
THE ASYMMETRIC IMPACT OF US TARIFFS ON CHINESE ECONOMY

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ABSTRACT

The US-China trade war, initiated in January 2018, is an ongoing major economic conflict between the two largest economies. This paper analyzes its impact on the Chinese economy by utilizing a fixed-effects regression model on annual provincial-level data from the National Bureau of Statistics China (2015-2020). It explores the impact of US tariffs of eleven key economic indicators, measuring international, aggregate outcomes, government finances, and household outcomes. Results show an asymmetric impact on China's economy: the employment of households is adversely impacted, while aggregate output and government finances are buffered. In conclusion, the paper discloses how effective the protective measures that the Chinese government utilize minimize the economic damage of U.S. Tariffs, revealing the significance and priorities of different economic agents within its economy.

Keywords: Us-China Trade War, Chinese Provincial Economies, Panel Data, Fixed Effects Model, Fiscal Transfers, Central Transfers, Tariff Exposure, Trade Shock
Stata, Subnational Analysis, Regression Analysis

1. INTRODUCTION

The United States - China Trade War, ignited in 2018 by the US's first imposed tariffs on approximately \$370 billion worth of Chinese imports. An ongoing economic conflict between the two largest economies, its effects could potentially reshape the world's economy. By 2023, the average US tariff rates on China had risen to approximately 19%, while China's average tariff on US goods reached roughly 21%. This paper investigates the following research question: What is the impact of US tariff exposure on Chinese provincial economies between 2015 and 2020. This paper examines the effects of the trade war on the Chinese economy at the provincial level, looking closely at how tariff exposure impacts the key economic indicators such as Gross Regional Product and Disposable Income and analyzing impact on households' welfare and government finances.

To answer this question, the paper employs a two-way fixed effects regression model using a balanced panel dataset of 31 Chinese provinces from 2015 to 2020, yielding 186 observations. The central finding reveals a stark asymmetry: while tariff exposure is associated with significant declines in employment, it correlates with increases in disposable income, wages, and consumption. Simultaneously, Gross Regional Product, government revenues, and central transfers from the central government all show positive and significant coefficients, suggesting state-led fiscal intervention buffered aggregate indicators while household employment absorbed the direct shock.

The paper proceeds as follows. Section 2 reviews the literature. Section 3 details the methodology. Section 4 describes the data. Section 5 reports results. Section 6 concludes.

2. LITERATURE REVIEW

Existing research on the US-China trade war falls into several strands. Bown (2021) evaluates the Phase One Agreement, finding it represented a truce rather than a resolution. Fajgelbaum et al. (2024) show that US consumers and businesses bore approximately 86 per cent of tariff costs. Autor, Dorn, and Hanson (2021) demonstrate that trade integration produces concentrated local losses—a framework informing this study's subnational focus. Benguria, Choi, and Saffie (2022) find tariff exposure led to significant declines in Chinese firm sales and employment. Cen et al. (2026) reveal that government-linked firms increased importing activity by 30 per cent following sanctions, highlighting the role of state connections.

This paper contributes to the literature by examining provincial variation on tariff exposure, introducing central government fiscal transfers as a specific mechanism, and employing fixed effect method on a unified set of household, government, and aggregate outcomes for the 2015-2020 period.

3. RESEARCH METHODOLOGY

This paper implements two types of regression analysis to examine the impact of US tariff exposure on the Chinese economy at the provincial level. All models were performed using STATA 18. Analysis is carried out on a balanced panel dataset including 31 Chinese provinces over 6 year - giving 186 observations in total. The first is a basic pooled regression model: an Ordinary Least Squares (OLS) model:

$$y_{it} = \alpha + \beta * x_{it} + \varepsilon_{it} \quad (\text{Model 1})$$

where y_{it} is the outcome variable representing one of the eleven economic indicators – such as disposable income or budgetary revenue - for province i in year t . x_{it} is the independent variable measuring the level of US tariff exposure for province i in year t ; β represents the coefficient of interest, measuring the change of the economic outcome in response to a unit increase of tariff exposure; and α , representing the intercept, shows the baseline value of y when there is no tariff exposure. ε_{it} is the idiosyncratic error term representing uninformed variability and unaccounted factors.

However, provincial economies differ systematically. The first model assumes all provinces are identical except for their tariff exposure, which might lead to biased estimates. To address potential omitted variable bias, this paper utilizes a second two-way fixed effects model: a two-way fixed effects model:

$$y_{it} = \alpha + \beta * x_{it} + v_i + \mu_t + \varepsilon_{it} \quad (\text{Model 2})$$

where v_i is set of dummy variables that represents the provincial fixed effects, accounting for time-invariant characteristics like geography, industrial development, and cultural factors. μ_t is

set of dummy variables that represents year fixed effect, capturing time-invariant common shocks at the national level - such as the COVID-19 pandemic or national policy changes, that impacts all provinces in a given year. This model estimates changes within each province over time. By accounting for regional idiosyncrasies and collective temporal trends, it isolates the effects of tariff exposure on the eight economic outcomes for all provinces at given years. Moreover, the coefficient β in this model shows a more accurate estimate of the causal effect of the US tariffs.

