Impact of China-US trade war on China's import and export structure

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Abstract

This article examines the impact of the China-US trade war on China's import and export structure. The article highlights the rise of protectionism amidst the deceleration of economic globalization. The outbreak of the China-US trade war in 2018 and the UK's departure from the EU are illustrative examples of this trend. It analyzes the impact of the trade war on trade flows and sectoral adjustments. The conclusion states that the trade war has decreased trade between China and the US. China has established alternative partnerships with Brazil, Germany, Japan, Argentina, and the UK. Additionally, there has been a slight decline in the proportion of imported industrial goods. The long-term effects of the trade war on China's import and export structure continue to evolve.

Keywords: trade war; import and export structure; China-US trade

Introduction

In recent years, after centuries of development in the principles of free trade, the rise of protectionism has become increasingly prominent. The pace of economic globalization has been forced to slow down, with events such as the outbreak of the China-US trade war and the United Kingdom's departure from the European Union exemplifying this trend. The China-US trade war, which began in 2018, has significantly impacted China's import and export structure.

To fully understand the consequences of the trade war, it is crucial to delve into its origins and development. The China-US trade war ignited in 2018 when the United States imposed tariffs on Chinese imports, citing intellectual property theft and unfair trade practices. In response, China retaliated with its own tariffs on US goods, resulting in a tit-for-tat escalation of trade restrictions and barriers.

The impacts of the China-US trade war on China's import and export structure are far-reaching. This article will examine the changes in the country's trade flows and sectoral adjustments, as well as the overall trade competitiveness. By analyzing these impacts, we can gain insights into the implications for China's economy and global trade dynamics.

Trade flow changes have been observed due to the trade war. The trade volume between China and the US has decreased significantly, leading China to seek alternatives elsewhere. Brazil, Germany, Japan, Argentina, and the United Kingdom have emerged as potential trade partners for China as it strives to diversify its trading relationships and reduce its reliance on the US market.

Furthermore, adjustments in the composition of imported goods have been witnessed. The proportion of industrial goods in China's import structure has slightly decreased, indicating a potential shift in sourcing strategies and adaptation to the trade war dynamics. At the same time, the export structure did not change a lot.

In conclusion, the impact of the China-US trade war on China's import and export structure is evident. The trade war has reduced trade between the two nations, prompting China to explore alternative partnerships with countries such as Brazil, Germany, Japan, Argentina, and the United Kingdom. Moreover, changes in the composition of imported goods, with a slight decrease in the proportion of industrial goods, indicate the need for adaptation amid the trade war. As the effects of the trade war may continue to unfold gradually, its ramifications on China's import and export structure should not be underestimated.

The rest of the paper is organized as follows. Section 2 reviews some important papers after the trade war. Section 3 introduces the data used in this paper. Section 4 shows the results of the discussion. Section 5 concludes.

2. Literature Review

Numerous articles have analyzed this issue since the onset of the China-US trade war in 2018. In 2018, Liu & Woo analyzed the reasons for the trade war and its impact on the United States, China, and the global economy. Their study focused on exchange rates, trade imbalances, and national security, making it one of the earliest examinations of the trade war's causes. (Liu & Woo, 2018) Another article by Liu utilized Google data to investigate the effects of the trade war on China. The results revealed that the trade war led to the depreciation of the Chinese RMB and a decline in the Chinese stock markets. Interestingly, China's trade surplus in goods with the US seems unaffected by this trade war. Both papers take a holistic approach to the issue (Liu, 2020).

Scholars have also constructed models to analyze the impact of the China-US trade war. For instance, Li & Lin developed a GE model to demonstrate that initiating a trade war serves the interests of the United States, even though it affects the interests of both sides, with China enduring greater harm (Li & Lin, 2018). Similarly, Itakura employed a CGE model to evaluate the ramifications of the China-US trade war. The results suggested that global value chains (GVCs) play a significant role in shaping trade responses at a detailed level (Itakura, 2020).

Concerning the specific aspects of Sino-US trade imports and exports, Berthou & Stumpner discovered that exports were not being redirected to other markets, resulting in a notable decline in total exports for both countries, estimated at -0.8ppt for the US and -2.0ppt for China (Berthou & Stumpner, 2020). Jiang et al. examined the impact of trade protection on exports and observed a decrease in quantity but relatively stable prices, with exports primarily reallocated between different regions. These findings are generally consistent with the analysis in this study, indicating that China's import structure has been moderately affected, while the total export amount and the proportion of goods in various categories have not changed significantly (Jiang et al., 2023). However, there have been changes in regional distribution. Tu et al. employed the SMART model to examine the direct economic consequences of the Sino-US tariff war on China and the US, highlighting that US imports, particularly in most industries, will redirect from China to alternative markets such as Mexico, Japan, and Germany. Meanwhile, China's imports from the United States will primarily shift to Brazil, Germany, Japan, Argentina, the United Kingdom, and Canada. This study offers a comprehensive analysis of the transition of imports and exports between China and the US (Tu et al. 2020).

