

The Impact of Sino-US Trade Friction on Trade Deflection Effect in Developing Countries

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Abstract. In recent years, as the Sino-US trade war has intensified, the economic and trade relationship between the two countries has undergone significant changes. Given this, this paper examines the impact of trade frictions on developing countries' trade flows from the perspectives of tariff barriers and trade policy uncertainty. First, it examines whether developing countries' exports to the United States change after the onset of trade frictions (i.e., the US import substitution effect). Second, it examines whether developing countries' exports to China change after the onset of trade frictions (i.e., the Chinese export deflection effect). An empirical analysis based on bilateral trade data from 2013 to 2023 shows that trade frictions significantly increase developing countries' exports to the United States, demonstrating a clear import substitution effect. However, imports from China do not increase significantly, indicating a nonsignificant Chinese export deflection effect. Finally, the study proposes policy recommendations for developing countries to address the changing international trade environment, such as promoting the diversification of export markets and products and enhancing supply chain autonomy.

Keywords: Sino-US trade friction; trade deflection effect; double difference model.

1. Introduction

In recent years, Sino-US trade frictions have continued to intensify. Since 2018, the United States has imposed tariffs on a variety of Chinese products and has launched multiple rounds of trade restrictions, significantly changing the pattern of trade between the two countries. The United States has raised tariffs in key areas such as steel and aluminum products, which have not only severely suppressed China's exports of related products, but also continued to disrupt the global trade system [1, 2]. This type of friction not only affects the two countries but also affects many developing countries, showing a significant trade deflection effect [3,4]. Some countries, such as Vietnam and Thailand, have gained export substitution opportunities due to the Sino-US trade conflict, and international supply chains and trade routes have undergone major restructuring [3, 4]. In terms of policy, the competition between China and the United States on tariffs, anti-dumping measures, and other measures has become increasingly fierce, prompting China to continuously optimize its foreign trade policy framework. Since 2018, US trade protectionism has risen, and the concept of "reciprocal tariffs" advocated by the Trump administration has particularly caused fluctuations in the global market, further aggravating the external challenges faced by Chinese export companies [5].

There are multiple mechanisms behind the deflection effect of these trade barriers, among which the restructuring of the global industrial chain is considered to be one of the key driving factors. Tao Tao said that external interferences such as the Sino-US trade conflict and the epidemic have increased the trade costs and geopolitical risks of China's related industrial chains, prompting the global supply chain to have a tendency to "de-China" and accelerate its shift towards regional low-cost centers. In addition, under the conditions of high tariff barriers and policy uncertainty, some labor-intensive industries have first shifted to developing countries such as Southeast Asia and South Asia [6]. The policy hedging mechanism also plays a certain role. When Sino-US frictions escalate, companies diversify their markets to avoid risks, such as strengthening trade ties with Association of Southeast Asian Nations (ASEAN) countries and shifting some export orders to places with low political and policy risks. The internal reason for Chinese companies to accelerate this hedging adjustment is the high level of trade policy uncertainty. The driving effect of foreign direct investment

(OFDI) further expands the deflection trend. When Chinese companies expand their foreign investment, some export activities shift from domestic to overseas affiliated companies or transit trade, thereby promoting the export of products to developing countries. Gao Xin et al. found that the deflection effect caused by the uncertainty of US trade policy toward China is mainly achieved by OFDI and bilateral structural effects [7]. Tariffs and anti-dumping measures have directly increased the cost of exports to the United States, while the global supply chain repositioning and export companies' diversification strategies have indirectly exacerbated the trend of flows to third-country markets.

The core question of this study is how the Sino-US trade friction, particularly tariff barriers and anti-dumping measures, has affected Chinese exports. Specifically, is trade deflection sufficient to offset the decline in Chinese exports to the US, particularly in developing countries? Specifically, this study addresses two key issues: how to quantify the impact of different trade friction measures on China's export structure, and whether export deflection can effectively mitigate the losses caused by the Sino-US trade friction. Answering these questions will help us understand the economic effects of the Sino-US trade friction and provide theoretical support for China's response to future trade frictions.

