

The Impact of the Sino-US Trade War on Manufacturing Industry in Both Countries

Yufei Chen¹, Kaiwei Dong², Daocong Qian³, Jinghang Wang⁴ and Yiting Wang^{5,*}

¹International Department, Beijing 101 Middle School, Beijing, China

²International Department, St. Andrews 107, 10540, Bangkok, Thailand

³Economy and Finance Department, Guangdong University of Science and Technology, Dongguan, China

⁴International Department, Beijing National Day School, Beijing, China

⁵Accounting and Finance Department, Dongbei University of Finance and Economics, Dalian, China

*Corresponding author: 1910831135@mail.sit.edu.cn

Abstract. The Sino-U.S. trade war created multiple impacts on different fields for both states. Most people would agree with the statement that people's lives became worse, many firms had to close down, the conflict between states increased, and the trend of globalization was reversed. In this research, the paper mainly discusses the impact of the Sino-US trade war, and it is hypothesized that the trade war has negative consequences on both sides. Specifically, both the manufacturing industry in the U.S. and China decreased in size, and China tried to be more innovative to compensate for it; new policies and tariffs that put on the trade between China and the U.S. decreased the exchange of consuming product; the introduction of foreign investment also declined in the manufacturing industries of both sides. The research could enable people to understand the current economic status clearly and allow related companies and the consumers to make plans for future policy.

Keywords: Trade war; manufacturing industry; innovation.

1. Introduction

The Sino-U.S. trade war refers to a series of disputes and conflicts in the realm of trade and economic policies between China and the United States. Its core controversies encompass issues such as trade deficits, intellectual property protection, and market access. The roots of the trade war can be traced back to the longstanding U.S. concerns over China's trade deficit and intellectual property issues. In 2018, the Trump administration announced tariffs on certain goods imported from China. Subsequently, both sides implemented multiple rounds of tariff measures, leading to a state of heightened trade tensions. The developmental trajectory of the Sino-U.S. trade war has gone through various stages of negotiations, escalations, and periods of relaxation. Negotiations between the two parties have occurred multiple times, often resulting in impasses. In 2019, temporary trade agreements were reached, although the fundamental contradictions remained unresolved. Throughout the trade war, both sides imposed successive rounds of tariffs on each other's goods, contributing to a certain level of economic pressure and uncertainty.

Manufacturing industries hold significant positions within the national economies of both China and the United States. For China, it stands as one of the world's largest manufacturing nations, with the manufacturing sector contributing a substantial proportion to its Gross Domestic Product (GDP). China's manufacturing sector plays a vital role in the global supply chain, covering a wide array of products, including electronics, appliances, textiles, and more. The impact of the Sino-U.S. trade war on China's manufacturing industry has been notable, as U.S. tariff measures have impacted the export of certain Chinese products, potentially resulting in challenges such as reduced orders and capacity adjustments for manufacturing enterprises. Meanwhile, the U.S. manufacturing sector remains

integral to its economy, although its share within the domestic economy has somewhat diminished in recent years. Nevertheless, the U.S. manufacturing industry remains crucial for generating employment opportunities and fostering innovation. The trade war has also affected the U.S. manufacturing sector, with tariffs on imported raw materials and components from China potentially elevating production costs for U.S. manufacturers and thereby influencing their competitiveness.

The present study primarily centers on exploring how the trade war has influenced the developmental environment of manufacturing industries in both China and the U.S., the inflow of foreign direct investment into the manufacturing sectors of both nations, and the examination of specific manufacturing enterprises chosen to investigate the effects of the trade war upon them. Such research endeavors contribute to an enhanced comprehension of the extensive ramifications of the Sino-U.S. trade war on manufacturing, providing valuable insights to policymakers, businesses, and scholars to fathom the repercussions on economies and industries, thereby enabling the formulation of appropriate policies and strategies.

