Surviving the U.S.-China Trade War? Evidence from Chinese Exporters

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IPES | UC Boulder
October 23, 2021

Who bears the cost of adjustment and how

- Rich IPE literature on the distributive impact of liberalization for a firm/industry/factor based on its standing in the international economy (see review by Kim and Osgood 2019). But who bears the cost of adjustment when a trade war shocks the international trading system, and how?

- Existing literature finds significant tariff passes-through (Fajgelbaum et al., 2019, Amiti et al., 2019), suggesting most of the cost is borne by American consumers and companies, but are Chinese exporters really surviving the trade war unscathed?
  "Some exporters of highly substitutable goods have just dropped out of the market as US firms have started importing from elsewhere. Their margins are too thin and tariffs are clearly hurting them."
  (BBC)

Research Question

- Has the US China trade war impacted exit rates among Chinese exporters? What accounts for heterogeneity in changes in exit rates?
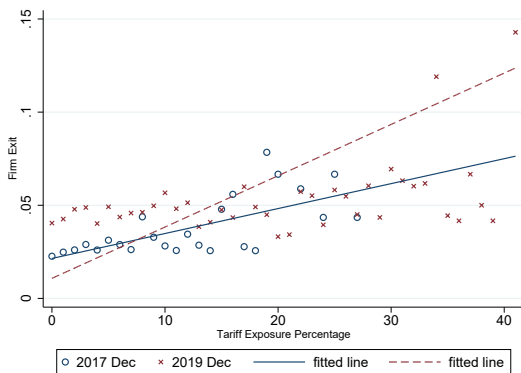
Result Preview: Baseline

Figure: Firm Exit Before 2018 and After

Firm exits in a trade war

Trade war can hurt exporters through dampened demand and greater policy uncertainty (Handley and Limão (2017) and Pierce and Schott (2016)). We expect the trade war to increase exit (ATE) among Chinese exporters, but the effect would be heterogeneous:

- H1 *ATE*: Exposure to Trump tariffs increases exit.
- H2 *The Productivity Hypothesis*: Exit rates are higher for smaller firms (size as proxy for productivity).
- H3 *The Outside Option Hypothesis*: Exit rates are higher for foreign firms.
- H4 *The Substitutability Hypothesis*: Exit rates are higher for firms engaged in processing trade, and especially for those engaged in exporting final products.

Data and Measurement

- 2016-2019 Product-level Tariff and Trade Data (HS10)
  - USITC, Peterson Institute for International Economics, Fajgelbaum et al.(QJE)
- Chinese Firm-Level Trade Transaction Data (HS8-firm)
  - 2011-2015 Chinese Customs Records - 513,338 firms
- Chinese Firm-Level Business Registration Database
  - 2016-2019 Firm Registration Status (National Enterprise Credit Information Publicity System, Tianyancha 天眼查)

Firm-Level Tariff Exposure

Similar to Benguria et. al. (2021), we compute tariff exposure as:

$$\text{Trump Tariff}_{ft} = \frac{\sum_h \tau_{ht}^{Trump} X_{fh,t_0}^{CHN \to US}}{\sum_h X_{fh,t_0}^{CHN \to All}} \tag{1}$$

$$\text{Retaliatory Tariff}_{ft} = \frac{\sum_h \tau_{ht}^{CHN} M_{fh,t_0}^{US \to CHN}}{\sum_h M_{fh,t_0}^{All \to CHN}} \tag{2}$$

where τ_{ht}^{Trump} is the Trump tariff imposed on product h at time t, $X_{fh,t_0}^{CHN \to US}$ is firm f's export values to the US in product h. $X_{fh,t_0}^{CHN \to All}$ is firm f's total exports of product h in the year 2015.