2. Literature Review

Studies have shown that developing countries are often significantly affected by the trade deflection effect caused by trade friction [1]. Hayakawa and Sudsawasd pointed out that after the United States raised tariffs, Vietnam benefited significantly in areas such as consumer goods and electronic products. Their research emphasized that Vietnam took over the market that originally belonged to China, and its exports to the United States increased significantly [3]. Choi and Nguyen also confirmed that as tariff measures continued to escalate, Vietnam and other Southeast Asian countries' exports to the United States increased significantly, gradually filling the market gap left by China's withdrawal [4]. Regarding the phenomenon of China's export deflection, Gao Xin's research showed that the uncertainty of the US trade policy toward China further prompted China to shift exports to Southeast Asia, such as ASEAN. The study emphasized that during the period of intensified Sino-US trade frictions, this uncertainty made Southeast Asia an important alternative market for Chinese export goods [7]. Lyu Jianxing focused on the impact of Sino-US trade frictions on China and other economies and found that the US's imposition of tariffs on China not only directly suppressed China's exports to the United States but also had an impact on third parties such as Japan and Germany. The results show that the impact of US trade policy goes beyond the bilateral scope and deeply affects the global trade flow [2]. More comprehensive studies, such as Nantembelele et al., pointed out that the growth of exports in sub-Saharan Africa was promoted by the Sino-US trade friction (especially in the agricultural and oil sectors). After constructing a general equilibrium model, the study analyzed the impact of the US tariff increase on the economies of China and the United States and emphasized that the trade friction put pressure on the economies of the two countries and also brought trade diversion opportunities to sub-Saharan African countries (especially in exports to the Chinese and American markets) [8]. Delgado-Martínez analyzed the trade creation and deflection effects of the Pacific Alliance during the Coronavirus Disease 2019 (COVID-19) pandemic. Although global trade was interrupted by the epidemic, the regional cooperation mechanism enabled the trade stability of the alliance member states to be maintained. However, its trade deflection effect on non-member countries is still uncertain. This finding is of great significance for understanding the role of regional agreements in the context of global crisis and policy uncertainty [9].

Existing literature provides valuable insights into the Sino-US trade friction and its impact on developing countries. Numerous studies have shown that friction affects not only the countries directly involved but also the global trade landscape. Export growth in developing countries (such as those in Southeast Asia and Africa) is driven by trade diversion and the use of alternative markets to regain market share. These studies provide theoretical support for further understanding and

predicting the impact of the Sino-US trade friction on global trade flows, particularly its impact on developing countries.

Lyu Jianxing and others pointed out that most previous studies have focused on a single anti-dumping or tariff measure and have only examined export deflection from China from the perspective of a single product. There is a lack of systematic strategic analysis, and most studies do not clearly identify the countries targeted by export deflection [2]. Existing studies mostly focus on developed countries, such as the United States and the European Union, and pay less attention to developing countries. This paper attempts to overcome these shortcomings by incorporating multiple trade friction measures into the analytical framework and further refining the beneficiary countries, hoping to more comprehensively depict the changes in the global trade landscape against the background of Sino-US friction.

The contribution of this study is to focus on developing countries, filling the gap in existing literature. Previous studies have focused on analyzing changes in China's or the United States' exports, while this study focuses on the impact of Sino-US trade frictions on trade flows in developing countries such as ASEAN, South Asia, and African countries to explore whether these countries can benefit from it. The theoretical logic is based on the multinational trade equilibrium model. It is assumed that if Sino-US trade barriers are raised, China's exports will partially shift to other markets, and US exports will also be deflected. Specifically, if China's exports to the United States are blocked, some goods will shift to other countries and regions. When the United States imports less from China, its imports from third countries will increase. Shi Huimin et al. found that China's anti-dumping measures against the United States have increased US exports to third countries, which is consistent with this study. This study assumes that Sino-US frictions will cause developing countries to take over part of the Sino-US trade flow, thereby causing changes in their exports or imports [10].

Innovation and breakthroughs are reflected in the research perspective and method. This article systematically explores the spillover effects of Sino-US trade friction on the trade of developing countries. It not only pays attention to changes in exports from China or the United States but also pays attention to the situation in markets such as Southeast Asia, South Asia, and Africa. During the research, the indirect impact of trade frictions is analyzed through trade policy uncertainty indicators and industrial chain perspectives, and more rigorous econometric identification strategies (such as double difference) are used to improve the credibility of causal inferences. These explorations provide theoretical and empirical support for the government to accurately formulate trade and industrial policies.