2. Literature Review

Since the beginning of the Sino US trade war, many scholars have analyzed its impact on the manufacturing industry from different perspectives. Among them, some scholars have studied the impact of trade wars on China's manufacturing industry from different perspectives: Fu measured the impact of trade wars by analyzing the stock prices of listed companies in China's manufacturing industry [1]. Meng and Cui analyzed the losses suffered by China's manufacturing industry by analyzing the actions of its competitors in trade wars, such as India and Argentina [2]. Wang focused on high-end manufacturing enterprises in China, pointing out that China's manufacturing industry needs to transform towards high-end manufacturing and maintain flexibility in Sino US relations [3]. However, these studies did not view China and the United States in a trade war as a pair of interdependent entities, ignoring the impact of the complex interconnectedness of economic trade between the two countries on the consequences of the trade war. In addition, some scholars have analyzed the trade war between China and the United States based on empirical analysis. Li et al. compared the manufacturing value chain cases of China and some important international countries, pointing out that the amplification and absorption effects between major countries around the world will further increase the impact of the trade war between China and the United States [4]. Urata compared and analyzed the impact of trade wars on the trade surplus and deficit between the two countries based on the historical case of the US Japan trade war [5]. However, these studies mainly use case comparison and discourse analysis methods, lacking the process of quantifying the substantive impact of trade wars caused by actual data, and cannot clearly and accurately reflect its impact. Therefore, this article uses a large amount of data to analyze the trade war between China and the United States from an objective perspective, with a particular focus on studying the impact of economic mutual influence and constraints on the outcome of the trade war between the two countries.

3. The Impact of Trade War on Manufacturing in China and the U.S.

3.1. The Overall Economic Environment of Manufacturing

The trade friction between China and the United States directly affects the production costs of manufacturing manufacturers in both countries, thereby affecting supply; meanwhile, policy changes will also cause changes in market demand, and changes in supply and demand relations will inevitably cause fluctuations in the overall economic environment of the manufacturing market. This article uses Manufacturing Value Added (MVA) and Manufacturing Purchasing Manager Index (PMI) to analyze the changes in the manufacturing economic environment.

Firstly, MVA refers to the net value created by the manufacturing industry for products produced by the manufacturing industry, which can effectively measure the level of manufacturing

development and economic contribution of a country or region [6]. Figure 1 shows the changes in MVA between China and the United States between 2015 and 2019.

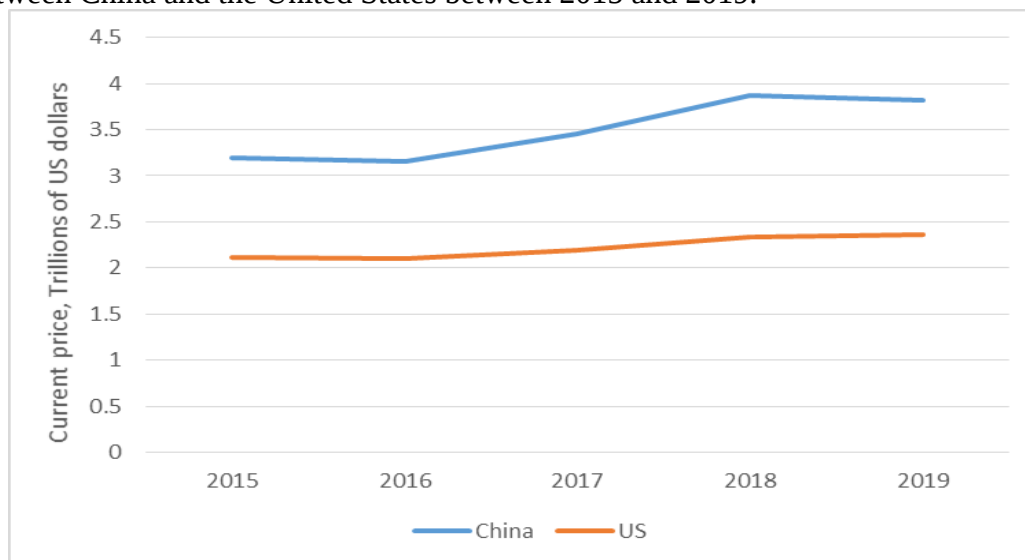


Fig. 1 Manufacturing value added in China and the US (Photo credit: Original)

