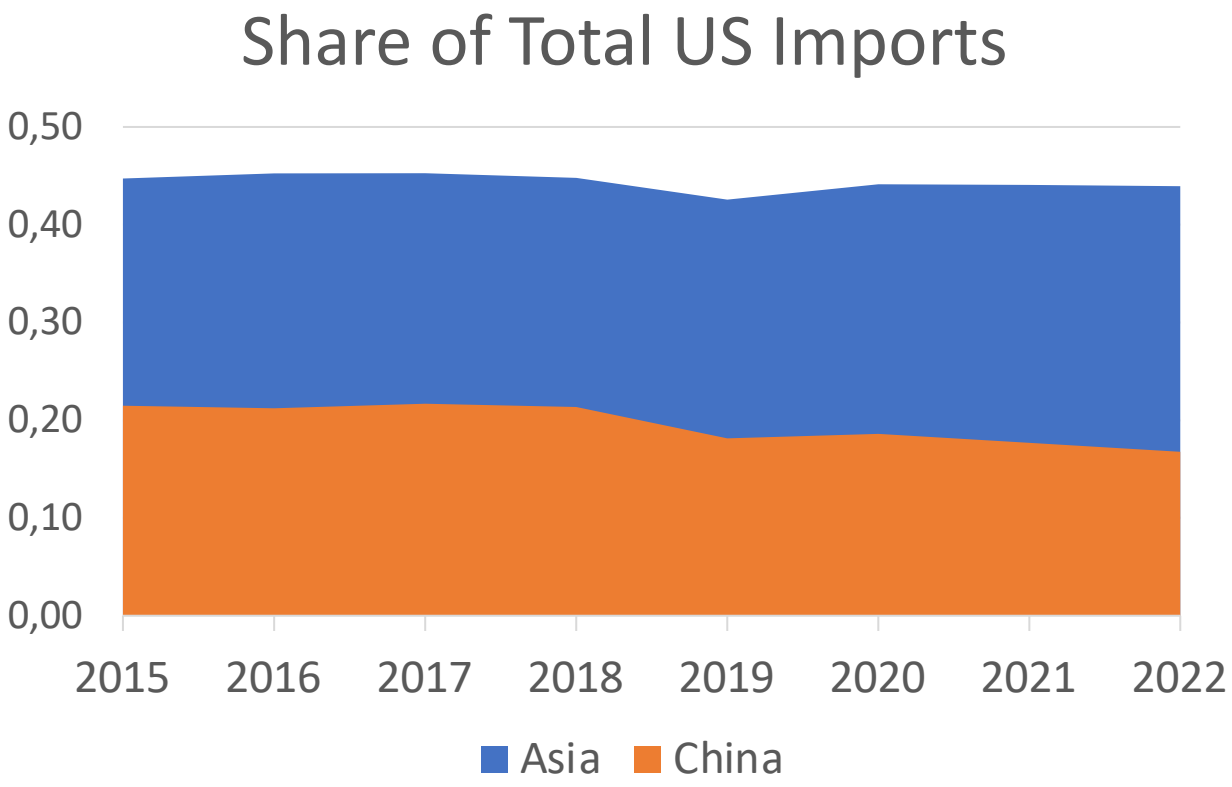
Key findings

- The earthquake led to a decline in imports from Japan of auto and electronics for country-products more dependent on Japan before 2011
- Overall imports in autos and electronics did not fall/grow less rapidly than others
- For both auto and electronics, intermediate imports were less affected than final imports
- Importers more exposed to Japan before the earthquake did not increase import diversification and there is no evidence of re-shoring or nearshoring
- Production relocation decisions were driven by fundamentals: large / developing countries, rather than top exporters, were the primary beneficiaries

Results suggest that the direct effect of COVID-19 on GVCs may be less pronounced than expected

- These results cannot be mechanically applied to the COVID-19 crisis, but they provide evidence on how firms react to import disruptions
  - Firms do not necessarily re-shore, nearshore or diversify suppliers to reduce risk
  - Intermediates are less amenable to replacement by new suppliers than final goods
- The absence of physical destruction under COVID-19 may favor inertia
  - Small differences in variable production costs weigh more heavily on a firm's decision to move to a new production location when factories need to be rebuilt
- The big unknown is policy
  - Governments may use subsidies and tariffs to influence firms' decisions, because of geopolitical concerns or fear of excessive dependence on a single source
  - Large policy shifts could induce firms to seek other sources for products where national or global dependence is high
- Those ASEAN countries that show they are a predictable place to do business win

Reshaping US imports: From China to Asia



- China's share of US imports fell from 21 percent to 17 percent
- Asia's share remained fairly flat at ~45% of US imports

Advanced Technology Product Code Descriptions

General Advanced Technology Product Definitions	
Code	**Definition**
(01) Biotechnology	Focuses on medical and industrial applications of advanced scientific discoveries in genetics to the creation of new drugs, hormones and other therapeutic items for both agricultural and human use.