3. Study Design

Based on the theoretical background, this study aims to analyze the changing trends in developing countries' exports to the US and imports from China following the Sino-US trade friction, specifically examining the existence of an export diversion effect. Two econometric models were constructed: Model 1 examines the US import substitution effect (i.e., an increase in developing countries' exports to the US), and Model 2 examines the Chinese export diversion effect (i.e., an increase in developing countries' imports from China). The following details are the model design, variable definitions, and data processing methods used in this study.

3.1. US Import Substitution Effect Model

After the trade friction, have developing countries with high dependence on China increased their exports to the United States, that is, have they filled China's share of the US market.

$$\ln(\text{Export}_{jt}^{\text{US}}) = \alpha + \beta(\text{Post}_t \times \text{ChinaShock}_j) + \gamma X_{jt} + \theta_j + \lambda_t + \varepsilon_{jt} \quad (1)$$

Among them, $\ln(\text{Export}_{jt}^{\text{US}})$ is the total exports of developing country j to the United States in month t , which is processed in natural logarithm. $\text{Post}_t \times \text{ChinaShock}_j$ is the interaction term, which represents the interaction effect between the policy dummy variable and China's trade dependence.

Control variables X_{jt} include the country's monthly GDP (in logarithmic form), the currency exchange rate against the US dollar (in logarithmic form), and the trade freedom index. Fixed effect: θ_j represents the country fixed effect, λ_t is the time fixed effect. The β coefficient represents the proportion of the export growth of countries with higher dependence on China to the United States relative to countries with lower dependence after the policy is implemented.

3.2. China's Export Deflection Effect Model

Research question: After the trade friction, did developing countries with high dependence on China increase their imports from China, that is, did they receive products that China could not export to the United States?

$$\ln(\text{Imports}_{jt}^{\text{CN}}) = \alpha + \beta(\text{Post}_t \times \text{ChinaShock}_j) + \gamma X_{jt} + \theta_j + \lambda_t + \varepsilon_{jt} \quad (2)$$

The model setup is similar to Model 1, except that the explanatory variable is replaced by the amount of developing countries' imports from China. This is done by examining whether countries with high China dependence have increased their imports from China following the US trade friction, thereby assessing the deflection effect of Chinese exports.

The explained variable is $\ln(\text{Imports}_{jt}^{\text{CN}})$, which is the total import amount of developing country j from China, using a logarithmic transformation. The core explanatory variable is $\text{Post}_t \times \text{ChinaShock}_j$, which indicates whether countries with high dependence on China are more likely to increase imports from China after the trade friction. The β coefficient in the model indicates the proportion of the increase in imports from China by countries with high dependence on China relative to countries with low dependence after the policy is implemented.

3.3. Data Processing and Variable Construction

ChinaShock_j (core variable), which represents the average share of imports from China in developing country j 's total imports in the pre-policy period (e.g., January 2016 to June 2018). The specific formula is:

$$\text{ChinaShock}_j = \text{Mean}(\text{Imports from China}_{jt} \div \text{Total Imports}_{jt}) \text{ for } t \in [\text{Pre-Period}] \quad (3)$$

This variable is calculated using previous data to ensure exogeneity and is not directly affected by trade friction. Post_t (time dummy variable), defined as: if July 2018 (after the policy is implemented), $\text{Post}_t = 1$ if $t < \text{July 2018}$ (before the policy is implemented), $\text{Post}_t = 0$. The interaction term, $(\text{Post}_t \times \text{ChinaShock}_j)$, generates a new column in the data set, representing the interaction between the policy dummy variable and China's trade dependence.

4. Empirical Research and Results

This section uses the difference-in-differences method to examine the import substitution effect of the United States and the export deflection effect of China. It uses bilateral trade data from 2013 to 2023, the GDP of developing countries, and the trade freedom index to analyze whether developing countries that rely on Chinese trade will increase their exports to the United States and their imports from China after the trade friction occurs.