The contribution of this study lies in reevaluating the alterations in China's import and export goods, as well as the national structure, after the gradual stabilization of the China-US trade war. It provides robust data support for related research.

3. Data and Method

The data for this study was obtained from the annual reports published by the China National Bureau of Statistics covering 2013 to 2022. The dataset offers comprehensive information on China's import and export activities, encompassing total volumes of imports and exports from different countries and categorized data across 13 major sectors. The first dataset consists of annual import and export volumes with different trading partners. This enables an examination of the impact of the China-US trade war on China's overall trade relationships during the study period. The second dataset provides a detailed breakdown of imports and exports across 13 major categories.

To ensure the integrity and accuracy of the analysis, any missing regional data from 2022 were excluded from the study. Firstly, the China-US trade war primarily took place in 2018 and 2019, rendering data from other years less relevant. Secondly, the outbreak of the COVID-19 pandemic in 2020 and its subsequent impact on global trade could have distorted the analysis of regional data in later years, justifying its exclusion.

Descriptive statistical analysis methods were employed to analyze the data and identify trends and changes in China's import and export structure over time. These methods facilitated a comprehensive understanding of the trade war's impact on China's overall trade patterns and the variation among different industries and sectors. Besides descriptive statistics, the findings were effectively presented through visual representations, including Combination charts and line graphs. Utilizing the Combination chart will offer a clear breakdown of the import and export shares among different countries, thereby highlighting the changes in China's trade relationships throughout the study period. Line graphs will illustrate trends in import and export volumes over time, facilitating the identification of significant shifts and fluctuations resulting from the trade war.

The data analysis employing descriptive statistics and visualizations will yield valuable insights into the impact of the China-US trade war on the structure of China's import and export activities. By examining the annual import and export volumes with different trading partners and categorizing the data into specific sectors, the study enables the identification of changes in China's trade patterns and the determination of the industries most affected by the trade war.

4. Discussion

Before analyzing the data, we need to conduct a descriptive analysis to understand the data overall. The following are the descriptive analysis results of the two sets of data:

Table 1 Import and Export amount statistical by continents

	North America	Oceania	Africa	Latin America	Europe	Asia
Average	64383790.56	17428110.56	19840987.00	29249784.33	82813030.11	231794292.56
Standard error	2761849.64	1399228.02	1031077.59	2319477.59	5140132.80	10526289.90
Median	61311474.00	15915877.00	20415879.00	26327753.00	77495555.00	227347807.00
Standard deviation	8285548.92	4197684.06	3093232.78	6958432.78	15420398.39	31578869.71
Variance	6.87E+13	1.76E+13	9.57E+12	4.84E+13	2.38E+14	9.97E+14
Kurtosis	3.93	1.93	0.34	3.25	3.08	4.24
Skewness	1.86	1.26	0.21	1.60	1.61	1.74
Region	27237265.00	13662163.00	10528374.00	23439954.00	50125212.00	111364658.00
Minimum value	56572422.00	12816228.00	14896190.00	21700736.00	67776336.00	194691029.00
Maximum value	83809687.00	26478391.00	25424564.00	45140690.00	1179901548.00	306055687.00
Sum	5794541115.00	156852995.00	178568883.00	263248059.00	745317271.00	2086148633.00

Table 2 Descriptive Statistical by goods

Exports (US $million)

