

Non-Tariff Barriers in the US-China Trade War

Tuo Chen¹ Chang-Tai Hsieh² Zheng (Michael) Song³

¹Tsinghua University

²University of Chicago

³Chinese University of Hong Kong

NBER ITI Spring 2023 Meeting

US-China Trade War

- Trade War (2018-2019)

- ▶ US wanted China to reduce use of non-market mechanisms
- ▶ US raised tariffs on Chinese imports over three rounds
- ▶ Chinese retaliated by raising tariffs on US imports
- ▶ US exports to China fell by 31 billion (to 123 billion in 2019)

- Phase 1 Trade Agreement (2020-2021)

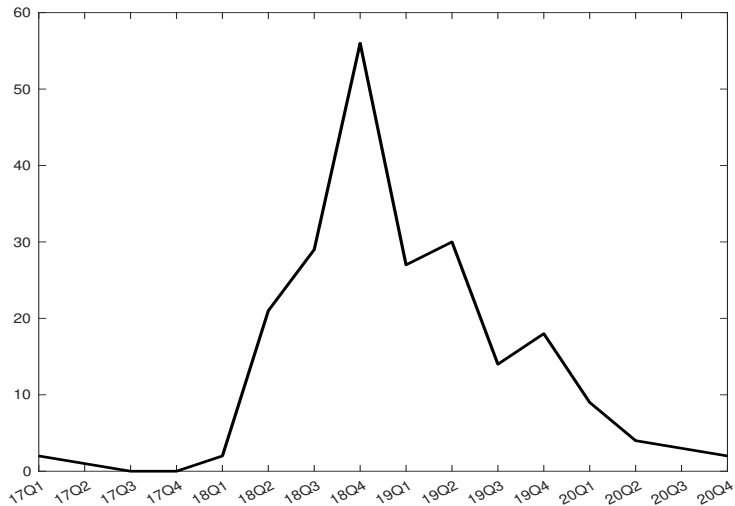
- ▶ China agreed to increase imports from the US by 231 billion by 2021
- ▶ Promised increase in imports implausible (almost triple in 2 years!)
- ▶ Imports from US increased by 57 billion by 2021

China used non-market mechanisms

- China did not have to lower tariffs in Phase 1 Agreement
 - ▶ Large importer “asked” to cut purchases of Brazilian soybeans and replace with American soybeans
 - ▶ Non-market mechanisms this time used to benefit US exporters!
- China also used non-market mechanisms during trade war (2018-2019)
 - ▶ May 1, 2018: Permits needed to sell US pet food on online platforms
 - ▶ May 3, 2018: Lengthy “inspections” for pests in US apples and lumber
 - ▶ October 26, 2018: Pig feed formula changed to lower share of American soybeans

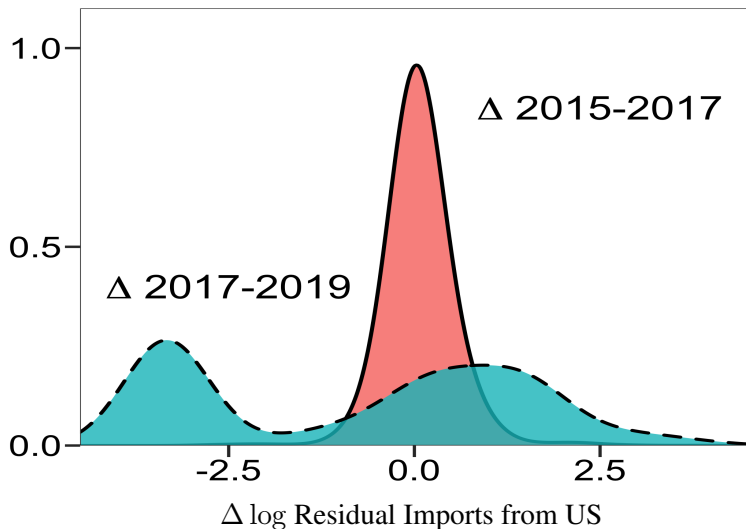
Non-market mechanisms also used in 2018 and 2019