(02) Life Science	Concentrates on the application of scientific advances (other than biological) to medical science. Recent advances, such as nuclear resonance imaging, echocardiography, and novel chemistry, coupled with new production techniques for the manufacture of drugs have led to many new products for the control or eradication of disease.
(03) Opto-Electronics	Encompasses electronic products and components that involve the emitting and/or detection of light. Examples of products included are optical scanners, optical disc players, solar cells, photo-sensitive semiconductors and laser printers.
(04) Information & Communications	Focuses on products that are able to process increased volumes of information in shorter periods of time. Includes central processing units, all computers and some peripheral units such as disk drive units and control units, along with modems, facsimile machines and telephonic switching apparatus. Examples of other products included are radar apparatus and communication satellites.
(05) Electronics	Concentrates on recent design advances in electronic components (with the exception of opto-electronic components) that result in improved performance and capacity and in many cases reduced size. Products included are integrated circuits, multi-layer printed circuit boards and surface-mounted components such as capacitors and resistors.
(06) Flexible Manufacturing	Encompasses advances in robotics, numerically-controlled machine tools, and similar products involving industrial automation that allow for greater flexibility to the manufacturing process and reduce the amount of human intervention. Includes robots, numerically controlled machine tools and semiconductor production and assembly machines.
(07) Advanced Materials	Encompasses recent advances in the development of materials that allow for further development and application of other advanced technologies. Examples are semiconductor materials, optical fiber cable and video discs.
(08) Aerospace	Encompasses most new military and civil helicopters, airplanes and spacecraft (with the exception of communications satellites that are included under Information & Communications Technology). Other products included are turbojet aircraft engines, flight simulators and automatic pilots.
(09) Weapons	Primarily encompasses products with military application. Includes such products as guided missiles and parts, bombs, torpedoes, mines, missiles, rocket launchers and some firearms.
(10) Nuclear Technology	Encompasses nuclear power production apparatus. Includes nuclear reactors and parts, isotopic separation equipment and fuel cartridges. Excludes nuclear medical apparatus, which is included under Life Science Technology.

Source: US Census Bureau

EXAMPLE – 10 Digit codes at Census, by year

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01 2933294500 DRUGS (EXCLUDING AROMATIC OR MODIFIED AROMATIC) CONTAINING AN UNFUSEDIMIDAZOLE RING (WHETHER OR NOT HYDROGENATED) IN THE STRUCTURE
01 2937110000 SOMATOTROPIN, ITS DERIVATIVES AND STRUCTURAL ANALOGUES
01 2937190000 POLYPEPTIDE, PROTEIN AND GLYCOPROTEIN HORMONES, THEIR DERIVATIVES AND STRUCTURAL ANALOGUES, NESOI
01 2937231010 ESTROGENS OF ANIMAL OR VEGETABLE ORIGIN
01 2937231050 PROGESTINS OF ANIMAL OR VEGETABLE ORIGIN, NESOI
01 2937235010 ESTROGENS NOT DERIVED FROM ANIMAL OR VEGETABLE MATERIALS
01 2937235020 PROGESTERONE NOT DERIVED FROM ANIMAL OR VEGETABLE MATERIALS
01 2937235050 PROGESTINS NOT DERIVED FROM ANIMAL OR VEGETABLE MATERIALS, NESOI
01 2937500000 PROSTAGLANDINS, THROMBOXANES AND LEUKOTRIENES, THEIR DERIVATIVES AND STRUCTURAL ANALOGUES
