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# The 2018 US-China Trade War and Trade Diversion:
# Evidence from Thai Customs Data

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▶ The 2018 U.S.–China trade war significantly disrupted global trade flows, creating substantial uncertainty for exporters worldwide.

   ⇒ Elevated tariffs covered 360 and 110 billion dollars of Chinese and U.S. exports.

   ⇒ Continued over Biden administration, and being aggravated in Trump's second term.

▶ While much attention has focused on the U.S. and China (Amiti et al., 2019; Fajgelbaum et al., 2020), spillover effects on third countries are less well understood.

   ⇒ Bystander countries may gain or lose from the trade war, depending on degrees of product substitutability and production responses (Fajgelbaum et al., 2024).

   ⇒ Spillovers may also emanate from supply chain linkages with China or the U.S.

   ⇒ *Thailand* emerges as an interesting study case due to high trade dependency and large trade with both the U.S. and China.

► We investigate how Thailand's exports responded to bilateral tariff shocks using detailed customs data from 2013–2023.

► Our analysis exploits cross-product variations in tariff exposure and the timing of tariff changes to identify the spill-over effects on Thailand's exports to major destinations.

► This paper also examines:

  ■ Dynamic responses of Thai exports
  ■ Product heterogeneity
  ■ Whether export reactions reflect potential transshipment or supply chain link with China

# Preview of Empirical Results

▶ Significant trade diversion effects due to U.S. tariffs on Chinese products, which raised Thai exports to the U.S. and ASEAN.

▶ Larger effects for manufacturing goods in U.S. strategic sectors.

▶ Suggestive evidence of transshipment of Chinese goods to the U.S., rather than supply-chain integration

▶ Rather limited spillover effects from China retaliation, with some negative impact on exports to China in certain sectors.

# Related Literature

▶ This paper mainly contributes to the literature on third-country spillovers of trade policy shocks.

⇒ Global reallocation: Fajgelbaum et al (2024), Alfaro and Chor (2023)

▶ On supply chain links to China & potential transshipment: Freund et al (2024), Iyoha et al (2024), Hayakawa (2024), Utar et al (2023)

▶ Impact of trade war on the U.S. and Chinese economies:

⇒ The U.S.: Amiti et al (2020), Fajgelbaum et al (2020), Handley et al (2020)

⇒ China: Jiao et al.(2024)

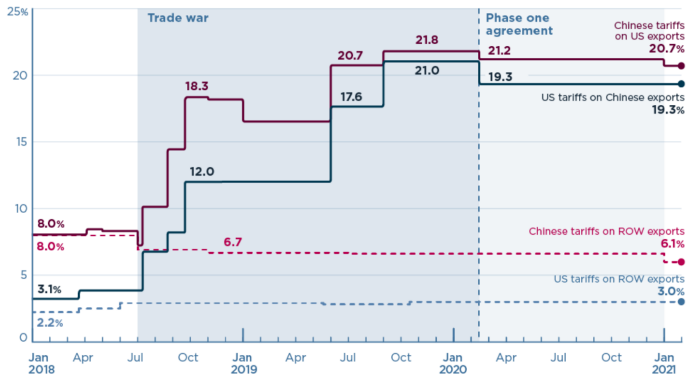▶ From July 6, 2018, the U.S. implemented five waves of tariff hikes against China.



Figure: U.S.–China Tariff Rates from Bown (2021)

# Thai Exports by Major Destinations

▶ Since 2018, exports to the U.S. have strongly expanded from roughly 10% to almost 20%, even as imports from China have risen significantly.
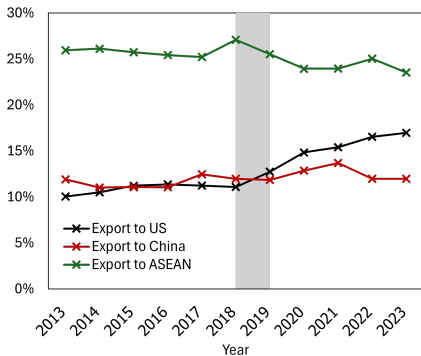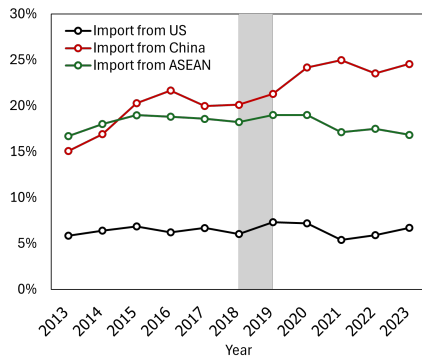


Figure: Share to Total Thai Exports



Figure: Share to Total Thai Imports

# Tariff Coverage across Thai Export Sectors

▶ U.S. tariffs and China retaliation cover 92% and 85% of Thai exports, respectively.
▶ Machinery and Electrical account for around 60% of total exports to the U.S., whereas China is a key market for Agriculture and Plastic & Rubber products.

