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- The US-China Trade War, Global Economic Uncertainty and Their Effects on East Asia –

Exports to the US and Imports from China during the US-China Tariff War: Evidence from Regional Trade Data in Vietnam

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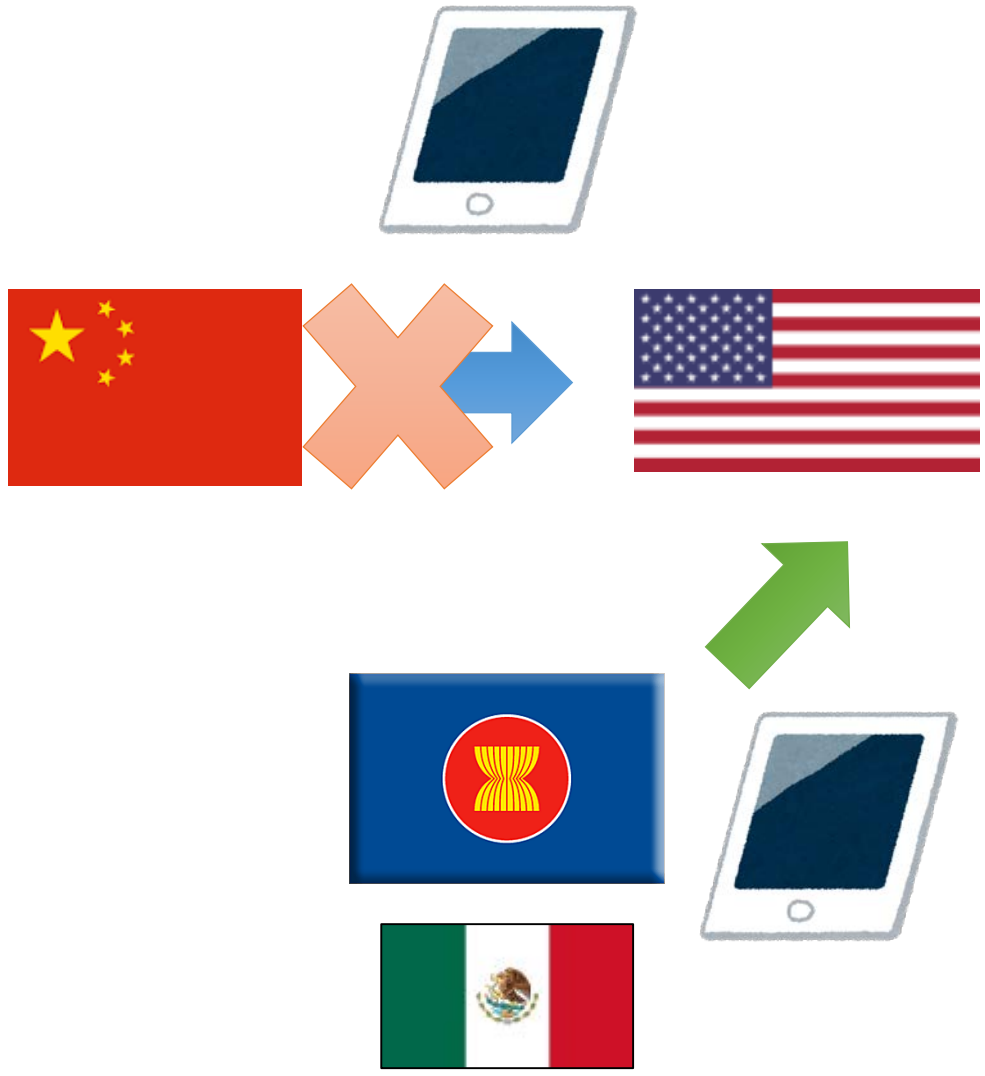
Introduction