4. DATA

This paper uses a balanced panel dataset comprising province by year data from 31 provinces in a six-year time period from 2015 to 2020 - yielding 186 observations in total. The primary source for all economic outcome variables is the National Bureau of Statistics of China (National Bureau of Statistics of China, 2024). The data on tariff exposure is from Chor and Li (2024). All raw data was processed and merged by province and year using STATA 18. Two regression models - a pooled Ordinary Least Squares model (Model 1) and a Two-Way Fixed Effects model (Model 2) - were applied on the combined data set, showing the correlation between 11 key economic indicators and the level of tariff exposure.

Table 1 - Variable List

Variable	Unit	Description
Tariff	Rate	Measured as 100%
Imports	1,000 USD	Total Value of Imports of operating units.
Exports	1,000 USD	Total Value of Exports of operating units.
Budgetary_Revenue	100 million yuan	Local Governments General Budgetary Revenue
Revenue_Tax	100 million yuan	Local Governments Revenue, Tax Revenue
Central_Transfers	100 million yuan	(Local Government General Budgetary Revenue) - (Local Government Revenue, Tax Revenue)
Gross_Regional_Product	100 million yuan	Gross Regional Product.
CPI	-	Consumer Price Index
Employed_Persons	10,000 persons	Number of Employed Persons in Urban Units
Disposable_Income	yuan	Per Capita Disposable Income Nationwide

Wage_Annual	yuan	Average Wage of Employed Persons in Urban Units
Consumption	yuan	Per Capita Consumption Expenditure Nationwide

Note: The source of tariff data is Chor and Li (2024). The source of other data is National Bureau of Statistics of China - <https://data.stats.gov.cn/english/easyquery.htm?cn=E0103>

Table 1 lists and defines the 12 key variables used in this study: one independent variable Tariff and eleven dependent variables. The dependent variables are key indicators that show a comprehensive reflection of China's economy, including trade(Imports, Exports), government fiscal status (Budgetary_Revenue, Revenue_Tax, and Central_Transfers), aggregate outcomes (Gross_Regional_Product, CPI), and household outcomes (Employed_Persons, Disposable_Income, Wage_Annual, Consumption). Central_Transfers represents a non-tax fiscal inflow, which is mainly distributed by the central government. Central_Transfers is calculated as Budgetary_Revenue minus Revenue_Tax

Table 2 - Summary Statistics Table

	(1)	(2)	(3)	(4)	(5)
	Mean	Standard deviation	Minimum	Maximum	N
Tariff	0.023	0.0376159	0	0.165	186
Population	4.46e+07	2.69e+07	5156089	1.01e+08	186
CPI	102.01	0.617	100.6	103.7	186
Wage_Annual (yuan)	77542.66	22855.67	45403	178178	186
Budgetary_Revenue (100 million yuan)	3015.258	2522.019	137.13	12923.85	186
Consumption(yuan)	18989.01	7085.686	8246	45605	186
Gross_Regional_Product (100 million yuan)	28374.3	23414.86	1063.6	113708.9	186
Revenue_Tax(100 million yuan)	2277.58	2084.01	92	10063.95	186
Employed_Persons(10,000 persons)	564.80	419.023	31.5	2085.3	186
Disposable_Income(Yuan)	27087.53	11478.59	12254	72232	186

Imports(1,000 USD)	6.12e+07	9.82e+07	122439	4.38e+08	186
Exports(1,000 USD)	7.64e+07	1.33e+08	177929	6.47e+08	186
Central_Transfers(100 million yuan)	737.68	501.10	45.13	3041.90	186

Note: N=186. Data are from the National Bureau of Statistics of China.

Table 2 shows the summary statistics for the regression sample. The mean tariff exposure across 31 provinces and 6 years was 0.77% with a large interprovincial variation - standard deviation is 2.42%. This indicates that the level of tariff exposure was not uniform, and it suggests that impact of the trade war may not be equally significant among the provinces. The economic outcomes also show dispersion, which reflects China's major regional distinctions. For example, Gross Regional Product averages 2.31 trillion yuan, but ranges from 29.06 billion yuan to 13.79 trillion yuan. Essentially, these statistics corroborate the importance of a two-way fixed effects model(Model 2) to account for provincial heterogeneity, allowing the analysis to yield accurate results and lead to reliable conclusions.

5. RESULTS

This section presents the findings from the regression analysis. Tables 3, 4, and 5 report the estimates from the Model 1 - the basic pooled OLS model - in the odd-numbered columns and that of Model 2 - a two-way fixed effects model - in the even-numbered columns.