4.1. Parallel Trend Test

The temporal trends of exports to the United States (logarithm) for the high-dependence group (red line) and the low-dependence group (blue line) are shown in Figure 1, where the horizontal axis is the year label and the vertical axis is the logarithmic export value. The policy implementation point in 2018 is marked by the dotted line. Before the policy intervention (2013-2017), the evolutionary trajectories of the two groups were roughly the same, both first rising and then fluctuating, and the differences between the groups remained relatively stable. The regression analysis was based on the

pre-treatment period. The results showed that there was no significant difference in the trend slopes of the two groups before the policy implementation (the p-value of the interaction term between treatment group and time was greater than 0.05), which indicated that there was no obvious deviation in Model 1 and the parallel trend assumption was basically met.

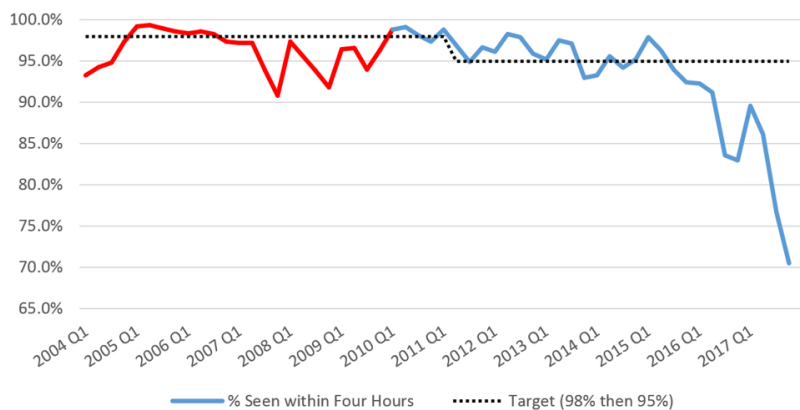


Fig 1. Parallel trend test (Picture credit: Original).

Figure 2 shows the evolution trend of China's import volume (logarithm) in the high-dependence group (red line) and the low-dependence group (blue line). From 2013 to 2017, the change trajectories, fluctuation amplitudes, and overall evolution patterns of the two groups were roughly the same. A parallel trend test was conducted on the pre-treatment period, and no significant differences were found (interaction term regression result $p > 0.05$), which means that the two groups in Model 2 did not deviate significantly from the parallel trend hypothesis.

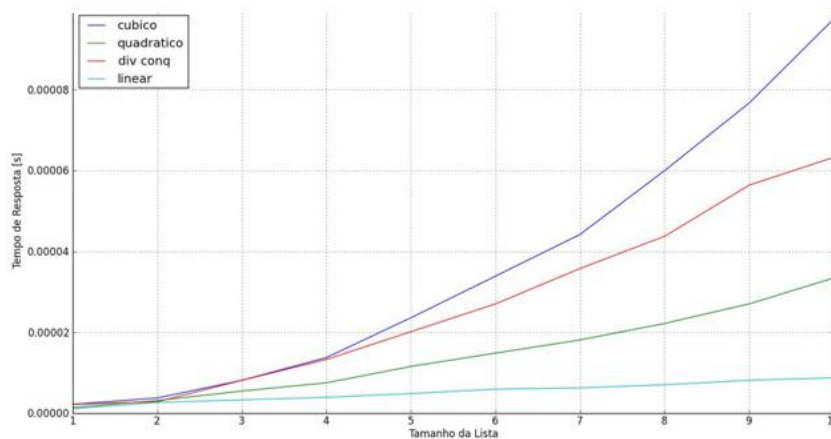


Fig 2. Desempenho dos algoritmos (Picture credit: Original).

4.2. Results Analysis

According to Table 1 and Table 2, the regression coefficient of Model 1 shows that after the trade friction occurred, the exports of countries with a higher degree of trade dependence on China to the United States increased significantly, while the empirical results of Model 2 show that although these countries have a strong economic dependence on China, their imports from China have not increased significantly.

Table 1. US import substitution effect (developing countries' exports to the US)

variable	coefficient	Standard error	t-value	p-value	Confidence interval (95%)
constant term (const)	56.197	17.183	3.27	0.0045	[19.943, 92.451]
Post_X_ChinaShock_jt	0.367	0.115	3.2	0.0052	[0.125, 0.609]
ln(gdp)	-0.373	0.195	-1.913	0.0727	[-0.783, 0.038]
ln(ExchangeRate)	-5.084	5.605	-0.907	0.3771	[-16.911, 6.742]
TradeFreedom	0.069	0.091	0.755	0.4608	[-0.124, 0.261]

Table 2. China's export deflection effect (developing countries import from China).