◆US-China Trade War

- ☐Tariff war since 2018
- ☐Strengthening export control measures since 2018

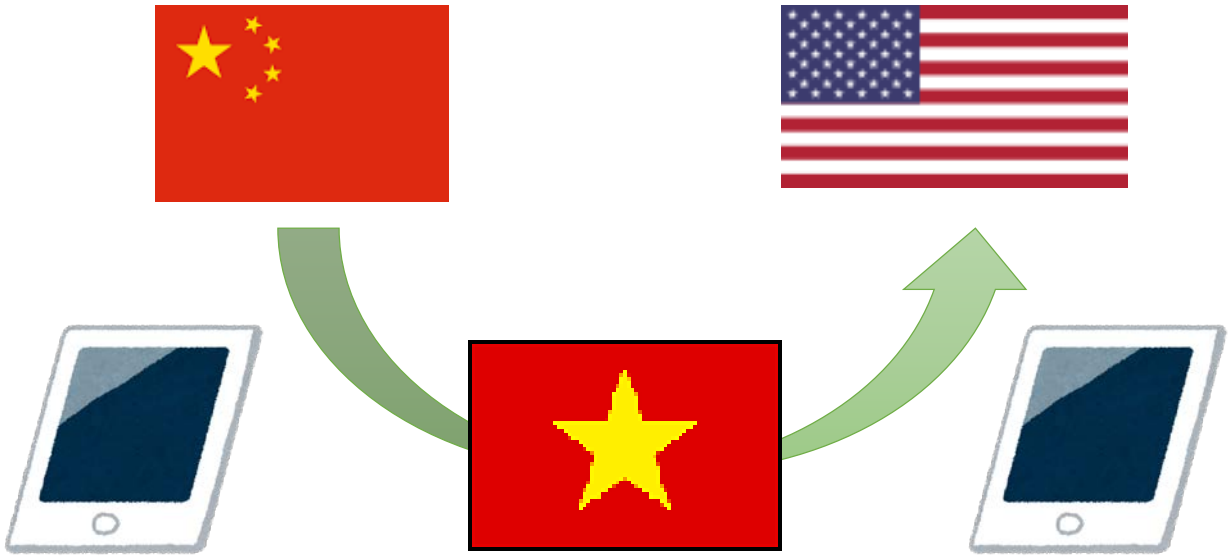
◆How has regional trade changed?

- ☐A decrease in China's exports to the US
  - ➢Amiti et al. (2019), Amiti et al. (2020), Fajgelbaum et al. (2020)
- ☐An increase in exports from the third countries to the US
  - ➢ASEAN countries and Mexico
  - ➢Vietnam: Alfaro and Chor (2023), Choi and Nguyen (2023), Rotunno et al. (2023), Ngoc and Wie (2023)