News Articles on Non-Tariff Barriers on US Products in China



Non-market mechanisms also used in 2018 and 2019

Residual of $\Delta \log$ US agricultural exports of HS-6 product on Δ tariff



Measure “non-market” tools affecting US exports

- Chinese customs-level (6-digit HS code) data between 2017 and 2020.
 - ▶ For each HS-6 product, Δ US imports/ROW import, after “controlling” for the effect of Chinese tariffs and cif price
- Trade War (2017 to 2019)
 - ▶ NTB increased by 55% in Agriculture and 17% in Mfg
 - ▶ Tariffs increased by 17% in Agriculture and 9% in Mfg
 - ▶ NTB applied with “discretion”
- Phase 1 Agreement (2019 to 2020)
 - ▶ NTB fell between 2019 and 2020 (on average and across products)
 - ▶ No change in tariff

Effect of Non-Tariff Barriers vs. Tariffs

- ↑ NTB accounts for 50% of decline in US exports between 2017 and 2019
- ↓ NTB accounts for *all* the increase in US exports in 2020
- Non-tariff barriers account for $> 90\%$ of welfare loss in China

Why are non-tariff barriers more costly than tariffs?

- Revenue Losses
- More dispersion in NTB (across products) compared to tariffs
- Non-tariff barriers are unofficial and applied with “discretion”
 - ▶ Burden applies primarily to private firms

Private Importer Share in Agricultural Imports

	2017	2019	2020
Imports from US	80%	60%	80%
Imports from ROW	80%	79%	79%

- ▶ *Misallocation* across importers

Utility from Imports

- Three-layer CES over imports of product i , by firm f , from country j
 - ▶ C_i^f : CES aggregate of product i of firm f from all source countries, elasticity ϵ
 - ▶ C_i : CES aggregate of C_i^f over all firm types for product i , elasticity η
 - ▶ C : CES aggregate of C_i across products, elasticity σ

- Shadow Price $p_{ij}^f = \underbrace{(1 + \phi_{ij}^f)}_{\text{NTB}} \underbrace{(1 + \tau_{ij})}_{\text{tariff}} \underbrace{p_{ij}}_{\text{cif price}}$

- Tariff revenue rebated to consumers
- p_{ij} determined by demand and supply, elasticity of foreign supply γ

Welfare Cost of Tariffs and NTBs

$$\text{Indirect Utility} \propto \left(\sum_i \left[\sum_f \left(\sum_j \left[\frac{(1+\bar{\tau})}{(1+\phi_{ij}^f)(1+\tau_{ij}) p_{ij}} \right]^{\varepsilon-1} \right)^{\frac{\eta-1}{\varepsilon-1}} \right]^{\frac{\sigma-1}{\eta-1}} \right)^{\frac{1}{\sigma-1}}$$

● Cost of Tariff

- ▶ Dispersion of τ_{ij} across countries j and product i
- ▶ $\bar{\tau}$ does not matter
- ▶ No welfare loss from distorting relative price of imports and domestic goods

● Cost of Non-Trade Barriers

- ▶ Dispersion of ϕ_{if} across countries j and product i
- ▶ $\bar{\phi}$ now matters
- ▶ Dispersion of ϕ across firms f

Inferring Non-Tariff Barriers

- Two firm types, state and non-state
- NTB of non-state for product i of country j relative to country $k \notin j$

$$\Delta \log \left(\frac{C_{ij}^n}{C_{ik}^n} \right) = -\epsilon \underbrace{\Delta \log \left(\frac{p_{ij}}{p_{ik}} \frac{1 + \tau_{ij}}{1 + \tau_{ik}} \right)}_{\text{Observed in customs data}} - \epsilon \Delta \log \left(\frac{1 + \phi_{ij}^n}{1 + \phi_{ik}^n} \right)$$