Tariff Exposure Summary

Table: Firm-Level Trump Tariff Exposure

Year	Tariff Exposure$_{ft}$		ΔTariff Exposure$_{ft}$	
	mean.all	sd.all	mean.all	sd.all
2017-Q1	0.016	0.034	0.000	0.002
2017-Q2	0.016	0.034	0.000	0.001
2017-Q3	0.016	0.034	0.000	0.002
2017-Q4	0.016	0.034	0.000	0.002
2018-Q1	0.016	0.034	0.001	0.010
2018-Q2	0.016	0.035	0.001	0.010
2018-Q3	0.036	0.057	0.035	0.056
2018-Q4	0.049	0.063	0.035	0.056
2019-Q1	0.049	0.063	0.035	0.056
2019-Q2	0.057	0.073	0.060	0.082
2019-Q3	0.076	0.089	0.067	0.081
2019-Q4	0.081	0.091	0.067	0.081

Tariff Coverage by Industry

Research Design / Main Specification
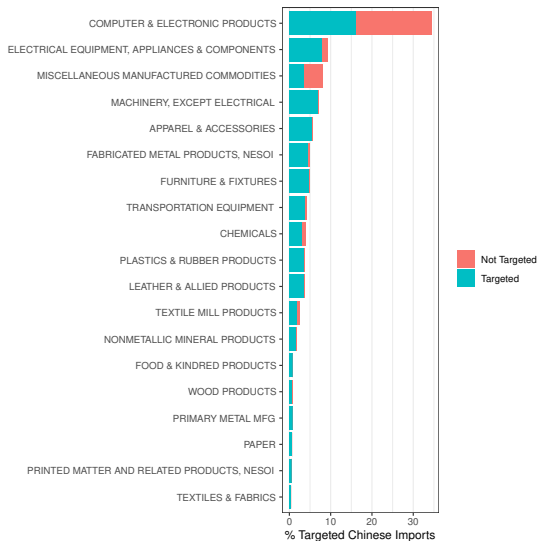
$$\text{Exit}_{it} = \alpha_1 + \beta_1 \text{Trump Tariff}_{it} + \beta_2 \text{Retaliatory Tariff}_{it} + \mathbf{Z}'_{ft}\gamma + \delta_i + \delta_t + \epsilon_{it}$$

- Trump Tariff = firm-level Trump tariff exposure for each firm i in year-month t
- Retaliatory Tariff = firm-level CHN retaliatory tariff exposure for each firm i in year-month t
- $\mathbf{Z}'_{ft}$ = firm-level tariff exposures from other major trading partners (i.e., Southeast Asian countries, Other high-income countries, or all the other trading partners)
- δ_i, δ_t are firm, year, and month fixed effects (we also tried various more sophisticated fixed effects)
- Standard errors are clustered at the firm level

Results: Baseline

Table: Baseline, Firm exit and exposure to tariffs

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel (a): Manufacturing Sample					
Trump Tariff Exposure	0.005***	0.008***	0.017***	0.012***	0.012***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Retaliatory Exposure	0.039***	0.042***	0.036***	0.046***	0.025***	0.019***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
All Countries' Tariffs?	No	Yes	Yes	Yes	Yes	Yes
Firm FE?	Yes	Yes	Yes	Yes	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	No
Month FE	Yes	Yes	Yes	Yes	Yes	No
Month by Year FE?	No	No	No	No	No	Yes
Industry by Year FE	No	No	Yes	No	No	No
City by Year FE	No	No	No	Yes	No	No
Firm Specific Linear Trends	No	No	No	No	Yes	No
Firm by Year FE	No	No	No	No	No	Yes
Observations	2971104	2971104	2971104	2971104	2971104	2971104
Post-Trade War Dependent Variable Mean: 5.36%, Sample Overall: 2.63%						

Note: Regressions use firm registration data from January 2016 through December 2019. Standard errors in parentheses are adjusted for clustering at the firm level. ***Significant at 1% level **Significant at 5% level *Significant at 10% level.