01 2937909000 HORMONES, PROSTAGLANDINS, THROMBOXANES AND LEUKOTRIENES, NATURAL OR SYNTHETIC; DERIVATIVES AND ANALOGUES THEREOF, ETC, NESOI
01 2940002000 D-ARABINOSE
01 2940006000 SUGARS, CHEMICALLY PURE, OTHER THAN SUCROSE, LACTOSE, MALTOSE, GLUCOSE AND FRUCTOSE; SUGAR ETHERS AND SUGAR ESTERS, AND THEIR SALTS, NESOI
01 3002110000 MALARIA DIAGNOSTIC TEST KITS
01 3002120090 ANTISERA AND OTHER BLOOD FRACTIONS
01 3002130000 IMMUNOLOGICAL PRODUCTS, UNMIXED, NOT PUT UP IN MEASURED DOSES OR IN FORMS OR PACKINGS FOR RETAIL SALE
01 3002140000 IMMUNOLOGICAL PRODUCTS, MIXED, NOT PUT UP IN MEASURED DOSES OR IN FORMS OR PACKINGS FOR RETAIL SALE
01 3002150000 IMMUNOLOGICAL PRODUCTS, PUT UP IN MEASURED DOSES OR IN FORMS OR PACKINGS FOR RETAIL SALE
01 3002190000 BLOOD FRACTIONS NOT ELSEWHERE SPECIFIED OR INCLUDED
01 3002200000 VACCINES FOR HUMAN MEDICINE
01 3002300000 VACCINES FOR VETERINARY MEDICINE
01 3002905150 HUMAN BLOOD; ANIMAL BLOOD PREPARED FOR THERAPEUTIC, PROPHYLATIC OR DIAGNOSTIC USES; ANTISERA AND OTHER BLOOD FRACTIONS, ETC. NESOI
02 2844400010 ELEMENTS, ISOTOPES AND COMPOUNDS WITH COBALT-60 RADIOACTIVITY ONLY
02 2844400020 RADIOACTIVE ELEMENTS, ISOTOPES AND COMPOUNDS OTHER THAN THOSE OF SUBHEADINGS 2844.10, 2844.20, AND 2844.30, NESOI
02 2844400021 AMERICIUM241 CALIFORNIUM252 CURIUM244 CESIUM137 GADOLINIUM153 IRIDIUM192 PROMETHIUM147 RADIUM226 SELENIUM75 STRONTIUM90 THULIUM170 YTTERBI
02 2844400028 RADIOACTIVE ELEMENTS, ISOTOPES AND COMPOUNDS OTHER THAN THOSE OF SUBHEADINGS 2844.10, 2844.20, AND 2844.30, NESOI
02 2844400050 ALLOYS, DISPERSIONS, CERAMIC PRODUCTS & MIXTURES CONTAINING THESE ELEMENTS, ISOTOPES OR COMPOUNDS; RADIOACTIVE RESIDUES, NESOI
02 2845900000 ISOTOPES, EXCEPT THOSE OF HDG 2844; COMPOUNDS, INORGANIC OR ORGANIC, OF SUCH ISOTOPES, WHETHER OR NOT CHEMICALLY DEFINED, NESOI
02 2914620000 COENZYME Q10 (UBIDECARENONE (INN)
02 2914692100 QUINONE DRUGS
