



# The Evolution Trend of China-US Economic and Trade Friction during the “14th Five-Year Plan” Period and Its Impact on China's Economy——Based on GTAP Model

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**Abstract.** This paper analyzes the evolution trend of China-US economic and trade frictions during the "14th Five-Year Plan" period. Based on this, two scenarios of China-US economic and trade frictions are set up. The dynamic GTAP model is used to estimate the impact of China-US economic and trade frictions on the Chinese economy and major industries during the "14th Five-Year Plan" period under different scenarios. The results show that the negative impact of China-US economic and trade frictions has diminished marginally during the "14th Five-Year Plan" period. For industries, the negative impact of China-US economic and trade frictions on China is mainly concentrated in the secondary industry. For sub-sectors, electronic equipment manufacturing industry, transportation equipment manufacturing industry, and metal products industry are greatly affected.

**Keywords:** China-US economic and trade friction, tariff barriers, economic growth, structural adjustment, dynamic GTAP model

## 1 Introduction

Since China joined the World Trade Organization in 2001, it has gradually integrated into the world economic system, and its international influence in foreign trade has increased significantly. The proportion of goods exports in the international market has risen from less than 1% in 1978 to 14.3% in 2018, ranking No. 1 in the world. In the face of China's rising global status, trade disputes between China and the United States have become increasingly frequent. In March 2018, the Trump administration launched a trade war against China. During the Trump administration, the United States has implemented three rounds and four batches of tariff hikes on Chinese exports, involving about 68% of China's exports to the United States. After Biden became president, he still maintained the Trump-era tariff policy. The China-US economic and trade frictions are becoming normalized, complicated and long-term.

Many scholars have analyzed the development trend of China-US economic and trade frictions and their impact on China's economy. The trade deficit is only a superficial excuse for the United States to provoke trade frictions, and that curbing China's technological progress and economic development and maintaining the political and economic hegemony of the United States is the essence of the problem <sup>[1]</sup>. China-US trade frictions led by the Biden administration will not stop, and it will spread to "super-trade" fields such as high technology, national security, and ideology <sup>[2]</sup>. The measures taken by the United States to suppress China's manufacturing industry are precise and diffuse. Although China has taken necessary measures to reduce the negative impact of trade frictions, it has not fundamentally resolved the problems of dependence on the international market and extensive trade patterns <sup>[3]</sup>. The results of dynamic GTAP model show that by strengthening regional economic and trade cooperation, China can effectively mitigate the negative impact of the superimposed effects of the epidemic and trade frictions on China's high-tech manufacturing supply chain <sup>[4]</sup>. The results of Input-output model show that the increase in tariffs has a greater impact on the upstream of electronic components, metal products, wholesale and other industries, and has The downstream industries such as automobiles, communication equipment <sup>[5]</sup>.

At present, the quantitative analysis of the impact of China-US economic and trade frictions on the Chinese economy is mainly to measure the impact of the current economy, and there is little quantitative analysis of the impact on the "14th Five-Year Plan" period. This paper uses GTAP model to estimate the impact of China-US economic and trade frictions on China's economy and industrial structure according to the future development trend of China-US economic and trade frictions.

## **2 Model and data processing**

### **2.1 Model introduction**

GTAP (Global Trade Analysis Project) model is a multi-country and multi-sector computable general equilibrium model. In the GTAP framework, the sub-models of each country's production, consumption, government expenditure and other behaviors are established, and then based on international trade relations, the sub-models are linked into a multi-country multi-sector general equilibrium model. GTAP model has good results for quantitative policy analysis, and is widely used in global economic integration, including reducing trade costs, opening up support for agriculture, cross-border capital, technology, and population flows. World Trade Organization, International Monetary Fund, and World Bank have used the GTAP model to analyze the international economy, and achieved good results. According to the development trend of future China-US economic and trade frictions, this paper estimates the impact of China-US economic and trade frictions on China 's economy and industrial structure.

## 2.2 Data processing

This paper adopts the latest GTAP- Dyn model and the tenth edition database, which describes the world economic data for 4 reference years (2004, 2007, 2011 and 2014), and distinguishes the 141 countries (regions) 65 departments. According to research needs, the GTAPAgg software developed by Purdue University's Global Trade Research Center was used to aggregate 141 countries into 9 regions (countries), and aggregate 65 industrial sectors into 29 industrial sectors.