Table: Thai Exports by Sectors

| Sector | Share of Tariffed Exposure | | Exports To: | | | |
| | US Tariffs | China Retaliation | World | U.S. | China | ASEAN |
|---|---|---|---|---|---|---|
| Agriculture | 91% | 78% | 17.6% | 9.7% | 33.6% | 18.3% |
| Apparel | 98% | 93% | 2.8% | 2.8% | 1.2% | 3.2% |
| Chemicals | 90% | 93% | 5.7% | 1.6% | 6.3% | 9.8% |
| Electrical | 94% | 77% | 22.0% | 35.5% | 10.4% | 17.1% |
| Machinery | 98% | 94% | 19.0% | 24.0% | 11.6% | 11.6% |
| Materials | 99% | 99% | 7.3% | 3.3% | 2.6% | 10.6% |
| Plastics & rubbers | 99% | 63% | 14.3% | 12.2% | 26.0% | 12.9% |
| Transportation | 68% | 92% | 14.7% | 4.6% | 2.9% | 19.4% |
| Other: Metals, Minerals | 95% | 97% | 11.4% | 10.9% | 8.1% | 12.0% |
| All sectors | 92% | 85% | 100% | 100% | 100% | 100% |

# How to Construct the 2018 Trade War Tariffs

▶ We aggregate all quarterly trade flow to the HS6 (3,765 products).

▶ For each HS-6 product $i$ and quarter $t$, we compute weighted averages of the 10-digit or 8-digit tariff rates relative to the pre-war period.

$$\Delta\tau_{i,t}^{US\to CN} = \sum_{j\in i} w_{j,1317}^{US\to CN} \Delta\tau_{j,t}^{US\to CN} \qquad (1)$$

$$\Delta\tau_{i,t}^{CN\to US} = \sum_{j\in i} w_{j,17}^{CN\to US} \Delta\tau_{j,t}^{CN\to US} \qquad (2)$$

■ $w_{j,1317}^{US\to CN}$ - the share of U.S. imports of Chinese products within the corresponding HS-6 product category ($w_{j,17}^{CN\to US}$ - share of Chinese imports of U.S. products).

■ $\tau_{j,t}^{US\to CN}$ from Fajgelbaum et al. (2024) available at HS-10 level

■ $\tau_{j,t}^{CN\to US}$ from Bown (2021) at HS-8 level
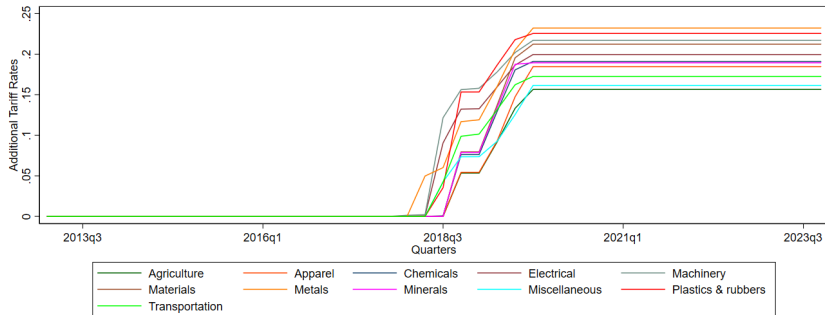
# Additional Tariffs from the 2018 U.S.–China Trade War



Figure: Additional U.S. Tariffs on Chinese Products ($\Delta \tau^{US \to CN}$)

# Additional Tariffs from the 2018 U.S.–China Trade War

▶ U.S. tariff exposure, mostly at 25%, exceeds that of China across all sectors.
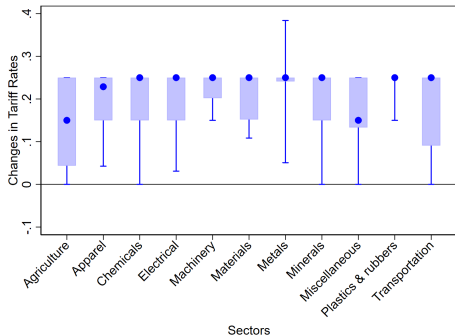▶ Significant variations in additional tariffs within and across industries
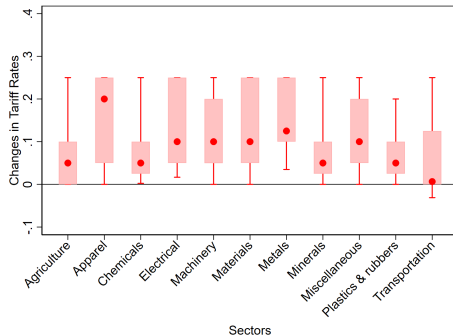