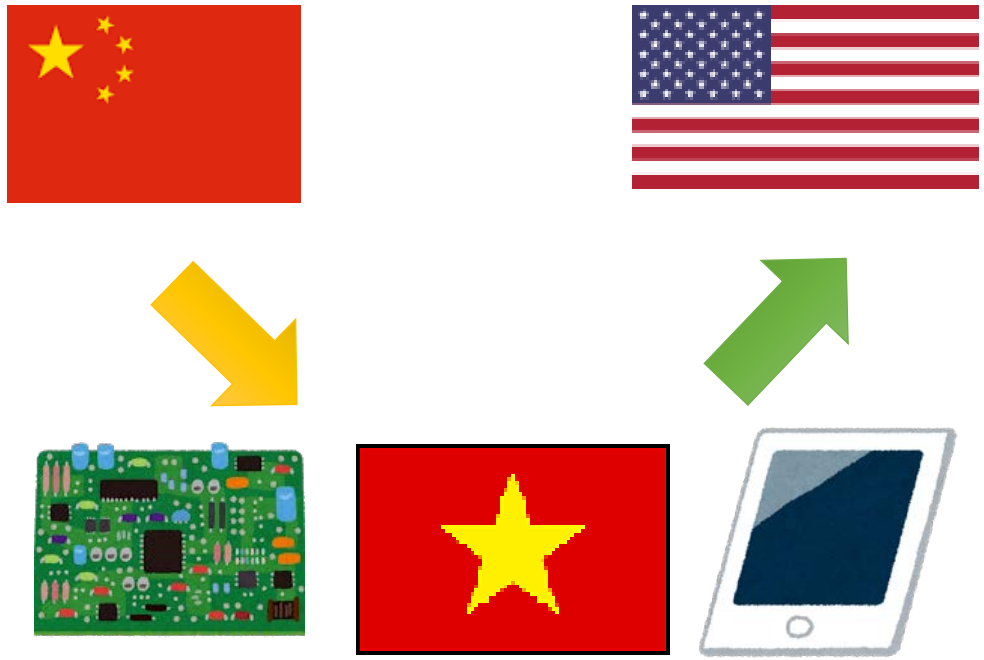


Introduction: Two Issues in the Third Countries

(i) Trade circumvention

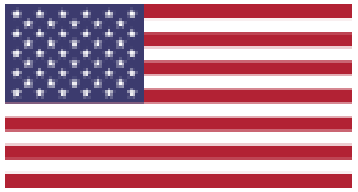


(ii) Hidden exposure to China



Introduction: What We Do

- Empirically investigating "Hidden exposure to China"
- Regressing imports from China in Vietnam on exports from Vietnam to the US
- Province-level trade data in Vietnam from January 2019 to December 2023
- Following Hayakawa (2024, Mimeo) for the identification of input-output linkages in trade statistics: Focusing on general and electrical machinery industries, i.e., HS 84 & 85



The dependent variable

The main independent variable

Introduction: Contributions

- Many empirical studies on the US-China tariff war
- The studies on the IO linkages between outputs to the US and inputs from China
  - Freund et al. (2023)
    - ✓ Capture each country's IO linkages with China using the intra-industry trade index with China or import growth in the same industry/product from China.
    - ✓ Include trade based on horizontal differentiation or trade circumvention
  - Yang and Hayakawa (2023)
    - ✓ Using the IO table to identify the IO linkages across sectors
    - ✓ A significant effect on input imports from China
  - Hayakawa (2024)
    - ✓ The same method of identifying IO linkages as ours
    - ✓ Country-level trade data in Asia from January 2017 to December 2021
    - ✓ Some countries (e.g., Taiwan, Malaysia, and Thailand) enjoy trade diversion in the US market. Only Thailand increased imports of upstream products from China.
    - ✓ This study: Applying this method to the regional trade data, i.e., enhancing our identification of the IO linkages by narrowing geographical areas of trading players

Contents

- How to identify input-output linkages
- Empirical Framework
- Estimation Results
- Conclusion

Source: Tia Dufour, White House (public domain)

Identification of IO Linkages

- Exploiting HS code structures

Downstream products

85.08		Vacuum cleaners
		With self-contained electric motor
8508.11		Of a power not exceeding 1,500 W and having a dust bag or other receptacle capacity not exceeding 20 l
	010	- Of a built-in dry battery type
	090	- Other
8508.19	000	Other
8508.60	000	Other vacuum cleaners
8508.70	000	Parts