Event Study
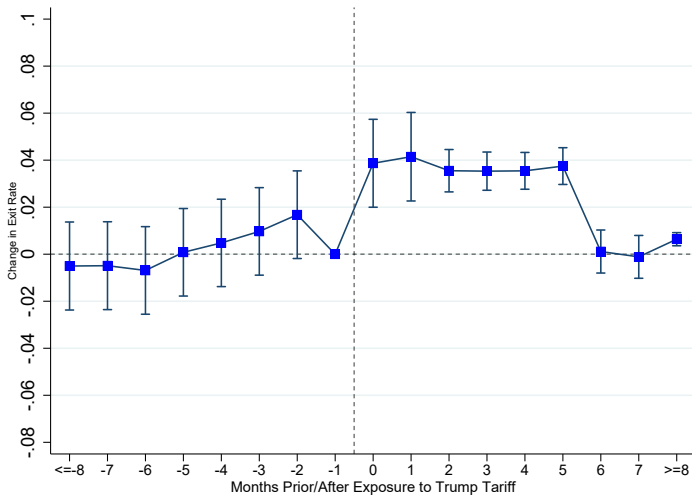
Results: Firm Size

Table: FIRM EXIT AND EXPOSURE TO TARIFFS, BY FIRM SIZE

	(1)	(2)	(3)	(4)
Emp < 50 × Trump Tariff	0.027***		0.027***	0.027***
	(0.009)		(0.009)	(0.009)
Emp < 100 × Trump Tariff		0.013*		
		(0.008)		
50 < Emp < 100 × Trump Tariff			-0.049***	-0.049***
			(0.010)	(0.010)
100 < Emp < 500 × Trump Tariff				-0.050***
				(0.009)
Emp > 50 × Trump Tariff	-0.056***			
	(0.006)			
Emp > 100 × Trump Tariff		-0.060***	-0.060***	
		(0.007)	(0.007)	
Emp > 500 × Trump Tariff				-0.090***
				(0.005)
Firm and Month and Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2236752	2236752	2236752	2236752

Note: Employment information is obtained from Tianyancha. ***Significant at 1% level Standard errors in parentheses are adjusted for clustering at the firm level. **Significant at 5% level ∗Significant at 10% level.   * $p < .10$, ** $p < .05$, *** $p < .01$

Results: Ownership

Table: FIRM EXIT AND TRUMP TARIFF, BY FIRM OWNERSHIP

	(1)	(2)	(3)	(4)	(5)
HKMT All × Trump Tariff	0.062*** (0.020)				
Foreign All × Trump Tariff	0.007 (0.015)				
HKMT WFOE × Trump Tariff		0.076** (0.033)		0.078** (0.033)	0.103*** (0.038)
HKMT JV × Trump Tariff		0.050** (0.024)		0.051** (0.025)	0.140** (0.070)
Foreign WFOE × Trump Tariff			-0.016 (0.016)	-0.006 (0.016)	0.001 (0.028)
Foreign JV × Trump Tariff			0.033 (0.031)	0.042 (0.031)	-0.017 (0.033)
Domestic (POE) × Trump Tariff					-0.022 (0.025)
Domestic (Others) × Trump Tariff	-0.000 (0.009)	0.001 (0.008)	0.010 (0.008)	-0.000 (0.009)	-0.002 (0.022)
Observations	2784194	2784194	2784194	2784194	2784194

Note: The firm ownership information from Tianyancha further enables us to distinguish whether a foreign firm owned by a HKMT or a real foreign company. Standard errors in parentheses are adjusted for clustering at the firm level. * $p < .10$, ** $p < .05$, *** $p < .01$

The HKMT Puzzle

Our findings on ownership are driven mainly by higher exit among firms designated as Hong Kong, Macau, and Taiwan enterprises. Why higher exit among HKMT firms?