Figure: U.S. tariffs: $\Delta\tau^{US\to CN}$

Figure: China tariffs: $\Delta\tau^{CN\to US}$

▶ Panel regression at the HS-6 product-by-destination-by-quarter level

$$y_{it}^d = \beta_1 \left( \text{Post}_{it} \times \Delta\tau_{it}^{US \to CN} \right) + \beta_2 \left( \text{Post}_{it} \times \Delta\tau_{it}^{CN \to US} \right) + \boldsymbol{\beta} \cdot \mathbf{X}_{it} + \epsilon_{it}, \quad (3)$$

- $y_{it}^d$ - log of export value to destination $d$ for product $i$ in quarter $t$
- $Post_t$ - the dummy variable for the period that product $i$ faces tariff hikes
- $\mathbf{X}_{it}$ includes tariff rates the U.S. and China imposed on Thai exports
- Time and product-by-quarter fixed effects

▶ Focus on six export destinations: U.S., China, Japan, Europe, ASEAN and ROW

# Export Responses to the U.S.–China Trade War

- Thai exports may gain from the Trade War, as Thai goods substitute for Chinese products in the U.S. market.
- ASEAN exports benefit from greater regional value chain integration or a downward supply curve.

Table: The Effect of U.S.–China Trade War on Thai Exports by Destination.

| | Total | USA | China | Japan | Europe | ASEAN | ROW |
|---|---|---|---|---|---|---|---|
| $\text{Post}_{it} \times \Delta\tau_{it}^{US\to CN}$ | 0.750** | 1.624** | 0.128 | 0.340 | -0.053 | 0.873** | -0.211 |
| | (0.346) | (0.709) | (0.775) | (0.561) | (0.613) | (0.371) | (0.503) |
| $\text{Post}_{it} \times \Delta\tau_{it}^{CN\to US}$ | 0.646* | 0.526 | -1.101 | -0.226 | 0.235 | 0.614 | 0.290 |
| | (0.365) | (0.550) | (0.730) | (0.521) | (0.599) | (0.432) | (0.507) |
| $\tau_{it}^{US\to TH}$ | -0.737 | -2.536** | -2.075 | -3.173*** | -2.715** | -1.725** | -2.184** |
| | (0.560) | (1.166) | (1.475) | (1.114) | (1.180) | (0.727) | (1.043) |
| $\tau_{it}^{CN\to TH}$ | -0.496 | 1.038 | -0.127 | 1.504 | 1.682 | -0.101 | 1.816* |
| | (0.603) | (1.157) | (1.486) | (1.010) | (1.068) | (0.747) | (1.040) |
| Observations | 135,960 | 60,940 | 53,196 | 77,176 | 57,552 | 118,404 | 91,080 |
| R-squared | 0.756 | 0.658 | 0.616 | 0.673 | 0.685 | 0.704 | 0.701 |
| HS6 × Quarter FE & Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

▶ We extend the baseline specification by replacing the post-treatment indicator with a set of quarter-specific indicators.

$$y_{it}^d = \sum_{k=-1}^{4} \beta_k^{US \to CN} \left( \text{Dur}_{it}^k \times \Delta\tau_{it}^{US \to CN} \right) + \sum_{k=-1}^{4} \beta_k^{CN \to US} \left( \text{Dur}_{it}^k \times \Delta\tau_{it}^{CN \to US} \right)$$
$$+ \beta' \mathbf{X}_{it} + \varepsilon_{it}^d,$$

$$(4)$$

- $y_{it}^d$ - log of export value to destination $d$ for product $i$ in quarter $t$
- $\text{Dur}_{it}^k$ - group quarters into yearly durations relative to the treatment period, $\text{Dur}^0 = 1$ if quarter t is within the first year post-treatment (i.e., quarters 0 to 3)
- $\mathbf{X}_{it}$ includes tariff rates the U.S. and China imposed on Thai exports
- Time and product-by-quarter fixed effects

# Dynamic Effects of the U.S.–China Trade War

▶ Exports to the U.S. exhibit a delayed but pronounced response to $\Delta\tau^{US\rightarrow CN}$.