## 3 The evolution trend of China-US economic and trade frictions during the "14th Five-Year Plan" period

China-US economic and trade friction is an important manifestation of the struggle between emerging powers and incumbent powers, and it is inevitable, long-term and complicated. The change in the US policy toward China has deep economic and political roots, and will not change the long-term trend due to short-term factors such as the progress of trade negotiations between the two countries and the change of the US government. The transformation of US-China relations from "engagement" and "competitive cooperation" to comprehensive containment is the inevitable result of the long-term changes in the domestic political and economic situation of the United States. The change in the US policy toward China is a manifestation of the US economic and social imbalance caused by economic globalization.

First, trade disputes characterized by large-scale and large-scale mutual increases in tariff rates are difficult to sustain for a long time. Trump's large-scale tariffs on China are a means of extreme pressure, using it as a tool to force China to make concessions on issues such as expanding imports, market access, intellectual property rights, and subsidies for state-owned enterprises. Biden administration still maintained the tariff policy. In May 2022, inflation in the United States hit a 40-year high, and in response to high inflation, the Biden administration may choose to reduce tariffs on some goods.

Second, disputes between China and the United States in the fields of investment, finance, technology and resources will be difficult to ease. In the process of changing power and position, China and the United States will inevitably encounter conflicts. In extreme cases, the United States may even contain China through energy and resource embargoes, technology blockades, restrictions on the use of the U.S. dollar, and win over allies.

Third, the "de-Sinification" of the global industrial chain does not conform to market laws. Since the China-US trade dispute, there have been signs of China's industrial chain relocation. Since the outbreak of COVID-19, the United States and Japan have successively introduced policies to support enterprises to withdraw from China, but the relocation of manufacturing industries does not conform to market rules. The main reasons are as follows: first, the capital investment required for the reconstruction of the industrial chain is difficult to guarantee; second, the supporting industrial clusters for industrial reconstruction cannot be easily established in the United States; third, the cost and quality of industrial workers are difficult to balance; fourth, the service-oriented

economic structure of the United States is not conducive to the development of manufacturing; fifth, the infrastructure for the development of the manufacturing industry is also difficult to support.

Fourth, the process of economic globalization may move forward in a roundabout way, the shortening of the industrial chain will become a short-term trend, and the development of surrounding regionalization may become a new direction of globalization. COVID-19 has caused damage to the global industrial chain, and it will take time to fully recover. COVID-19 has fully exposed the pain points of "industrial hollowing". These countries no longer trust the global industrial chain, and hope to develop their relatively independent and complete industrial system through the relocation of manufacturing industries. Although it is difficult to build an independent and complete industrial system in the short term, it is a possible development trend to localize industries related to national security. The global economy has been deeply integrated, the production links of various countries are highly interdependent, and the proportion of intermediate products such as parts and raw materials in international trade is 70%. The industrial chain will become a short-term trend from long to short, and the development of surrounding regionalization may become a new direction of globalization.

## **4 China-US economic and trade frictions on China's economy and industrial structure during the "14th Five-Year Plan" period**

### **4.1 Scenario setting of China-US economic and trade frictions**

According to the previous analysis of the development trend of China-US economic and trade frictions, two scenarios are set up: China-US economic and trade frictions intensify and China-US economic and trade frictions ease.

China-US economic and trade frictions intensify scenario: During the "14th Five-Year Plan" period, China-US economic and trade frictions recurred, and the United States resumed imposing additional tariffs on all Chinese goods. In 2022, the United States will impose a 25% tariff on \$250 billion of goods and a 15% tariff on \$300 billion of goods. From 2023 to 2025, the United States will gradually reduce the tariff rate from 15% to 10% on \$180 billion of the \$300 billion of goods, and keep the 25% tariff on \$250 billion of goods unchanged, and restrict the export of high-tech products to China. China impose the same proportion of tariff against the United States.