- HKMT enterprises may have invested mainly to take advantage of preferential policies (e.g. round-tripping investment, 三来一补)
- HKMT enterprises are less productive than domestic and "real" foreign enterprises (Huang and Sharif 2008)
- HKMT enterprises may be engaged in export that are more substitutable.

Results: Processing Trade

Table: FIRM EXIT AND TRUMP TARIFF, PROCESSING TRADE

	(1)	(2)	(3)	(4)
Trump Tariff × Share of PT	0.030***			
	(0.007)			
HKMT × Trump Tariff		0.059***		0.123***
		(0.004)		(0.006)
HKMT × Trump Tariff × Share of PT		0.028*		
		(0.015)		
Trump Tariff × Share of Final Products			0.047***	
			(0.003)	
HKMT × Trump Tariff × Share of Final Products				0.113***
				(0.008)
Foreign × Trump Tariff		0.008**		0.008**
		(0.003)		(0.003)
Trump Tariff (Reference Group)	0.012***	0.003*	0.043***	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
Observations	2784674	2784194	2784674	2784194

Note: The firm ownership information from Tianyancha further enables us to distinguish whether a foreign firm owned by a HKMT or a real foreign company. Standard errors in parentheses are adjusted for clustering at the firm level. * $p < .10$, ** $p < .05$, *** $p < .01$

Results: Other Heterogeneity

Table: FIRM EXIT AND TRUMP TARIFF, OTHER MECHANISMS

	(1)	(2)	(3)	(4)	(5)	(6)
Trump Tariff × Firm Age	-0.089***					
	(0.005)					
Trump Tariff × Share of US Exports Before War		0.142***				
		(0.006)				
Trump Tariff × Share of Exports to Other High-Income Countries Before War			-0.141***			
			(0.008)			
Trump Tariff × Deep Pocket (approx. by Registered Captial)				-0.040***		
				(0.001)		
Trump Tariff × Num. of Products					-0.035***	
					(0.001)	
Trump Tariff × Num. of Products to the US						-0.026***
						(0.002)
Trump Tariff	0.267***	-0.109***	0.026***	0.102***	0.071***	0.050***
	(0.016)	(0.005)	(0.002)	(0.002)	(0.003)	(0.003)
Observations	2784674	2784674	2784674	2767059	2784674	2784674

Note: Regressions use firm registration data from January 2016 through December 2019. Standard errors in parentheses are adjusted for clustering at the firm level. $^{*} p < .10$, $^{**} p < .05$, $^{***} p < .01$
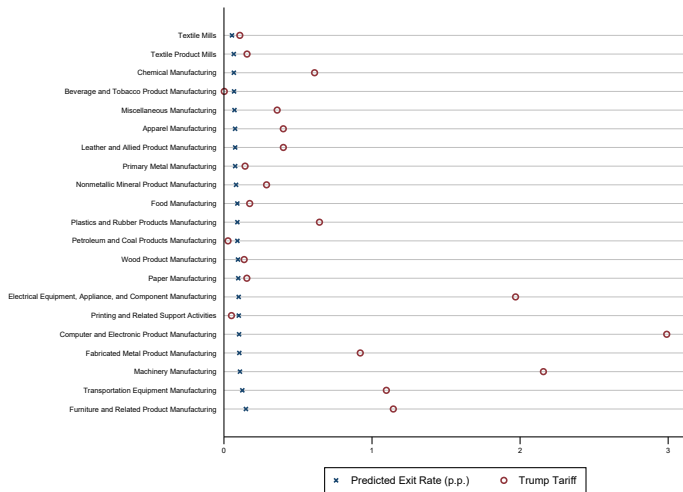
Results: By Industry

Figure: Predicted Exit Rate by Industry

Conclusion

- The trade war has increased exit among Chinese exporters.
- The effects are driven by small firms, firms that are registered as HKMT enterprises, and firms whose position on the global production network is more substitutable.
- The trade war has been costly not only for American consumers and companies, but also Chinese exporters.