Table 3. The Effect of Tariff on Exports and imports

	(1)	(2)	(3)	(4)
	Imports		Exports	
Tariff	9.15e+08***	2.48e+08 ***	1.19e+09***	2.68e+08***
Standard Error	(2.12e+08)	(4.31e+07)	(3.33e+08)	(4.53e+07)
Fixed Effect	N	Y	N	Y
R squared	0.0916	0.9936	0.0654	0.9970
N	186	186	186	186

Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3 shows the results for provincial import and export values. The basic pooled OLS model - Model 1- shows the positive coefficients and statistically significant relationship in columns (1) and (3). A one percentage point increase in the tariff variable is associated with a \$9.15 billion increase in the Total Value of Imports of operating units and a \$11.90 billion increase in the Total value of Exports of operating units.

However, the fixed effects model (Model 2), which controls time-invariant provincial characteristics and common yearly shocks, estimates a different magnitude of impact from tariff exposure. The results in columns (2) and (4) still show a positive and statistically significant relationship between tariff exposure and trade volumes. A one percentage point increase in the

tariff variable is associated with a increase of \$2.48 billion in the Total Value of Imports of operating units and an increase in \$2.68 billion of the Total Value of Exports of operating units. The maliciously of the agent becomes smaller after controlling province fixed effects and year fixed effects.

Table 5. The Effect of Tariff on Household Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Employed_Persons		Disposable_Income		Wage_Annual		Consumption	
Tariff	2379.161**	- 480.02**	158802.7***	49250.81***	336919.8***	94395.42***	88970.47***	13727.37***
Standard Error	(929.68)	(185.04)	(15459.58)	(3942.27)	(27940.96)	(11680)	(10073.73)	(2611.11)
Fixed Effect	N	Y	N	Y	N	Y	N	Y
R squared	0.0344	0.9934	0.3645	0.9929	0.4414	0.9833	0.2977	0.9919
N	186	186	186	186	186	186	186	186

6. CONCLUSION

The purpose of this paper is to investigate the asymmetric impact of US tariff exposure on the Chinese provincial economies between 2015 and 2020, and to identify the mechanisms resulting in the decoupling between household welfare and aggregate output. Using a two-way fixed effects regression model on a balanced panel of 31 Chinese provinces (186 observations), the analysis leads to three central findings.

First, the impact of US tariffs was highly asymmetric. While tariff exposure was associated with a statistically significant decline in provincial employment (approximately 48,000 persons per one percentage point increase in the tariff rate under Model 2), household welfare indicators such as disposable income, average annual wage, and consumption expenditure all showed positive and statistically significant correlations with tariff exposure.

Second, aggregate economic indicators - Gross Regional Product, local government budgetary revenue, and tax revenue - also exhibited positive coefficients, suggesting that the overall performance of provincial economies did not decline despite the trade shock.

Third, and most crucially, the variable `Central_Transfers` showed a strong positive relationship with tariff exposure - approximately 1.64 billion yuan per 1% increase under Model 2. This provides direct evidence that the central government in Beijing actively provided fiscal resources to provinces that were most affected by US tariffs.

Together, these findings support the thesis that the Chinese government utilized fiscal transfers to buffer aggregate provincial output and government finances, while household-level employment absorbed the direct negative shock of the trade war. The positive coefficients for income and consumption, despite falling employment, suggest labor market polarization: lower-wage export manufacturing jobs may have been lost, but the remaining workers, who potentially work in state-supported or higher-value sectors, saw wage increases. This pattern reveals the strategic priorities of China's state-capitalist system: protecting macroeconomic stability and government revenue was of more importance than preserving aggregate employment levels in the short run.

7. LIMITATIONS

The study has several limitations. First, the analysis is correlational rather than purely causal. While the fixed effects model (Model 2) controls for time-invariant provincial heterogeneity and common yearly shocks, it cannot completely eliminate omitted variable bias or reverse causality. Second, the tariff variable is constructed at the provincial level based on export composition, which may not show significant variation within the provinces. A more detailed firm-level analysis would provide clearer identification. Third, the study period (2015-2020) includes the COVID-19 pandemic (2020), which may obscure the estimated tariff effects. Although year fixed effects control for common shocks, disruptions related to the pandemic may have interacted with tariff exposure in ways that are not fully covered. Fourth, the tariff variable unit required careful interpretation; the reported effects (in Section 5 Results) are for a one percentage point increase, but readers must be aware that actual tariff changes were often larger in magnitude. Fifth, the analysis does not capture general equilibrium effect - spillovers from affected provinces that indirectly affect other provinces- which could mean the results are underestimations of the true effects.

8. DIRECTION FOR FUTURE RESEARCH

Future research could extend this analysis in several directions. First, examinations on firm-level data can be done to understand which type of firms (for example - state-owned vs. private, large vs. small) adjusted their supply chains or shifted to domestic markets in response to tariffs. Second, comparisons between China's experience with that of other countries affected by US tariffs, such as the European Union, can be used to research whether similar buffering mechanisms occur elsewhere. Third, another direction is to assess the long-term effects of the labor market polarization: did export-industry workers eventually find reemployment in other sectors? Finally, extending the analysis beyond 2020 would capture the effects of the Phase One trade agreement and China's post-pandemic adjustment period.

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