Data source: Choice Database

It can be seen that the added value of China's manufacturing industry has always been higher than that of the United States. Although the impact of the trade war caused a slight decline in data in 2018, the overall trend remained upward. This indicates that the contribution of the manufacturing industry to the Chinese economy has remained stable, and China still has strong competitiveness and development potential in the field of manufacturing. This is due to China's labor advantages and industrial chain advantages. Although the sanctions imposed by the United States have hindered some high-tech manufacturing and export businesses, the large domestic demand market and sufficient labor force brought about by the population base; As well as the complete, efficient, and flexible industrial system accumulated over the years, the manufacturing industry has maintained its position as the pillar of China's economy without experiencing widespread collapse.

Secondly, the manufacturing PMI can comprehensively reflect the business activity indicators of the manufacturing industry during a certain period of time, thereby reflecting the level of economic activity. This indicator has a 50% dividing line between prosperity and decline, and values above 50% indicate an expansion trend in the manufacturing economy; On the contrary, it indicates a downward trend.

Figure 2 shows the changes in manufacturing PMI between the two countries. Overall, the United States has a higher value than China because it has a strong advantage in scientific research and innovation in high-end manufacturing; meanwhile, the manufacturing backflow policy adopted by the United States since 2005 has shown significant results, resulting in a corresponding increase in order volume, production, and employee numbers [7, 8]. However, since the beginning of the trade station in 2018, both sides have shown a downward trend in this indicator, indicating that both manufacturing industries have experienced varying degrees of contraction. For China, firstly, the technology blockade imposed by the United States on China has affected the development of China's high-end manufacturing industry; the appreciation of the RMB against the US dollar has dealt a blow to China's commodity exports, resulting in a decreasing trend in trade surplus. From the perspective of the United States, the continuous imposition of tariffs by the United States has led to escalating trade tensions, and many countries that cooperate with the United States have PMI values below the boom-and-bust line [9]. Therefore, domestic manufacturing confidence in the United States has also been weakened.

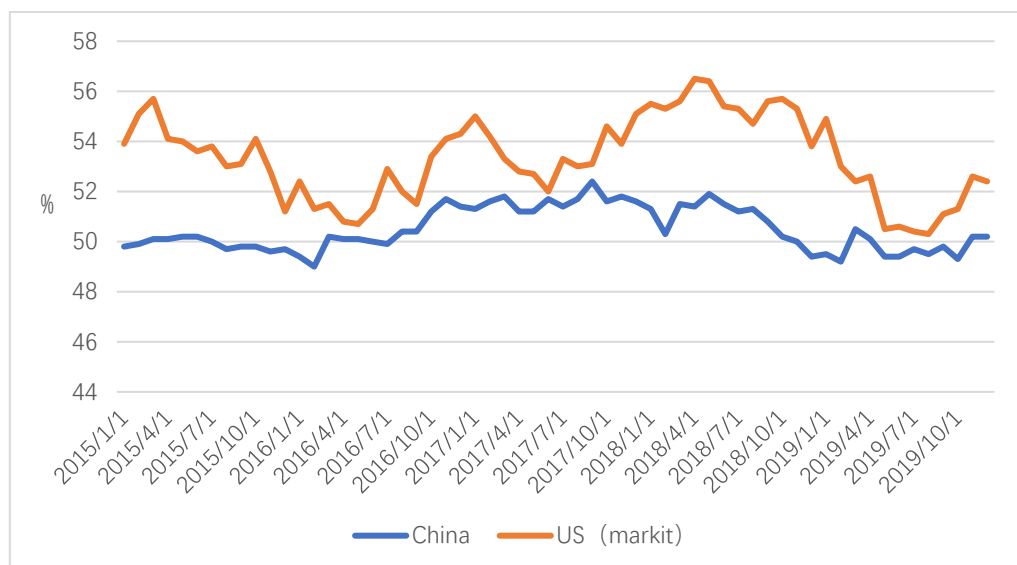


Fig. 2 Manufacturing PMI index (Photo credit: Original)