China-US economic and trade frictions ease scenario: China-US economic and trade frictions ease slightly. On February 14, 2020, the first phase of the China-US economic and trade agreement came into effect. The tariff rate imposed by the US on US\$120 billion of Chinese goods was cut in half, from 15% to 7.5%, and the US maintained a 25% tariff on \$250 billion of goods. During the "14th Five-Year Plan" period, the US tariffs on US\$120 billion of Chinese goods will gradually lifted, the tariffs on US\$200 billion of goods dropped to 12.5%, and the tariffs on US\$50 billion of goods remained unchanged at 25%. China impose the same proportion of tariff against the United States.

#### 4.2 Calculation of the impact of China-US economic and trade frictions on China's economy and industrial structure

In October 2018, the International Monetary Fund (IMF) released the World Economic Outlook report themed "Challenges to Stabilizing Economic Growth", and analyzed and measured the impact of the China-US trade dispute on the economies of the two countries in a column. Under the scenario of 25% tariffs on 250 billion US dollars of goods, it will affect the average annual growth rate of China's GDP during the "14th Five-Year Plan" period by 0.2-0.3 percentage points; Under the scenario of 25% tariffs on all goods, it will affect the average annual growth rate of China's GDP during the "14th Five-Year Plan" period by 0.4-0.5 percentage points<sup>[6]</sup>. This paper uses the GTAP model to measure the impact of China-US economic and trade frictions on China's GDP during the "14th Five-Year Plan" period. The specific results are as follows:

During the "14th Five-Year Plan" period, the negative impact of China-US economic and trade frictions has diminished marginally. The results show that under the two scenarios, the negative impact of China-US economic and trade frictions on the macro economy is marginally diminishing due to the reduced scale and magnitude of tariffs. Under the scenario of intensified China-US economic and trade frictions, the negative impact of China-US economic and trade frictions on China's average annual GDP growth rate is 0.4 percentage points during the "14th Five-Year Plan" period. Under the scenario of easing China-US economic and trade frictions, the negative impact of China-US economic and trade frictions on China's average annual GDP growth rate is 0.3 percentage points during the "14th Five-Year Plan" period. The impact degree of the China-US economic and trade friction intensify scenario differs from that of the ease scenario by only 0.1 percentage points, mainly because under the intensify scenario the increase in tariffs is mainly on labor-intensive products with low added value, which has a limited impact on China's GDP.

**Table 1.** Impact of China-US economic and trade frictions on China's GDP (Source: self-calculation)

| years   | China-US economic and trade frictions intensify (%) | China-US economic and trade frictions ease (%) |
|---|---|--|
| 2021  | -0.64   | -0.43  |
| 2022  | -0.51   | -0.36  |
| 2023  | -0.43   | -0.31  |
| 2024  | -0.38   | -0.28  |
| 2025  | -0.35   | -0.25  |
| The average annual effect during the "14th Five-Year Plan" period | -0.43   | -0.31  |

For industries, during the "14th Five-Year Plan" period, the negative impact of China-US economic and trade frictions is mainly concentrated in the secondary industry. The results show that in the two scenarios, since the scope of US tariffs on China is mainly concentrated on tradable goods, the negative impact of China-US economic and trade frictions is mainly concentrated in the secondary industry, while the negative

impact on the tertiary industry is relatively small. Since China's countermeasures against the U.S. tariffs mainly focus on agricultural products, it has a small positive effect on the development of China's primary industry.

**Table 2.** Impact of China-US economic and trade frictions on the average annual growth rate of the added value of the three industries during the "14th Five-Year Plan" period (Source: self-calculation)

| Department name    | China-US economic and trade frictions intensify (%) | China-US economic and trade frictions ease (%) |
|--------------------|---|--|
| GDP                | -0.43   | -0.31  |
| primary industry   | 0.01  | 0.07   |
| Secondary industry | -0.58   | -0.47  |
| Tertiary Industry  | -0.34   | -0.24  |

For sub-sectors, under the scenario of intensifying China-US economic and trade friction, the United States imposes tariffs on China in a wide range, and imposes tariffs on almost all products, which will have a negative impact on most industries except agriculture. The China-US economic and trade frictions have a great impact on the electronic equipment manufacturing industry, wood processing industry, leather processing industry, non-metallic mineral products industry, transportation equipment manufacturing industry, and metal products industry, respectively reduce the average growth rate of the above industries 1.4, 1.4, 1.4, 1.0, 0.6 and 0.4 percentage points during the "14th Five-Year Plan" period. As the commodities that China imposes tariffs on the United States are mainly concentrated on agricultural products, which will promote the development of domestic agriculture, the average annual growth rate of agricultural added value will increase by 1.0 percentage points during the "14th Five-Year Plan" period.