Upstream products

Upstream products **Downstream products**

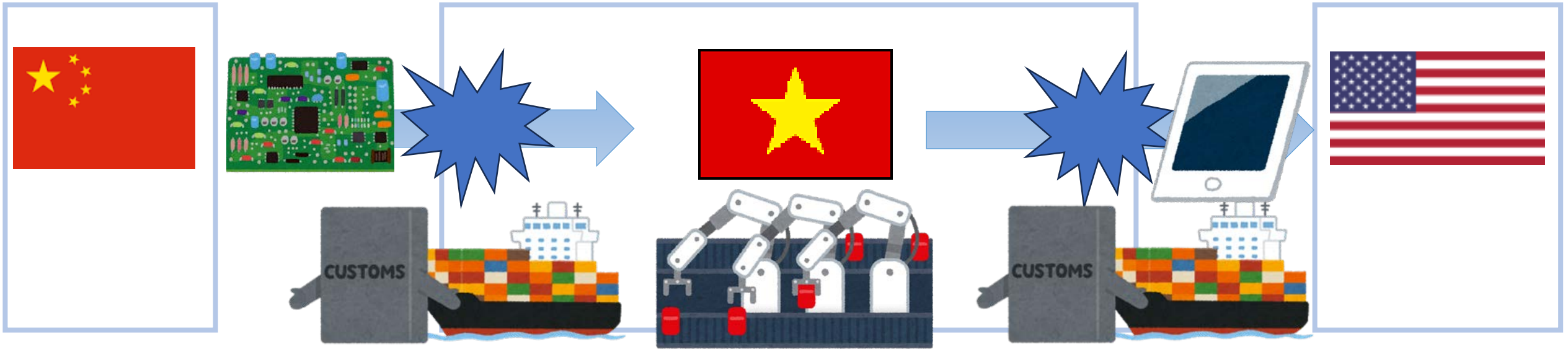
85.29		Parts suitable for use solely or principally with the apparatus of headings 85.25 to 85.28
8529.10	000	Aerials and aerial reflectors of all kinds; parts suitable for use therewith
8529.90		Other
		- Display modules
		-- Incorporating liquid crystal devices (LCD)
	111	--- Of display diagonal of less than 59cm
	112	--- Of display diagonal of 59cm or more but less than 76cm
	113	--- Of display diagonal of 76cm or more
	190	-- Other
	900	- Other

Identification of IO Linkages (Cont.)

- Identify 82 linkages, i.e., 82 pairs of downstream and upstream products
- Cover 91% of six-digit codes in HS 84 & 85
- Cover 92% of the global trade values in 2021
- Unlike the IO table, can examine changes in IO linkages at a short frequency, e.g., monthly or quarterly
- Focus on the nearest IO relation in terms of HS codes rather than identify all possible IO combinations across products
- May call it the “intra-sectoral IO relation”

Empirical Framework

- Examining the linkage between the exports of downstream products to the US and the imports of upstream products from China at a province-level in Vietnam
- Province-level export and import data in Vietnam from January 2019 to December 2023, obtained from the Global Trade Atlas (IHS Markit)
- Time lag in production
  - Analyze at quarterly or half-yearly frequency



Empirical Framework (Cont.)

- The estimation equation for IO linkage l in province r at time t

$$\frac{Imports\ from\ China_{lrt}}{Imports\ from\ World_{lrt}} = \beta \cdot \text{arcsinh}(Exports\ to\ US_{lrt}) + \text{u}_{lr} + \text{u}_{rt} + \text{u}_{lt} + \epsilon_{lrt}$$

  - $\text{arcsinh}(x) = \ln\left(x + \sqrt{x^2 + 1}\right)$
- Fixed effects (FE)
  - Linkage-province FE: Region-specific product characteristics that are less likely to dramatically change in the short run, e.g., the existence of downstream and upstream industries and their technology level in each province
  - Province-time FE: Time-variant factor prices (e.g., wages) and the average effect of the COVID-19 pandemic at a province level
  - Linkage-time FE: Time-variant product characteristics, such as changes in supply capacity in China, demand sizes in the US, tariffs in the US and Vietnam, or other nation-wide policy measures in Vietnam, in addition to the US additional tariffs on China.
- Endogeneity, especially simultaneity bias, but estimate by the OLS
  - Identified by changes in provincial exports to the US in Vietnam driven by the supply side

Table A1. Basic Statistics: Quarterly

Variable	Obs	Mean	Std. Dev.	Min	Max
Import share from China	37,901	0.468	0.414	0	1
Import share from Japan	37,901	0.086	0.217	0	1
Import share from Korea	37,901	0.114	0.260	0	1
Import share from Taiwan	37,901	0.049	0.171	0	1
Exports to US	37,901	2.714	5.554	0	22.231
Exports to ASEAN	37,901	3.468	5.511	0	20.863
Exports to China	37,901	2.714	5.243	0	22.822
Exports to ROW	37,901	4.967	6.424	0	22.875
Exports to US * Entry	37,901	7.213	14.763	0	61.693
Exports to US * Transparency	37,901	6.822	13.971	0	58.833
Exports to US * Support	37,901	6.998	14.330	0	57.981

Source: Author's compilation.
Note: Except for import share variables, we take the inverse hyperbolic sine transformation for all variables.