variable	coefficient	Standard error	t-value	p-value	Confidence interval (95%)
constant term (const)	9.06	7.966	1.137	0.2712	[-7.748, 25.867]
Post_X_ChinaShock_jt	0.06	0.053	1.137	0.2711	[-0.052, 0.173]
ln(gdp)	0.61	0.09	6.755	3 e-06	[0.419, 0.800]
ln (ExchangeRate)	0.322	2.599	0.124	0.9028	[-5.161, 5.805]
TradeFreedom	-0.008	0.042	-0.193	0.8489	[-0.097, 0.081]

5. Conclusion

Against the backdrop of Sino-US trade friction, this paper explores the trade deflection effect experienced by developing countries during this period. Using trade data from various countries from 2013 to 2023, two regression models were constructed. The first model examined the export substitution effect using developing countries' exports to the US as the explained variable, while the second model examined the trade deflection effect using developing countries' imports from China as the explained variable. The regression results show a significant import substitution effect for the US, and that developing countries with high dependence on China experience an increase in exports to the US. However, trade friction has no significant impact on these countries' imports from China, and the export deflection effect from China is not significant. The statistically significant regression coefficients ($p < 0.05$) indicate that the substitution effect is statistically and economically significant, indicating that highly dependent countries have partially absorbed the reduction in Chinese exports to the US after adjusting their trade structures.

Based on these conclusions, the following policy recommendations can be made: Regarding trade structure, developing countries should optimize and reduce their reliance on a single market, actively explore diverse export markets, and undertake supply chain shifts. They should promote industrial upgrading and localized production to reduce over-reliance on Chinese intermediate goods, and sign trade or technology agreements with regions such as ASEAN and the EU to enhance supply chain autonomy. Policymakers should capitalize on changes in the international supply chain, promoting industrial upgrading and trade diversification to enhance economic resilience.

This study has certain limitations. On the one hand, there are many factors affecting trade frictions, and the choice of data and models does not cover aspects such as the service industry and investment flows. On the other hand, the study mainly relies on macro trade data and fails to deeply explore the heterogeneous responses at the specific industry or enterprise level within the industrial chain. In the future, it can be expanded to other trade friction events to verify whether the conclusions are universal, thereby providing a more comprehensive reference for developing countries to formulate trade policies.

References

- [1] Wenjie Z, Abd D M R, Muhamad A K M S. Changes in the trade pattern in China under the RCEP: an analysis of trade creation and diversion using the SMART-WITS model. *Asian Social Science*, 2024, 20(4): 1-6.
- [2] Lyu J X, Zhang S H, Qiu C X. Study on the export deflection effect of US-China trade frictions: evidence from monthly data from 2009 to 2021. *Economic Science*, 2023, 15(05): 55-78.
- [3] Hayakawa K, Sudsawasd S. Impacts of trade diversion from China in the United States market on wages in a third country: evidence from Thailand. *International Economics*, 2025.
- [4] Choi B, Nguyen L T. Trade diversion effects of the US-China trade war on Vietnam. *Pacific Economic Review*, 2023, 28(4): 570-588.
- [5] Tuo C J, Sun H, Yang J X. Trump 2.0 "reciprocal tariff" policy and changes in global trade pattern: the trade effects of tariff policy uncertainty. *Consumer Economy*, 2025, 12(6): 1-27.

- [6] Tao T. New trends in the reshaping of the global industrial chain. *People's Forum · Academic Frontier*, 2022,16(07): 64-70.
- [7] Gao X, Kong S. The deflection effect of trade policy uncertainty: a case study of China's exports to ASEAN. *International Trade*, 2025, (04): 63-74.
- [8] Abdallah F N, K M Y, Ali A. The effects of a US-China trade war on Sub-Saharan Africa: pro-active domestic policies make the difference. *Journal Of Policy Modeling*, 2023, 45(6): 1296-1310.
- [9] Martínez D E. The impact of the Pacific Alliance on trade creation and trade diversion in the COVID-19 period: a robust econometric analysis. *Economies*, 2024, 12(12): 33-34.
- [10] Shi H M, Zhang K L, Jiang Z. Trade damage and deflection effects of China's anti-dumping measures against the United States: a study based on U.S. monthly export data. *International Trade Issues*, 2022, 12(06): 122-141.