Data source: Choice Database

In summary, it can be seen that the manufacturing industries of both sides are affected to varying degrees by the trade war. To cope with this crisis, China's manufacturing industry should attach greater importance to technological research and innovation while maintaining its existing advantages, and encourage the manufacturing industry to continue to provide pulling force for overall economic development.

3.2. Foreign Investment in the Manufacturing

The trade war has had multiple impacts on the introduction of foreign investment into the manufacturing industries of both sides, including investment flows, supply chain adjustments, and changes in industrial structure.

3.2.1 The impact on China

Trade war will first slow down foreign investment inflows. Due to the increased uncertainty between China and the United States caused by the trade war, foreign investors may hold a wait-and-see attitude towards building factories or expanding business in China, resulting in a decrease in foreign direct investment [10].

It can be seen that since the 2018 trade war, FDI entering China has experienced significant fluctuations. Although there have been several increases in the middle, the overall trend is showing a downward trend. This shows that foreign markets have low confidence in the Chinese market due to the trade war and the COVID-19 epidemic. The growth rate of investment in China's manufacturing industry has plummeted since 2011, from 37.7% to 3.1% in 2017, and its contribution to overall investment growth has decreased from 47.9% to 16.4%, becoming an important factor restricting the transformation of China's manufacturing industry. However, due to the fact that most manufacturing companies in China are state-owned, excluding factory investment, the reduction in FDI has not had a fundamental impact.

Regarding the supply chain, some foreign companies may consider reducing their dependence on Chinese manufacturing to reduce the risks arising from tariffs and trade restrictions. This may lead to some foreign investors turning to other countries or regions. In order to reduce its dependence on Chinese labor, the United States chose to relocate existing factories to Vietnam or Laos, and also chose to invest in building new factories there.

Moreover, due to the restrictions imposed by the United States on China's high-tech sector, some foreign technology companies may be more cautious in technology transfer and cooperation, limiting

the scope of technology investment. For example, the United States has imposed a blockade on China in the chip industry and imposed sanctions on some high-tech companies such as Huawei. From Figure 3, it can be seen that after the 2018 trade war, China's chip import growth rate has experienced a very significant decline, which is partly due to the US technology blockade.