Category	Average	Median	St.d	Variance	Kurtosis	Skewness	Region	Min	Max	Sum	Obs
Total exports	2571849.05	2414496.50	502902.00	2.53E+11	1.02	1.46	1495970.45	2097631.00	3593601.45	25718490.45	10
Exports of primary products	124107.65	116681.19	20635.42	4.26E+08	1.40	1.24	65678.99	103927.11	169606.10	1241076.54	10
Exports of food and live animals mainly for consumption	63397.76	63078.96	5427.38	2.95E+07	0.01	0.56	17884.53	55726.09	73610.62	633977.60	10
Exports of beverages and cigarettes	3133.69	3189.20	423.11	1.79E+05	-1.60	-0.18	1185.17	2528.07	3713.24	31336.89	10
Exports of non-edible raw materials	17133.77	15871.68	3787.32	1.43E+07	1.00	1.29	11929.29	13101.67	25030.96	171337.74	10
Exports of fossil fuels, lubricants, and related raw materials	39166.56	34917.56	11345.50	1.29E+08	1.60	1.23	37455.51	26873.19	64328.70	391665.60	10
Exports of animal vegetable oils and waxes	1275.87	937.54	968.87	9.39E+05	3.00	1.81	2991.57	575.14	3566.71	12758.73	10
Exports of manufactured goods	2447743.05	2290644.63	484650.85	2.35E+11	0.98	1.46	1431550.95	1992444.40	3423995.35	24477430.45	10
Exports of chemicals and related products	172288.37	151529.43	64985.70	4.22E+09	1.63	1.59	193704.21	119617.54	313321.75	1722883.71	10
Exports of manufactured goods by raw materials	426036.86	402441.69	81625.80	6.66E+09	1.40	1.51	248737.14	351244.68	599981.82	4260368.57	10
Exports of machinery and transport equipment	1221829.27	1138886.36	247437.51	6.12E+10	0.60	1.33	720520.25	984212.26	1704732.51	12218292.67	10
Exports of miscellaneous products	611574.67	584090.44	80526.06	6.48E+09	0.66	1.37	227787.59	529488.41	757276.00	6115746.67	10
Exports of other goods, unclassified	16013.88	5965.13	17478.98	3.06E+08	-0.27	1.09	47481.59	1729.05	49210.64	160138.83	10

Imports (US $million)

Category	Average	Median	St.d	Variance	Kurtosis	Skewness	Region	Min	Max	Sum	Obs
Total imports	2070376.58	2012597.50	374946.91	1.41E+11	0.07	0.84	1128072.75	1587926.00	2715998.75	20703765.75	10
Imports of primary products	698268.21	672494.17	202068.08	4.08E+10	0.46	0.86	648620.95	441054.92	1089675.87	6982682.06	10
Imports of food and live animals mainly for consumption	74024.11	59557.57	32836.03	1.08E+09	-0.75	0.89	89412.82	41701.17	131113.99	740241.13	10
Imports of beverages and cigarettes	6485.50	6615.99	1102.81	1.22E+06	-0.82	-0.52	3155.53	4509.43	7664.96	64854.99	10
Imports of non-edible raw materials	291761.92	278542.18	72429.31	5.25E+09	0.35	0.92	223716.29	202544.71	426261.00	2917619.16	10
Imports of fossil fuels, lubricants, and related raw materials	316392.67	315957.95	104302.41	1.09E+10	1.12	0.79	358765.61	176525.62	535291.23	3163926.72	10
Imports of animal vegetable oils and waxes	9604.00	8937.78	2548.51	6.49E+06	0.05	0.95	7845.77	6732.23	14578.00	96040.03	10
Imports of manufactured goods	1372107.17	1330375.70	177347.10	3.15E+10	0.25	0.93	563640.70	1146871.30	1710512.00	13721071.73	10
Imports of chemicals and related products	209900.73	203597.67	34833.90	1.21E+09	-0.52	0.57	102305.85	164116.53	266422.38	2099007.29	10
Imports of manufactured goods by raw materials	157920.65	149611.38	29103.97	8.47E+08	-0.42	0.76	88908.02	121919.98	210828.00	1579206.52	10
Imports of machinery and transport equipment	791219.21	760751.62	113747.42	1.29E+10	-0.20	0.83	347971.54	657825.46	1005797.00	7912192.06	10
Imports of miscellaneous products	141249.00	139281.47	11501.40	1.32E+08	4.21	1.66	43255.76	126141.24	169397.00	1412489.95	10
Imports of other goods, unclassified	71817.69	76237.48	22081.84	4.88E+08	2.37	-1.07	82413.24	22323.12	104736.36	718176.93	10

Through the descriptive analysis shown in Table 1 and Table 2, we can get the mean, median, standard deviation, variance, interval, maximum value, minimum value, and other data about China's import and export situation. In general, China's total import and export volume is very large and rapidly changing, which may be caused by China's rapid development in recent years, and step by step, become the world's factory, resulting in rapid growth of total import and export volume. Data broken down by goods tell a similar story.

4.1 Analysis of Chinese Import and Export by Continent

Asia, especially ASEAN, has always been China's largest import and export trading partner, with its share of more than 50% for a long time, and the proportion of other continents or countries after including Asia, fluctuations will be difficult to see. Asia is also very important for analyzing China's import and export structure, so it is analyzed separately.