Under the scenario of easing China-US economic and trade frictions, the tariffs on US\$120 billion of goods that the US imposed tariffs on China will be gradually cancelled, the impact on the involved industries will be relatively small. The tariff rate on US\$200 billion of goods will be gradually reduced, and the impact will gradually weaken, while the tariff rate on US\$50 billion of high-tech products will remain at a rate of 25%. China-US economic and trade frictions have a greater impact on the wood processing industry, leather processing industry, electronic equipment manufacturing industry, non-metallic mineral product industry, transportation equipment manufacturing industry, and metal product industry, respectively reduce the average growth rate of the above industries 1.2, 1.1, 1.1, 0.6, 0.4, and 0.4 percentage points during the "14th Five-Year Plan" period. As the commodities that China imposes tariffs on the United States are mainly concentrated on agricultural products, which will promote the development of domestic agriculture, the average annual growth rate of agricultural added value will increase by 0.2 percentage points during the "14th Five-Year Plan" period.

**Table 3.** Average annual growth rate of added value of sub-sectors during the "14th Five-Year Plan" period (Source: self-calculation)

| Sub-sector name                                     | China-US economic and trade frictions intensify (%) | China-US economic and trade frictions ease (%) |
|---|---|--|
| agriculture   | 0.17  | 0.24   |
| Livestock and Meat Products                         | -0.29   | -0.24  |
| mining industry                                     | 0.05  | 0.04   |
| Beverages and Tobacco Products                      | -0.31   | -0.24  |
| food processing industry                            | -0.20   | -0.18  |
| textile industry                                    | -0.29   | -0.10  |
| clothing industry                                   | -0.17   | -0.03  |
| Leather processing industry                         | -1.37   | -1.08  |
| wood processing industry                            | -1.37   | -1.18  |
| Paper products and printing and publishing industry | -0.22   | -0.32  |
| metal products industry                             | -0.38   | -0.36  |
| Transportation Equipment Manufacturing              | -0.58   | -0.40  |
| Other light industries                              | -1.23   | -0.76  |
| Chemical rubber and plastic products                | -0.10   | -0.07  |
| ferrous metal smelting                              | -0.39   | -0.31  |
| Nonferrous Metals Industry                          | -0.16   | -0.13  |
| Electronic equipment manufacturing                  | -1.42   | -1.08  |
| Machinery and equipment manufacturing               | -0.20   | -0.17  |
| Non-metallic mineral products industry              | -0.98   | -0.61  |
| Processing of petroleum and coal products           | -0.23   | -0.15  |
| Electricity production and supply                   | -0.29   | -0.22  |
| construction industry                               | -1.55   | -1.21  |
| Water and gas production and supply                 | -0.29   | -0.19  |
| Communications industry                             | -0.39   | -0.29  |
| Transportation industry                             | -0.36   | -0.25  |
| Financial insurance industry                        | -0.35   | -0.26  |
| business service                                    | -0.46   | -0.33  |
| entertainment industry                              | -0.29   | -0.18  |
| Other service industries                            | -0.34   | -0.23  |

## 5 Conclusions

China-US economic and trade friction is an important manifestation of the struggle between emerging powers and incumbent powers, and it is inevitable, long-term and complicated. The trade disputes characterized by large-scale and large-scale mutual increases in tariff rates will not be sustainable for a long time, and the disputes between

China and the United States in the fields of investment, finance, technology, and resources will be difficult to ease. During the "14th Five-Year Plan" period, the negative impact of China-US economic and trade frictions has diminished marginally. For industries, the negative impact of China-US economic and trade frictions on China is mainly concentrated in the secondary industry, and the negative impact on the tertiary industry is relatively small. For sub-sectors, electronic equipment manufacturing industry, transportation equipment manufacturing industry, and metal products industry are greatly affected.

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