Table A2. Basic Statistics: Half-yearly

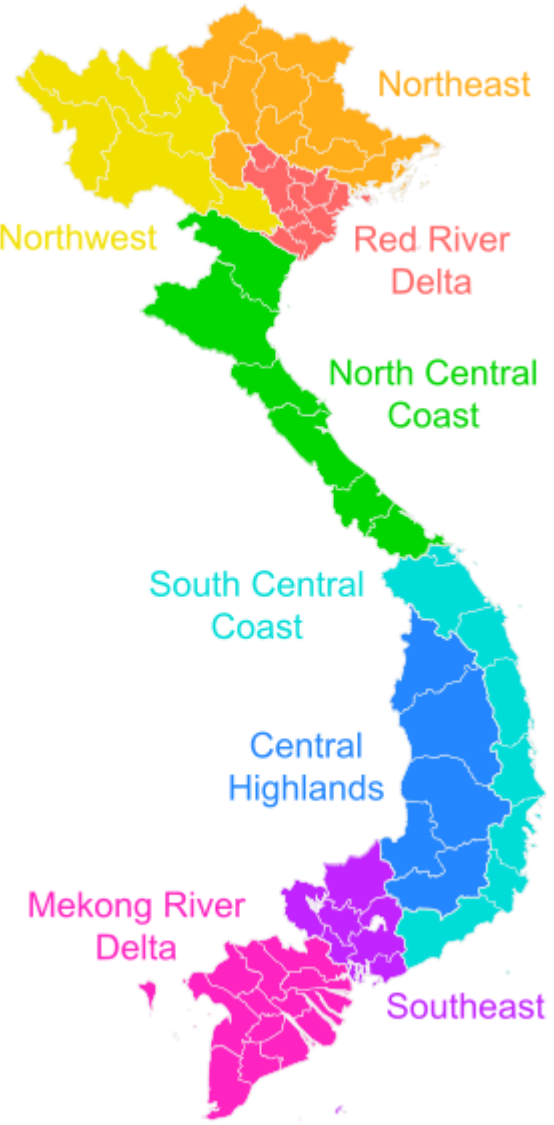
Variable	Obs	Mean	Std. Dev.	Min	Max
Import share from China	21,957	0.472	0.408	0	1
Import share from Japan	21,957	0.082	0.209	0	1
Import share from Korea	21,957	0.109	0.250	0	1
Import share from Taiwan	21,957	0.049	0.170	0	1
Exports to US	21,957	2.816	5.684	0	22.895
Exports to ASEAN	21,957	3.910	5.741	0	21.306
Exports to China	21,957	2.991	5.473	0	23.497
Exports to ROW	21,957	5.375	6.548	0	23.481
Exports to US * Entry	21,957	7.487	15.112	0	63.583
Exports to US * Transparency	21,957	7.078	14.297	0	60.602
Exports to US * Support	21,957	7.257	14.661	0	59.644

Source: Author's compilation.
Note: Except for import share variables, we take the inverse hyperbolic sine transformation for all variables.

Table 1. Growth Rates in Exports of Downstream Products to the US and Imports of Upstream Products from China from 2019 to 2023 (%)

	Export	Import			
	USA	China	Japan	Korea	Taiwan
Northwest	49,491	-23	186	-35	432
Northeast	148	-44	164	-29	-7
Red River Delta	78	9	-32	-85	77
North Central	2,937	-45	-96	-16	-59
South Central Coast	644	13	1	0.2	-98
Central Highlands	-98	1,706	-33	-92	-58
Southeast	192	36	-36	-66	-47
Mekong River Delta	130	33	-35	150	-21

Source: Author's compilation.