- ▶ Normalize weighted average of $\Delta \log(1 + \phi_{ik}^n)$ to zero

- NTB of state vs. non-state for product i from country j

$$\Delta \log \left(\frac{C_{ij}^s}{C_{ij}^n} \right) = \left(1 - \frac{\epsilon}{\eta} \right) \underbrace{\Delta \log \left(\frac{C_i^s}{C_i^n} \right)}_{\text{same for all countries}} - \epsilon \Delta \log \left(\frac{1 + \phi_{ij}^s}{1 + \phi_{ij}^n} \right)$$

Estimating ϵ

- Demand for product i from j = Supply of product i from j

$$\Delta \log C_{ij} = -\frac{\epsilon\gamma}{\epsilon+\gamma} \Delta \log (1 + \tau_{ij}) + \Delta \text{NTB} + \Delta \text{Supply}$$

$$\Delta \log p_{ij} = -\frac{\epsilon}{\epsilon+\gamma} \Delta \log (1 + \tau_{ij}) + \Delta \text{NTB} + \Delta \text{Supply}$$

- Elasticities wrt tariff

- ▶ Quantity: -3.108 (0.266) (agriculture) and -2.335 (0.112) (mfg)

- ▶ Price: -0.074 (0.084) (agriculture) and -0.033 (0.084) (mfg)

- Implied demand and supply elasticities

- ▶ EoS across source countries: $\epsilon = 3.36$ (agriculture) and $\epsilon = 2.34$ (mfg)

- ▶ US supply elasticity: $\gamma = 42$ (agriculture) and $\gamma = 71$ (mfg)

Average $\Delta \log$ NTB on US Imports

	Δ Tariff	Δ Non-Tariff Barriers Non-State	State
Agriculture			
2017-2019	0.148	0.725	0.023
2019-2020	0.001	-0.573	0.029
Manufacturing			
2017-2019	0.073	-0.066	0.156
2019-2020	0.010	0.197	0.186

Standard Deviation of $\Delta \log$ NTB on US Imports

	Δ Non-Tariff Barriers		
	Δ Tariff	Non-State	State
Agriculture			
2017-2019	0.073	0.697	0.656
2017-2020	0.083	0.363	0.362

- Reversion of Δ NTB in Phase 1 Agreement

Regression of Δ NTB 2019-2020 on Δ NTB 2017-2019: -0.837 (0.028)

Δ Tariffs and NTB for Select Two-Digit Products

	Δ Tariff	Δ NTB
Oil seeds	0.145	1.006
Cereals	0.250	1.492
Fish	0.282	-0.083
Meat	0.533	-0.127
Vehicles	0.002	0.366
Cotton	0.187	0.894

Why Non-Tariff Barriers Instead of Tariffs?

- China's "Trilemma"
 - ▶ Punish US exporters
 - ▶ Claim tariffs were only in retaliation for US tariffs
 - ★ Reciprocal tariffs were not "enough"
 - ★ NTB are unofficial – can always deny their use
 - ▶ Protect profits of state owned firms
 - ★ Tariffs also hurt profits of state owned firms
 - ★ NTB can be applied with "discretion"

Solution to the “Trilemma”

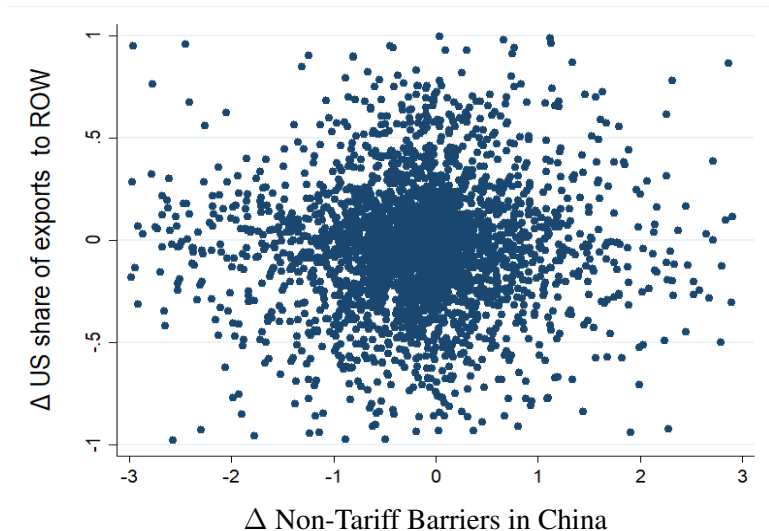
- Use NTBs to “punish” American exporters
 - ▶ Should have thought about the supply elasticity!
- Products with large state shares hit with NTBs only on non-state firms
 - ▶ Regression of Δ NTB on state share of HS-6 product: 4.431 (0.655)
- Products with small state shares hit with tariffs
 - ▶ Regression of Δ tariff on state share of HS-6 product: -0.202 (0.043)