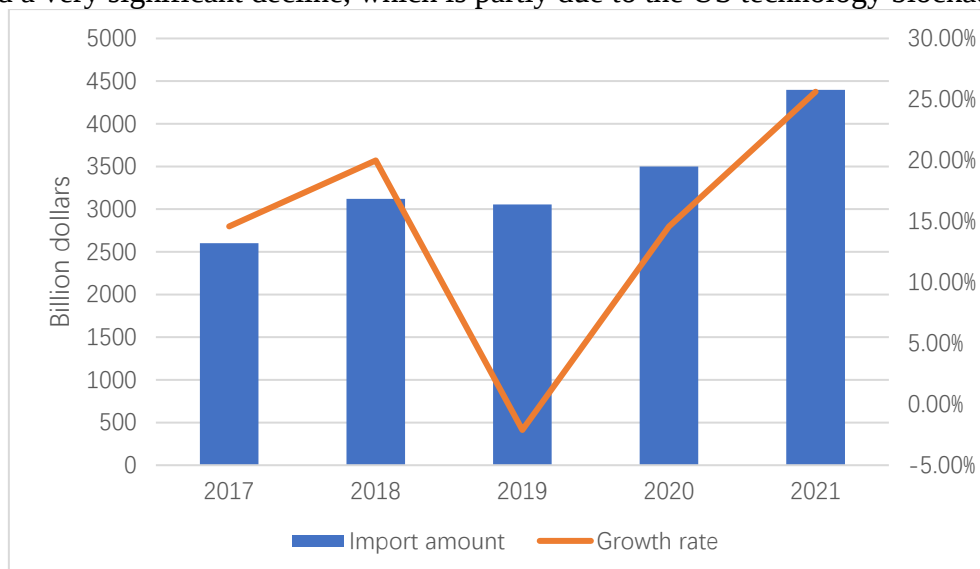


Fig. 3 China's chip import volume (Photo credit: Original)

Data source: Choice Database

3.2.2 The impact on the U.S.

The trade war reduces the attractiveness of the United States to foreign investment. The uncertainty and tariff pressure caused by the trade war in the United States may have reduced some foreign investors' interest in American manufacturing. Similarly, as the dominant currency and country in the world, the US dollar launching a trade war against China is actually a "default" on free trade, which will reduce foreign confidence and trust in US investment.

As shown in the Figure 4, from the beginning of the trade war to 2022, the annual FDI of the United States has shown a decreasing trend year by year, and the investment environment of the United States will also not be friendly to foreign enterprises, especially investment from China.

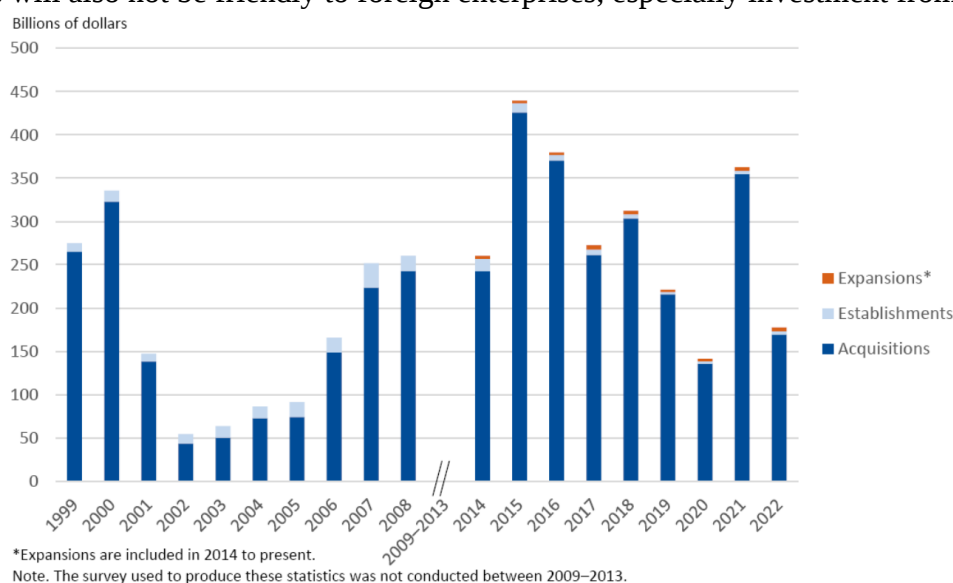


Fig. 4 FDI in China over the years (Photo credit: Original)

Data source: U.S. Bureau of Economic Analysis

Finally, decoupling from China has led to diversification of the supply chain. Some American companies may consider diversifying their supply chains from China to other countries to reduce the risks posed by trade wars. This may lead to an increase in foreign investment in the United States. Companies have committed more than \$200bn to US manufacturing projects since Congress passed sweeping subsidies last year, as President Joe Biden's effort to spark a new industrial revolution gains momentum. In response to the depression caused by the pandemic and the pain caused by the trade war, the US government adopted Executive Order 14017 to maintain supply chain security and promote the development of its manufacturing industry. "These actions are contributing to a historic recovery in American manufacturing and industrial strength. During President Biden's first year in office, the economy added 367,000 manufacturing jobs - the most in nearly 30 years. It can be seen that these policies have had a certain effect. However, in order to engage in a trade war and decouple from China, reducing dependence on Chinese manufacturing products has become very important. The US government has begun to push manufacturing companies to relocate a large number of factories from China to Southeast Asia and other countries to reshape the supply chain.