Source: Afrogindahood (CC BY-SA 4.0)

Table 2. Baseline Results by the OLS

	China	Japan	Korea	Taiwan
Quarterly				
Exports to US	0.002**	-0.001**	0.000	-0.001
	[0.001]	[0.000]	[0.001]	[0.000]
Number of obs.	37,901	37,901	37,901	37,901
Adj. R-sq.	0.503	0.446	0.532	0.404
Half-yearly				
Exports to US	0.002**	-0.001***	0.000	-0.001
	[0.001]	[0.000]	[0.001]	[0.000]
Number of obs.	21,957	21,957	21,957	21,957
Adj. R-sq.	0.513	0.455	0.544	0.446

Notes: This table reports the estimation results using the OLS method. The dependent variable is the share of imports from the country in the first column out of global imports. We take the inverse hyperbolic sine (or arcsinh) transformation for independent variables. The study time is defined quarterly in "Quarterly" and half-yearly in "Half-yearly." ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The standard errors are clustered at a province-linkage level. In all specifications, we control for province-linkage fixed effects, province-time fixed effects, and linkage-time fixed effects.

Table 3. OLS Results: Export Destination

	Quarterly	Half-yearly
Exports to US	0.002**	0.002**
	[0.001]	[0.001]
Exports to ASEAN	-0.001	-0.002**
	[0.001]	[0.001]
Exports to China	0.001	-0.001
	[0.001]	[0.001]
Exports to ROW	0.002**	0.002**
	[0.001]	[0.001]
Number of observations	37,901	21,957
Adjusted R-squared	0.504	0.513

Notes: This table reports the estimation results using the OLS method. The dependent variable is the share of imports from China out of global imports. We take the inverse hyperbolic sine (or arcsinh) transformation for independent variables. The study time is defined quarterly in "Quarterly" and half-yearly in "Half-yearly." ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The standard errors are clustered at a province-linkage level. In all specifications, we control for province-linkage fixed effects, province-time fixed effects, and linkage-time fixed effects.

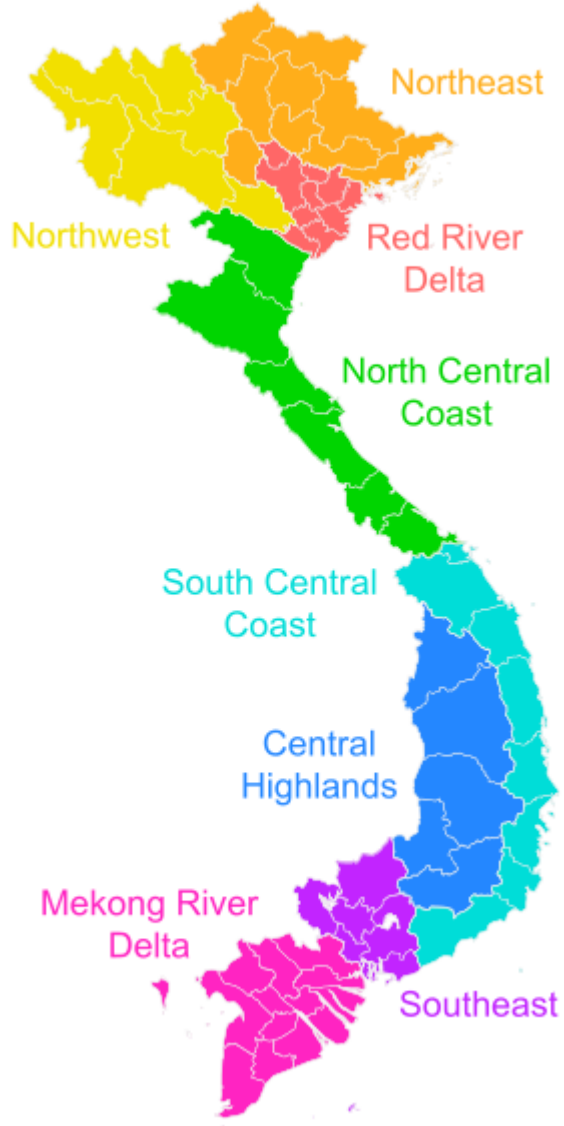
Table 4. OLS Results: Heterogenous Effects