02 2918993000 AROMATIC DRUGS
```

Strategic goods fall in 11 HS 2-digit categories

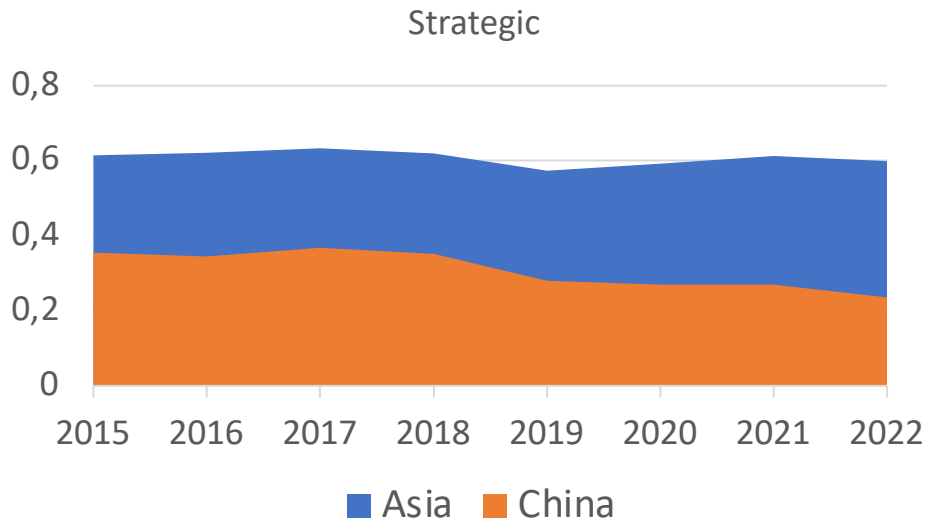
- 28 INORGANIC CHEMICALS; ORGANIC AND INORGANIC COMPOUNDS OF PRECIOUS METALS; OF RARE EARTH METALS, OF RADIO-ACTIVE ELEMENTS AND OF ISOTOPES
- 29 ORGANIC CHEMICALS
- 30 PHARMACEUTICAL PRODUCTS
- 38 CHEMICAL PRODUCTS N.E.C
- 84 NUCLEAR REACTORS, BOILERS, MACHINERY AND MECHANICAL APPLIANCES; PARTS THEREOF
- 85 ELECTRICAL MACHINERY AND EQUIPMENT AND PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS; TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, PARTS AND ACCESSORIES OF SUCH ARTICLES
- 87 VEHICLES; OTHER THAN RAILWAY OR TRAMWAY ROLLING STOCK, AND PARTS AND ACCESSORIES THEREOF
- 88 AIRCRAFT, SPACECRAFT AND PARTS THEREOF
- 90 OPTICAL, PHOTOGRAPHIC, CINEMATOGRAPHIC, MEASURING, CHECKING, MEDICAL OR SURGICAL INSTRUMENTS AND APPARATUS; PARTS AND ACCESSORIES
- 93 ARMS AND AMMUNITION; PARTS AND ACCESSORIES THEREOF
- 98 SPECIAL CLASSIFICATION PROVISIONS

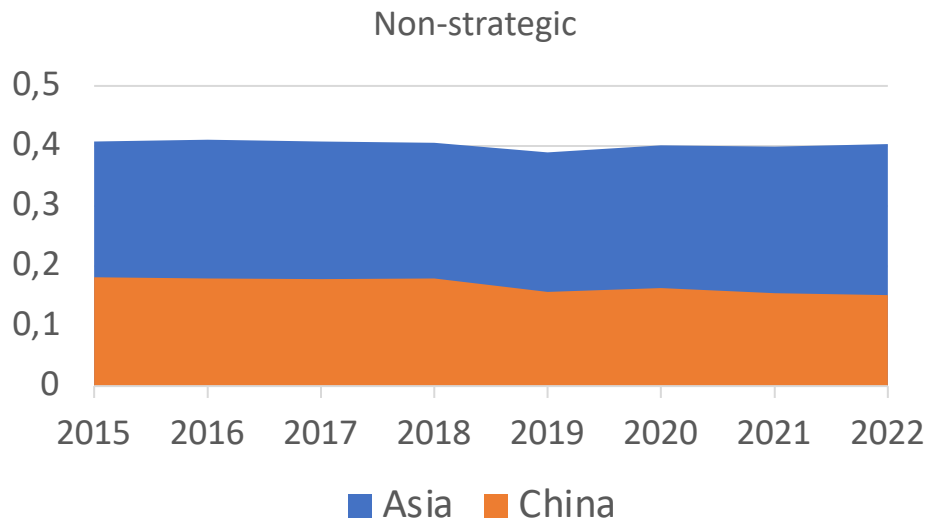
Summary Statistics

- Sectors are 54 percent of total US imports
- Most products face tariffs especially in ATP goods
- 2022 data estimated from data through September

ATP	Tariff	Share 2017	Share 2022	China Share 2017	China share 2022
0	0	13%	14%	0.08	0.12
0	1	45%	42%	0.30	0.33
1	0	6%	6%	0.15	0.20
1	1	16%	15%	0.18	0.06
Not in regressions		21%	22%	0.30	0.29

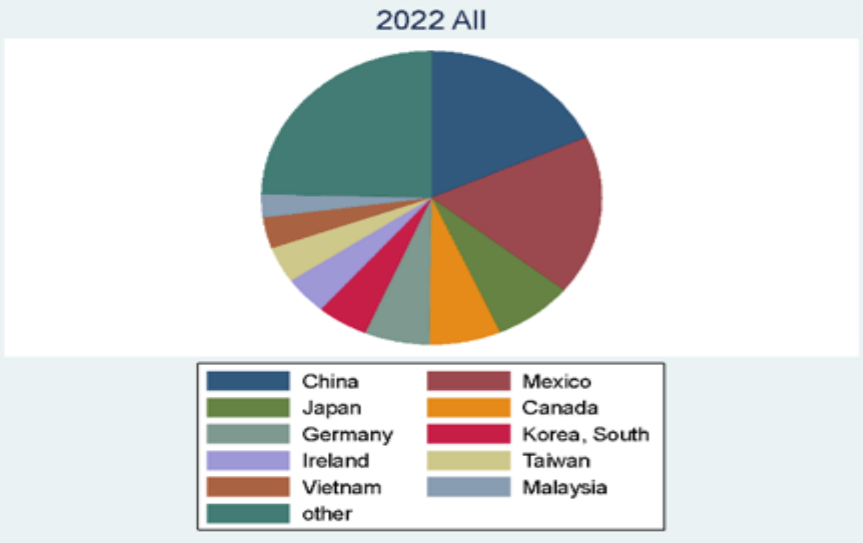
Reshaping Strategic Goods Imports

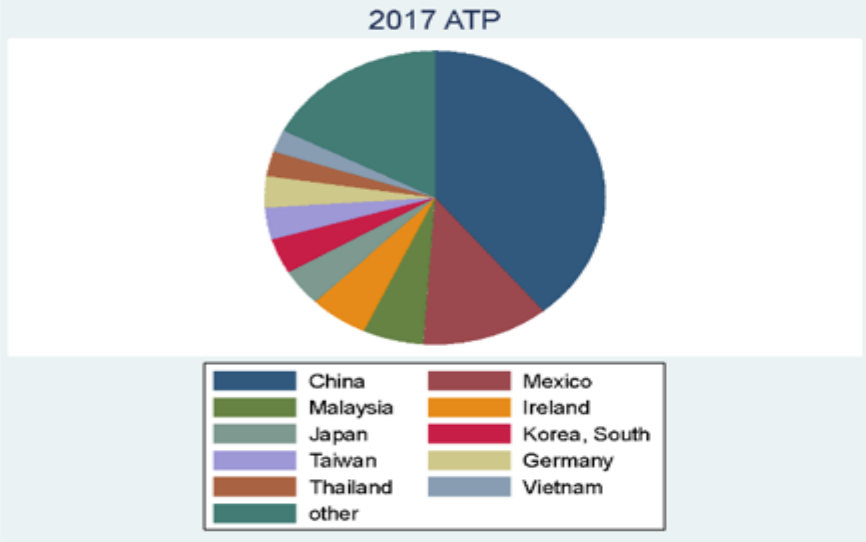


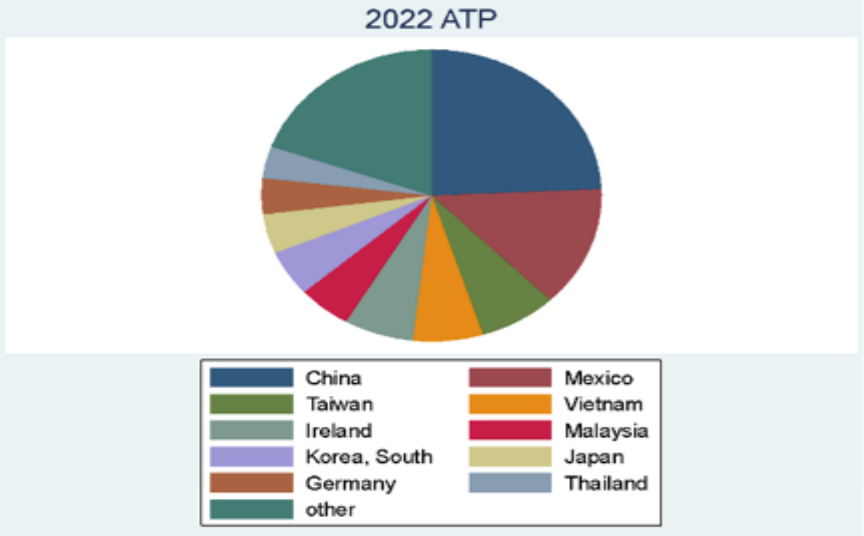


- China's share fell most among strategic goods, from 35% to 24%
- Among non-strategic goods it fell from 18% to 15%
- Strategic goods remained flat at 19-20% of total imports
- Asia's share of both strategic and non-strategic goods remained flat

Who is gaining?