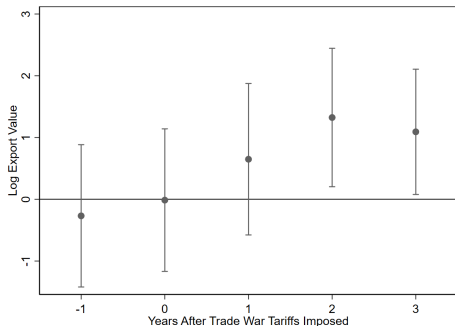▶ Thai goods may complement those U.S. tariffed products in China.



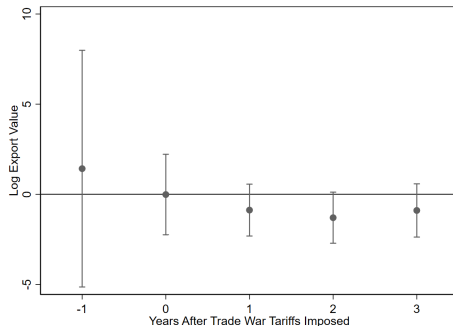Figure: US Export Responses to $\Delta\tau^{US\rightarrow CN}$

Figure: China Export Responses to $\Delta\tau^{CN\rightarrow US}$

# Heterogenous Effects of U.S. Tariffs on the U.S. Exports

▶ Thai exports serve as substitutes for non-commodity manufactured goods, demonstrating significant impact only for capital goods within strategic industries in the U.S. market.
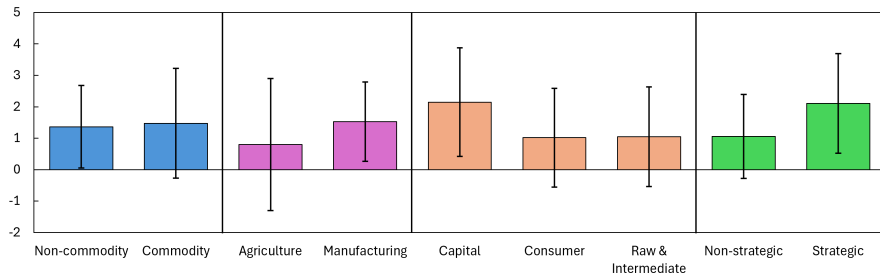


Figure: Heterogenous Effects of $\Delta\tau^{US\rightarrow CN}$: Export to the U.S.

# Heterogenous Effects of U.S. Tariffs on ASEAN Exports

▶ The trade war may have strengthened regional supply chain integration, as Thailand exports more raw material inputs within high-technology manufacturing good sectors.
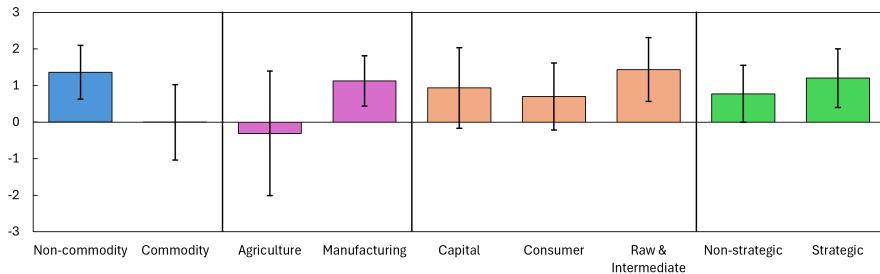


Figure: Heterogenous Effects of $\Delta\tau^{US\to CN}$: Export to ASEAN

# Heterogenous Effects of CN Retaliation on China Exports

▶ China decreases imports of non-commodity and non-strategic manufacturing goods from Thailand.
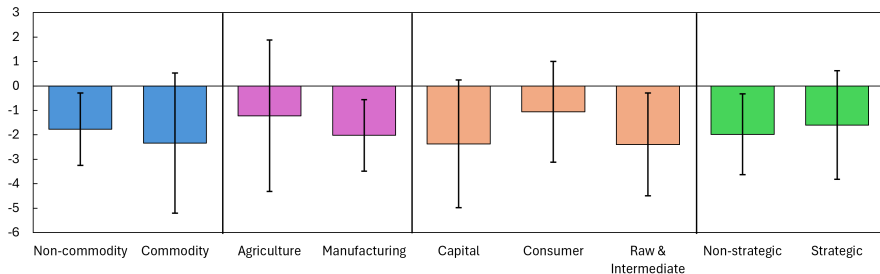