	Quarterly	Half-yearly
Exports to US	-0.071***	-0.080***
	[0.024]	[0.026]
Exports to US * Entry	0.012**	0.012**
	[0.005]	[0.005]
Exports to US * Transparency	0.007	0.011*
	[0.005]	[0.006]
Exports to US * Support	0.009**	0.008*
	[0.004]	[0.004]
Number of observations	37,901	21,957
Adjusted R-squared	0.504	0.513

Notes: This table reports the estimation results using the OLS method. The dependent variable is the share of imports from China out of global imports. We take the inverse hyperbolic sine (or arcsinh) transformation for independent variables. The study time is defined quarterly in "Quarterly" and half-yearly in "Half-yearly." ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The standard errors are clustered at a province-linkage level. In all specifications, we control for province-linkage fixed effects, province-time fixed effects, and linkage-time fixed effects.

Table 5. OLS Results: By Region

	Quarterly	Half-yearly
Exports to US	-0.013*	-0.008
(Base: Northwest)	[0.007]	[0.007]
* Northeast	0.013*	0.008
	[0.008]	[0.007]
* Red River Delta	0.015**	0.008
	[0.007]	[0.007]
* North Central	0.018**	0.012
	[0.009]	[0.008]
* South Central Coast	0.017**	0.011
	[0.008]	[0.007]
* Central Highlands	0.008	0.013
	[0.017]	[0.017]
* Southeast	0.016**	0.01
	[0.007]	[0.007]
* Mekong River Delta	0.018**	0.013*
	[0.008]	[0.008]
Number of observations	37,901	21,957
Adjusted R-squared	0.503	0.513



Source: Afrogindahood (CC BY-SA 4.0)

Notes: This table reports the estimation results using the OLS method. The dependent variable is the share of imports from China out of global imports. We take the inverse hyperbolic sine (or arcsinh) transformation for independent variables. The study time is defined quarterly in "Quarterly" and half-yearly in "Half-yearly." ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The standard errors are clustered at a province-linkage level. In all specifications, we control for province-linkage fixed effects, province-time fixed effects, and linkage-time fixed effects.

Table 6. OLS Results: By Year

	Quarterly	Half-yearly
Exports to US	0.003**	0.004**
(Base: 2019)	[0.001]	[0.002]
* 2020	-0.001	-0.002
	[0.001]	[0.001]
* 2021	0.000	-0.001
	[0.002]	[0.002]
* 2022	-0.002	-0.003*
	[0.002]	[0.002]
* 2023	-0.003*	-0.002
	[0.002]	[0.002]
Number of observations	37,901	21,957
Adjusted R-squared	0.503	0.513

Notes: This table reports the estimation results using the OLS method. The dependent variable is the share of imports from China out of global imports. We take the inverse hyperbolic sine (or arcsinh) transformation for independent variables. The study time is defined quarterly in "Quarterly" and half-yearly in "Half-yearly." ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The standard errors are clustered at a province-linkage level. In all specifications, we control for province-linkage fixed effects, province-time fixed effects, and linkage-time fixed effects.

Concluding Remarks

What We Studied

- Empirically investigated how the exports of downstream products to the US changed the imports of their upstream products from China during the US-China tariff war.
- Used province-level trade data in Vietnam to precisely capture the IO linkages
- Focusing on the trade in general and electric machinery industries from January 2019 to December 2023

What We Found

- Exports of downstream products to the US significantly increased imports of their upstream products from China.
- Not significantly increase the imports of upstream products from Japan, Korea, and Taiwan.
- Greater in provinces with better business environment in terms of entry costs, transparency in public services, and public support to business
- Greatest in the Mekong River Delta region, i.e., a southern region rather than regions sharing borders with China
- China may compensate for the loss of exports to the US by increasing exports to Vietnam.
- Valid only in intra-sectoral linkages, i.e., the IO linkages within general or electrical machinery products. There might exist inter-industry linkages as well.