However, trade wars, decoupling, and Anti-globalization is not beneficial for global economy, and this is reflected in China's labor surplus and rising prices in the United States. Because decoupling takes a long time, transferring the industrial chain will break up the existing mature industrial chain. Therefore, the investment cost of the company is high and also long-term.

Figure 5 shows the US CPI since 2018. It can be seen that since the launch of the trade war, US prices and CPI have been on the rise, which is a side effect of pursuing decoupling from China's trade.

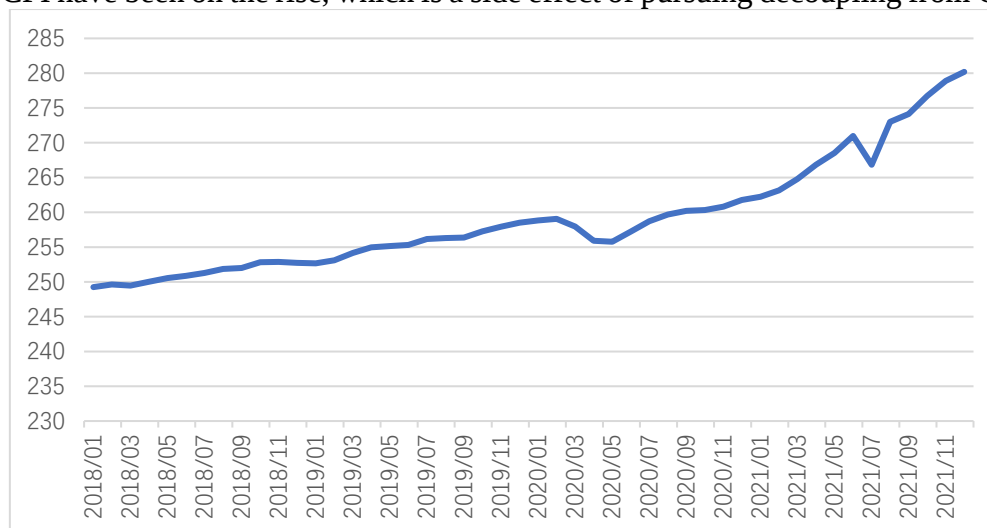


Fig. 5 Annual CPI in the United States (Photo credit: Original)

Data source: Choice Database

Overall, the trade war has created a series of unstable factors for the introduction of foreign investment into the manufacturing industries of both China and the United States. Due to policy uncertainty and risks brought about by trade wars, foreign investors may be more cautious when considering investment and expanding their business. In addition, due to supply chain adjustments and changes in industrial structure, investment flows may also change. These impacts have brought challenges and opportunities to the manufacturing industry and overall economy of both China and the United States.

3.3. Case Analysis of Electronic Product

Many industries in the US and China have had a significant impact because of the trade war, and due to the research, this part of the paper will mainly be focused on two specific manufacturing industries: car manufacturing, and smartphone manufacturing.

To begin with the impact on car manufacturing. The trade war between the US and China has significantly increased the import tax on car accessories. As a result, many car companies such as Tesla, Ford and so on have encountered a significant strike. This impact did not just strike Chinese or American automobile companies but both [11]. Office of the United States Trade Representation has a statement that the import automobile tariffs from the USA to China was 40% which is much higher than the 27.5% that the USA had applied to China at that time (Office of the United States Trade Representative 2018).