Figure 1 Chinese International Trade with Asia in amount and percent (in US $million)
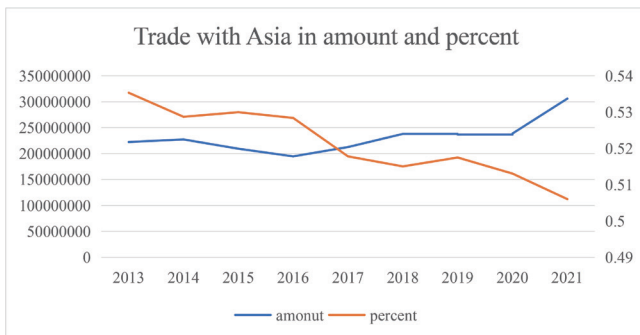
Figure 2 Chinese International Trade with Other Continents
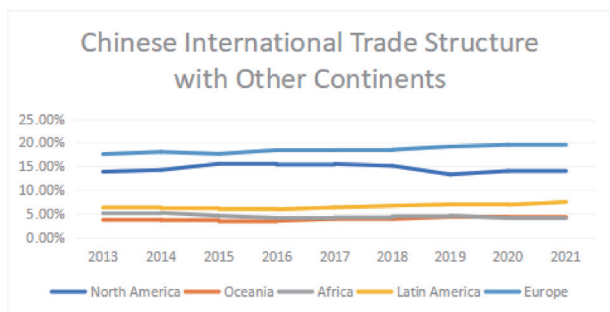
The left axis of Figure 1 shows the total imports and exports with Asia, and the right axis shows the proportion of China's total imports and exports. It can be seen that the total volume of imports and exports between China and Asia shows a slowly rising trend, but the proportion continues to decline. If you focus on the China-US trade war period from 2018 to 2019, you can see that in the case of an overall slow decline, the proportion of China's total imports and exports to Asia in 2019 has increased significantly. After receiving a series of sanctions, China may transfer part of its foreign trade to Asia, especially Southeast Asia, to seek alternatives.

Figure 2 shows the change in the proportion of China's trade with other continents in China's total imports and exports. From the figure, we can see that the proportion of China's trade with North America began to decline significantly in 2018. Compared with 15.48% in 2017 only 15.09% in 2018, it dropped to 13.27% in 2019, and it did not exceed 14% in the following two years. This is significantly lower than the average of 14.89% from 2013 to 2017. In all other continents, the proportion increased after 2018. The only major countries in North America are Canada and the United States, and Canada's trade with China only accounts for 9% of China's trade with North America, accounting for about 1.9% of China's total trade. Indicating that this decline is related to the United States. The change in the proportion of overall trade with North America is also evidence that China is actively looking for alternatives on other continents after receiving sanctions. This is consistent with the analysis results of Jiang et al. (2023) and Tu et al. (2020).

In general, trade between China and the United States has decreased significantly after the China-US trade war. However, China is actively looking for alternatives in the international market, and the total volume of imports and exports to other continents has increased.

4.2 Analysis of Chinese Import and Export by Goods

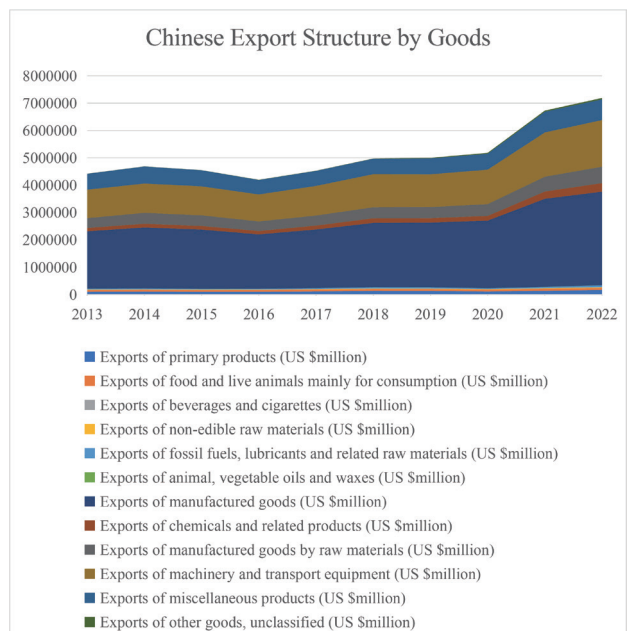**Figure 3 Chinese Export Structure by Goods**

Figure 3 shows China's export structure in recent years. On the whole, China's exports do not seem to have been greatly affected by the China-US trade war. This is consistent with the research results of Berthou & Stumpner(2020), and the transfer of China's imports and exports between continents is also consistent with the research results of Jiang et al. (2023). And we can note that after 2020, China's export growth is very fast, far faster than before. And the share of Exports of machinery and transport equipment has increased.