Are these Non-Tariff Barriers?

- We don't know for sure that what we measure are NTBs
 - ▶ Designed to maintain plausible deniability
- Average NTB increased in 2018/2019 and decreased in 2020
 - ▶ But not for all products
 - ▶ And only for non-state importers
- Variation in tariffs and NTB “explained” by state share of imports
- Increase in NTB in 2018/2019 only in Chinese market

Increase in NTB only in Chinese market

Δ Share of US exports to ROW vs. Δ NTB in China, 2017-2019



Welfare cost of Chinese trade barriers

- Already have tariff, NTBs, EoS across countries ϵ , supply elasticity γ
- Elasticity of substitution between firms η
 - ▶ Regress $\Delta \log \left(\frac{C_i^n}{C_i^s} \right)$ on $\Delta \log \left(\frac{1 + \bar{\phi}_i^n}{1 + \bar{\phi}_i^s} \right)$
 - ▶ Remember that tariffs apply equally to state and non-state
 - ▶ Elasticity across firms $\eta = 3.36$ (agriculture) and $\eta = 2.34$ (mfg)
- Elasticity of substitution between products σ
 - ▶ Regress $\Delta \log C_i$ on $\Delta \log(1 + \bar{\tau}_i)$
 - ▶ Elasticity across products $\sigma = 1.47$ (agriculture) and $\sigma = 1.25$ (mfg)
 - ▶ Similar estimate if we also include Δ NTBs

Extension: Input-Output Structure

- Firms combine imports with local input X

$$\tilde{C}_i^f = C_i^{f\alpha_i} X_i^{f1-\alpha_i}$$

- EoS of *imports* across firms is $\alpha_i (\eta - 1) + 1$
- No change in EoS of imports across countries or across products
- No change in how we infer non-tariff barriers (we exploit variation within a product)

Effect of Trade War on Imports from US (in billion US\$)

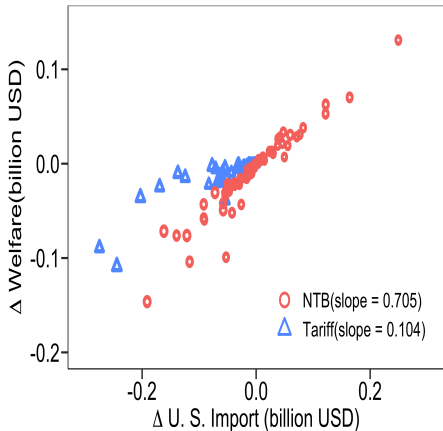
	<u>2019/2017</u>	<u>2020/2019</u>
<u>Agriculture</u>		
Tariffs Only	-10.5	-0.5
Tariffs + NTB	-21.5	3.8
<u>Manufacturing</u>		
Tariff Only	-12.6	0.8
Tariff + NTB	-23.9	1.1

Effect of Trade War on Chinese Welfare (in billion US\$)

	<u>2019/2017</u>	<u>2020/2019</u>
<u>Agriculture</u>		
Tariffs Only	-1.7	-0.2
Tariffs + NTB	-12.7	5.4
<u>Manufacturing</u>		
Tariff Only	-1.6	-0.2
Tariff + NTB	-27.2	-13.6

Elasticity of Welfare to Imports, Tariffs vs. NTBs

Agriculture



Manufacturing