The data provided by CarSalesBase shows the average sales of Ford from 2015 to 2020 in China, and Figure 6 clearly shows the amount strikes Ford received during the trade war. The sale has decreased from 839,815 in 2017 to 383,485 in 2018. To make these numbers more obvious, this study uses the sales growth of Ford to explain this strike. The sales growth has decreased from -11.73% in 2017 to -54.34% in 2018.

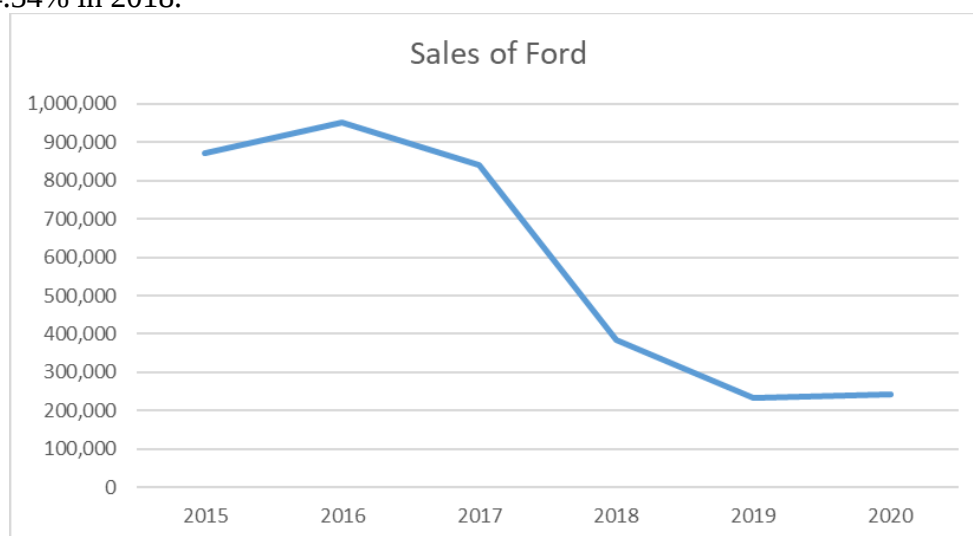


Fig. 6 Sales volume of Ford (Photo credit: Original)

Data source: CarSalesBase

Apart from the automobile manufacturing industry, the field of electronic technology has also been significantly impacted due to the trade war, and this has been mainly focused on Huawei [12]. Huawei has been out on the US trade restrictions list, and this list restricts most suppliers who have the potential to supply technology or goods to Huawei. This has caused a strike on Huawei and especially on Huawei's revenue.

Figure 7 shows the revenue trends of Huawei, and the revenue of Huawei has obviously had a significant drop from 2020 to 2021, to be more specific, the revenue of Huawei has decreased from 891,368 to 636,807. Such a strike is the result of sanctions from Western countries due to the trade war. Huawei needed to increase its budget on production costs as a result of the cut of the supply line, and this forced Huawei to increase the price of their smartphone, this led to a decrease in sales and in the end caused the strike in Huawei's overall revenue.