Shift away from taxed Chinese imports

	dependent variable: bilateral import growth 2017-2022					
	All	All	All	All	All	ATP
CH	-0.300***	0.238***		0.231***		
	[0.0240]	[0.0689]		[0.0728]		
tariff		0.114***	0.0866***			
		[0.0232]	[0.0236]			
CHtariff		-0.622***	-0.594***	-0.633***	-0.620***	-0.885***
		[0.0734]	[0.0736]	[0.0768]	[0.0767]	[0.267]
Observations	66,110	66,110	66,110	66,110	66,110	8,231
R-squared	0.002	0.003	0.027	0.003	0.029	0.045
Product FE				x	x	x
Country FE			x		x	x

Robust standard errors in parentheses

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

Some evidence overall imports declined, but not in strategic goods

dependent variable: Change in total imports 2017-2022						
	All	ATP	All	ATP	All	ATP
tariff	-0.104***	-0.0874	-0.14	-0.242	-0.240***	-0.44
	[0.0347]	[0.125]	[0.121]	[0.276]	[0.0851]	[0.305]
Observations	8,784	875	8,784	875	8,784	875
R-squared	0	0.001	0	0.003	0	0.006
2-digit FE			x	x		
4-digit FE					x	x

Robust standard errors in parentheses

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

Shift to other suppliers, but no nearshoring

	dependent variable: bilateral import growth, China excluded							
	All	All	All	All	All	All	ATP	Other
targdppc	-0.0692**				-0.0426	-0.0396	0.293**	-0.0693
	[0.0335]				[0.0412]	[0.0407]	[0.122]	[0.0428]
tarpop		0.0350**			0.0287	0.0246	0.0819	0.0254
		[0.0148]			[0.0187]	[0.0181]	[0.0533]	[0.0192]
tardist			0.0161		-0.0434			
			[0.0320]		[0.0566]			
tarcontig				-0.0179	-0.101			
				[0.0797]	[0.139]			
Observations	59,066	59,141	62,183	62,183	59,066	59,066	7,468	51,598
R-squared	0.027	0.027	0.027	0.027	0.027	0.027	0.039	0.028
Country and Product FE	4,383	4,383	4,405	4,405	4,383	4,383	432	3,951

Robust standard errors in parentheses

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

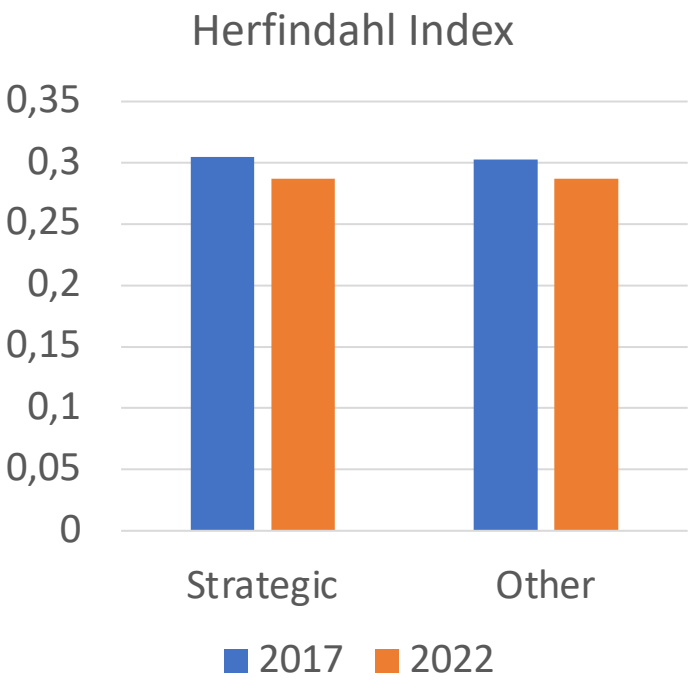
For tariffed goods, RCA matters

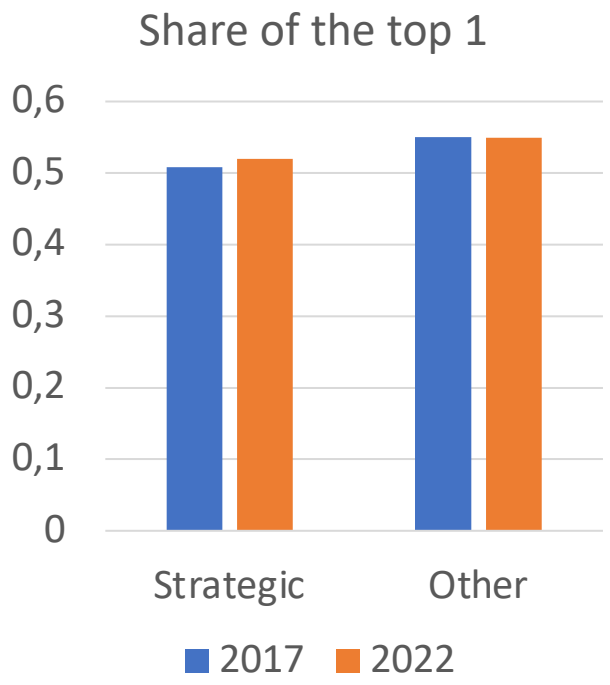
dependent variable: bilateral import growth, China excluded			
VARIABLES	All	All	All
RCA	-0.00199***		-0.00226***
	[0.000527]		[0.000660]
RCAtar	0.00156***		0.00185***
	[0.000603]		[0.000719]
undisttar		0.0520*	0.0294
		[0.0313]	[0.0387]
targdppc			0.00274
			[0.0495]