We analyze China's manufactured goods imports separately for similar reasons to Asia. As can be seen from the composite chart, China's imports of manufactured goods accounted for about 60% of the total imports, and they suddenly decreased in 2018 and remained at a lower level in 2019. It will grow rapidly in 2020 for multiple reasons, such as the epidemic. It also coincides with the timing of the China-US trade war.

Figure 4 Chinese Imports of Manufactured Goods
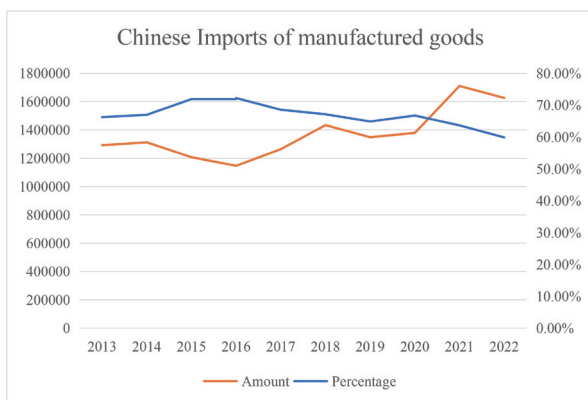
As can be seen from the drawing of other types of commodities, China's export structure has undergone considerable changes in 2018, especially in machinery and transport equipment, primary products, fossil fuels, lubricants, and related raw materials, non-edible raw materials, and other commodities have shown a significant proportion change, machinery and transport equipment and non-edible raw materials decreased significantly, while primary products, fossil fuels, lubricants, and related raw materials have increased significantly. This is also related to the process of the China-US trade war, first focusing on technology companies and then gradually expanding to the whole field.

Overall, China's exports have not significantly impacted, but there may be a shift between countries. In terms of imports, due to the strengthening of China's automobile industry and the impact of the China-US trade war, the change is large, and the change is more obvious after COVID-19 in 2020.

Figure 5 Chinese Imports Structure by Goods
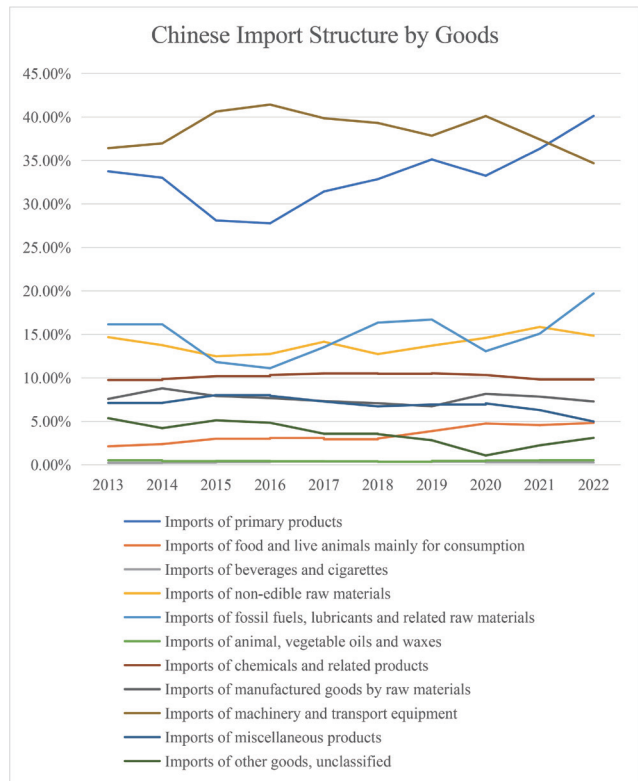
5. Conclusion

The China-US trade war has caused a certain impact on the trade of both sides and the world, and the consequences of this anti-globalization action are also gradually emerging. This paper analyzes the distribution of China's total imports and exports by continent and commodity type. It was found that after the trade war, China's imports from North America decreased significantly and shifted to other regions to seek alternatives. The trade war has little impact on China's exports, and the proportion of imported goods has changed significantly. This is mainly reflected in machinery and transport equipment, primary products, fossil fuels, lubricants and related raw materials, non-edible raw materials, and other commodities.

This paper only makes a superficial study of this issue. The specific situation of which countries China's imports have been transferred to and which commodities have been transferred still needs to be analyzed with more detailed data. The change in the proportion of imported goods types may also be due to other reasons. For example, the increase in China's automobile exports and the decrease in imports, this long-term trend is likely to be due to the rise of China's new domestic energy automobile industry in recent years and led to exports. The real reasons for these changes are also unclear.

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