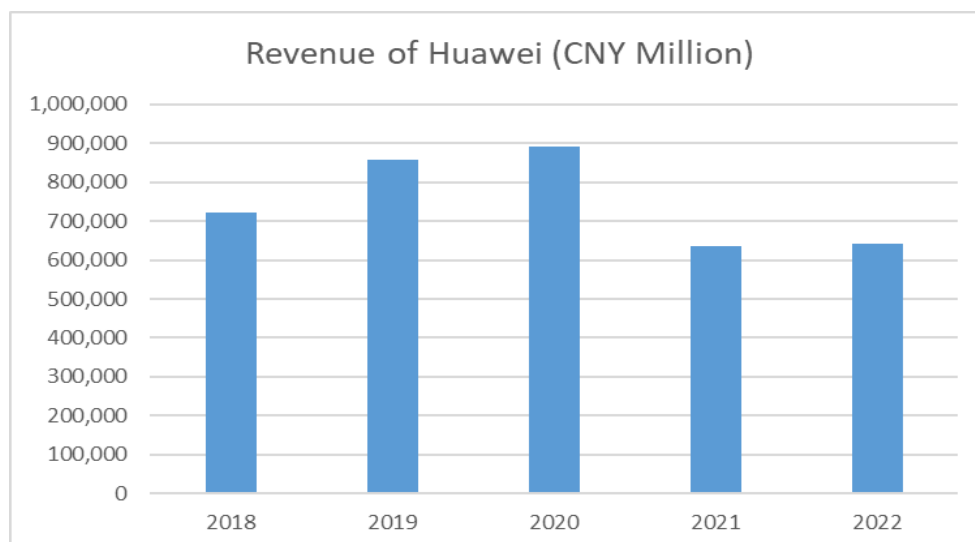


Fig. 7 Revenue of Huawei (Photo credit: Original)

Data source: Huawei Annual Financial Report

4. Conclusion

In conclusion, the Sino-U.S. trade war had a great negative impact on both sides. The research illustrates that both the U.S. and China endured severe decreases in the scale of the domestic manufacturing industry, and China's solution is to increase its innovation ability; The exchange of consuming products, including agricultural products and electronic products, reduced due to policy and tariff during the trade war; Foreign investment was also destabilized by factors created by the trade war such as policy uncertainty and risks. This research aims to illustrate the influence of economic conflict between China and the United States visibly, which may help make individual lives easier, enable firms to make plans for the future, and assist the authority to make rational decisions. The study could also inspire future people to make more quantitative analyses to improve people's understanding of the impact of the Sino-U.S. trade war.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

References

- [1] Fu Meijiao. The impact of the U.S.-China trade war on Chinese manufacturing companies and measurement of influencing factors. Dalian: Dongbei University of Finance and Economics, 2020.
- [2] Meng Pingli, Cui Jiahui. Analysis of the current characteristics of Sino-U.S. trade friction and corporate response strategies. *Business Economics*, 2020, 02: 67-69+97.
- [3] Wang Chunxia. Analysis of the economic background of Sino-U.S. trade friction and its impact on the Chinese economy. *China Business Review*, 2020, 02: 77-78.
- [4] Li Zhen, Li Maolin, Chen Tianming. Intermediate input dependence and export trade in Chinese manufacturing: An analysis based on the historical context of Sino-U.S. trade friction. *Financial and Economic Science*, 2021, 06: 67-80.
- [5] Urata S. US-Japan trade frictions: The past, the present, and implications for the US-China trade war. *Asian Economic Policy Review*, 2020, 15(1): 141-159.
- [6] Cheng Y, Luo Q. Measurement of value added in Sino-US manufacturing trade and analysis of influencing factors: Based on the perspective of global value chains. *Xinjiang Finance and Economics*, 2021, 05: 71-80.

- [7] Gregory T. Rationales and mechanisms for revitalizing US manufacturing R&D strategies. *The Journal of Technology Transfer*, 2010, 35(3): 283-333.
- [8] Lu D, Tang L.M. R&D intensity of Sino-US manufacturing: Disparities, causes, and policy implications. *Economist*, 2023, 04: 67-78.
- [9] Qiao Hu. An innovative approach to PMI analysis and enhancing information flow efficiency. *IEEE Access*, 2023, 11: 1-1.
- [10] Ding Haoyuan, Koedijk, K.G, Qi Tong, et al. U.S.-China trade war and corporate reallocation: Evidence from Chinese listed companies. *World Economy*, 2022, 45(12): 3907-3932.
- [11] Liisa V. Forum on Tesla and the global automobile industry. *Management and Organization Review*, 2018, 14(3): 467-470.
- [12] Zhang Yongli, Zhu Xianduo. Analysis of the global trade network of the chip industry chain: Does the U.S.-China tech war matter? *Heliyon*, 2023, 9(6): e17092-e17092.