tarpop			0.0415**
			[0.0183]
Observations	62,183	58,132	58,094
R-squared	0.028	0.022	0.022
Country and Product FE	x	x	x

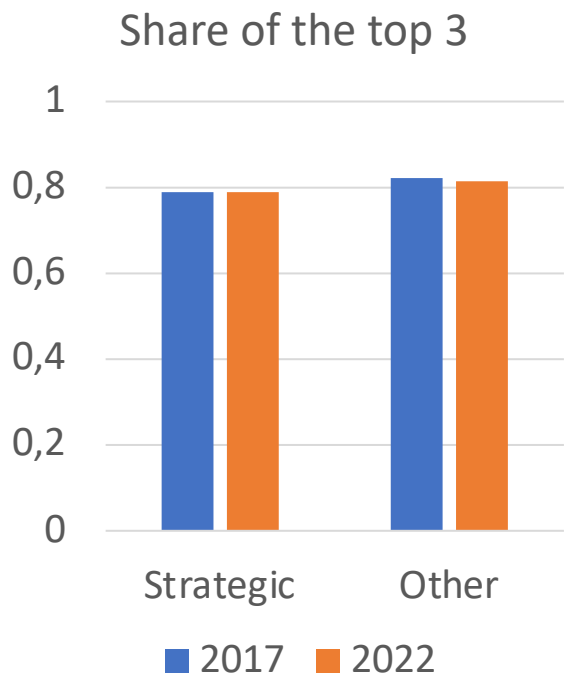
Robust standard errors in brackets

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

Strategic Goods and Diversification Comparing means







Some diversification in sourcing, but did not happen at the top of the distribution
China is most common number 1 supplier in all categories, all years
Strategic goods are one third of total imports in these codes in both years

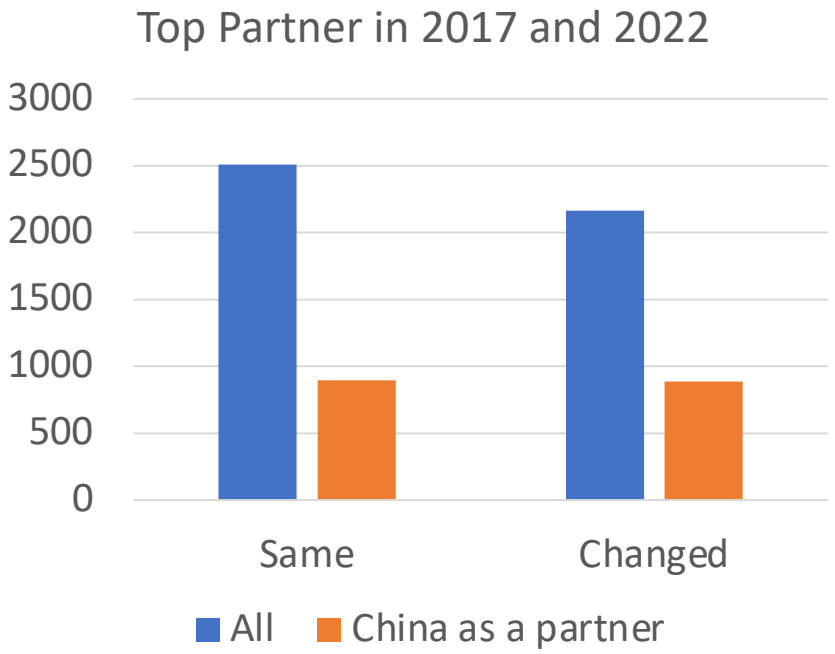
No significant increase in diversification

	dependent variable: change in Herfindahl Index						*dependent variable: change in share of top 3*					
	All	ATP	All	ATP	All	ATP	All	ATP	All	ATP	All	ATP
tariff	-0.0285**	-0.123***	-0.0304	-0.0696**	0.0121	-0.0192	-0.0101***	-0.0217**	-0.00794	-0.0131	-0.00078	0.00591
	[0.0131]	[0.0463]	[0.0343]	[0.0256]	[0.0300]	[0.0845]	[0.00237]	[0.00996]	[0.00733]	[0.0140]	[0.00512]	[0.0145]
Observations	8,857	878	8,857	878	8,857	878	7,696	728	7,696	728	7,556	722
R-squared	0	0.008	0	0.001	0	0	0.002	0.005	0.001	0.001	0	0
2-digit FE			x	x					x	x		
4-digit FE					x	x					x	x

Robust standard errors in parentheses

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

Absence of sharp increase in diversification is not because things are static



Conclusions

- Trade is shifting away from China in tariffed goods & ATP goods
- Surge in imports, flat US manufacturing, and limited effect of tariff on total imports suggests limited reshoring
- No evidence of nearshoring, reshoring, nor diversification
- Trade is shifting to RCA partners

Japanese imports declined if high dependency

Table 1 Impact on imports from Japan

Panel A: All	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Auto				Electronics			
	log of imports	log of imports	log of imports	log of imports	log of imports	log of imports	log of imports	log of imports
(Dummy share 2004–2010 > 15)	−0.814***			−0.576***	−0.386***			−0.108
	(0.165)			(0.181)	(0.057)			(0.069)
(Dummy share 2004–2010 > 10)		−0.694***		−0.140		−0.469***		−0.221***
		(0.140)		(0.158)		(0.050)		(0.064)