Figure: Heterogenous Effects of $\Delta\tau^{CN\rightarrow US}$: Export to China

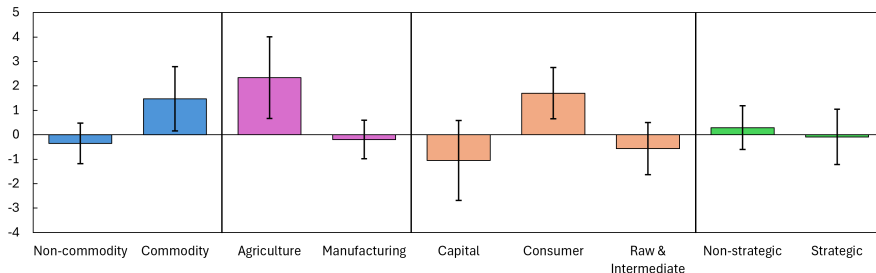► Greater exports of Thai agricultural products to ASEAN (maybe later channeled into China)



Figure: Heterogenous Effects of $\Delta \tau^{CN \rightarrow US}$: Export to ASEAN

# Rising Trend of U.S. Exports and Chinese Imports

▶ Thailand may be serving as a link in the supply chain for Chinese products or a route for the transshipment of Chinese goods to the U.S.

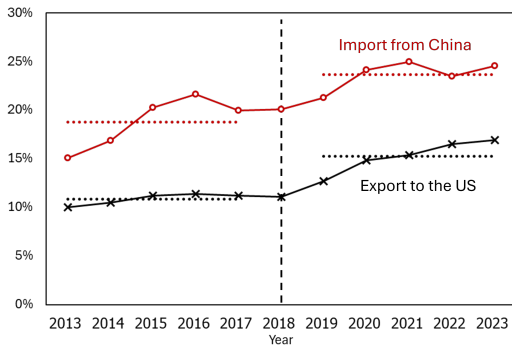

Figure: Thai Export Share to the U.S. and Import Share from China

▶ Test whether imports from China become more aligned with exports to the U.S. for tariffed products in the post-tariff period.

$$y_{it}^{US} = \beta_1 \left( im_{st}^{CN} \times \text{Tariffed}_i^{US \to CN} \times \text{Post}_{it} \right) + \beta_2 \left( im_{st}^{CN} \times \text{Tariffed}_i^{US \to CN} \right)$$
$$+ \beta_3 im_{st}^{CN} + \beta_4 \left( \text{Tariffed}_i^{US \to CN} \times \text{Post}_{it} \right) + \boldsymbol{\beta} \cdot \mathbf{X}_{it} + \epsilon_{it}, \tag{5}$$

- $\text{Tariffed}_i^{US \to CN}$ - the dummy variable for tariffed products
- $im_{st}^{CN}$ - log of imports from China at the HS-6 or HS-2 levels
  - ⇒ HS-6 to examine product transshipment
  - ⇒ HS-2 for potential supply chain linkages

# Transshipment and Supply Chain Effects

▶ Larger roles of product transshipment from China through Thailand

Table: Evidence of Transshipment and Supply Chain Effects

| Log Exports to the U.S. at HS6 | Import from China s=HS6 | Import from China s=HS2 |
|---|---|---|
| $im_{st}^{CN}$ | 0.031 | -0.022 |
| | (0.049) | (0.021) |
| $im_{st}^{CN} \times \text{Tariffed}_i^{US \to CN}$ | -0.039 | 0.013 |
| | (0.051) | (0.023) |
| $im_{st}^{CN} \times \text{Tariffed}_i^{US \to CN} \times \text{Post}_{it}$ | 0.062*** | 0.038*** |
| | (0.012) | (0.009) |
| $\text{Tariffed}_i^{US \to CN} \times \text{Post}_{it}$ | -0.724*** | -0.542** |
| | (0.252) | (0.259) |
| Observations | 60,940 | 60,940 |
| R-squared | 0.658 | 0.658 |
| HS6 × Quarter FE & Time FE | Yes | Yes |

- ▶ Robust evidence of trade diversion: Thailand experienced a substantial increase in exports to the U.S. and ASEAN.
- ▶ The positive effects on US exports emerged with a delay and varied across sectors, while potentially reflecting transshipment of Chinese products.
- ▶ Negative responses of exports to China to retaliatory actions

To do next:

- ▶ Further identify trade war impact channels, particularly via supply chain linkages.
- ▶ Deepen analysis of trade war impact heterogeneity across sectors
- ▶ Conduct granular firm-level analysis: extensive vs. intensive margins, firm nationality.