(Dummy share 2004–2010 > 5)			−0.594***	−0.345**			−0.508***	−0.387***
			(0.128)	(0.138)			(0.047)	(0.051)
Observations	5,336	5,336	5,336	5,336	50,194	50,194	50,194	50,194
R-squared	0.903	0.903	0.902	0.904	0.912	0.913	0.913	0.913
Treated	74	109	177	177	683	1024	1708	1708
Total country-products	405	405	405	405	3971	3971	3971	3971
Auto-Electronics > 15	0.428**			0.468**				
Auto-Electronics > 10		0.226		−0.081				
Auto-Electronics > 5			0.085	−0.042				

But total imports did not fall

Table 3 Impact on total imports

Panel A: All	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Auto				Electronics			
	log of imports	log of imports	log of imports	log of imports	log of imports	log of imports	log of imports	log of imports
(Dummy share 2004–2010 > 15)	0.018			−0.115	0.105**			0.115**
	(0.108)			(0.129)	(0.043)			(0.052)
(Dummy share 2004–2010 > 10)		0.108		0.129		0.050		−0.007
		(0.103)		(0.145)		(0.038)		(0.048)
(Dummy share 2004–2010 > 5)			0.125	0.092			0.006	−0.017
			(0.105)	(0.124)			(0.034)	(0.036)
Observations	5,562	5,562	5,562	5,562	52,597	52,597	52,597	52,597
R-squared	0.947	0.947	0.947	0.947	0.962	0.962	0.962	0.962
Treated	74	109	177	177	683	1024	1708	1708
Total country-products	405	405	405	405	3971	3971	3971	3971

Large, developing countries gained; but proximate countries did not

Table 4 Country-specific fundamentals

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Auto		Electronics	
	Auto	Electronics	Intermediate	Final	Intermediate	Final
	log of imports	log of imports	log of imports	log of imports	log of imports	log of imports
(Dummy share 2004–2010 > 10)	0.188***	0.103***	0.135***	0.119	0.197***	0.079***
	(0.033)	(0.010)	(0.038)	(0.074)	(0.019)	(0.012)
(Dummy share) * …						
(log GDP pc pre)	−0.061***	−0.063***	−0.065***	−0.007	−0.069***	−0.060***
	(0.015)	(0.006)	(0.016)	(0.029)	(0.011)	(0.007)
(log of pop. Pre)	0.019**	0.019***	0.030***	0.006	0.018***	0.017***
	(0.009)	(0.004)	(0.010)	(0.021)	(0.007)	(0.004)
(log of distance)	0.036*	0.049***	0.032	−0.024	0.046***	0.053***
	(0.020)	(0.008)	(0.021)	(0.049)	(0.014)	(0.009)
Observations	449,922	3,275,053	333,842	116,066	952,400	2,322,653
R−squared	0.865	0.821	0.872	0.821	0.831	0.817