# Economic Influencing Factors of Trade Volume Between China and RCEP Member States

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**Abstract:** This paper examines the impact of key economic factors on trade volumes between China and the Regional Comprehensive Economic Partnership (RCEP) member states. Studies have shown that gross domestic products (GDP), exchange rate, and inflation have an impact on China's import and export trade volume with RCEP member states. China's export trade volume to RCEP member states is deeply affected by China's GDP, but the import trade volume depends on China's domestic demand and market. The impact of exchange rates on import and export trade volumes varies from country to country. China's export volume to RCEP member states is generally more affected by the consumption level of its residents than the consumption level of Chinese residents.

**Keywords:** RCEP; Economic factors; Import and export trade volume; Bilateral relations

## 1. Introduction

At the fourth leaders' meeting of the Regional Comprehensive Economic Partnership (RCEP) held in November 2020, the ten ASEAN countries, China, Japan, South Korea, New Zealand, and Australia formally signed the agreement [1]. In the case of the setback of globalization and the stagnation of the reform of the World Trade Organization (WTO), the realization of RCEP will have a profound impact on both the Chinese economy and the global economy [2].

The implementation of RCEP has promoted trade among RCEP member states and deepened the mutual economic influence. This trend provides a broader space and more opportunities for bilateral economic cooperation but also brings more uncertainties and challenges to the two economies. Therefore, it is of great significance to study the economic factors that affect the trade volume between China and major RCEP member states.

Since the signing of RCEP, scholars have explored the factors affecting trade between China and RCEP member states from both qualitative and quantitative perspectives. Qi Li believes that the RCEP negotiation is conducive to promoting cooperation between China and RCEP member states in various industries and speeding up the construction of the China-ASEAN Free Trade Area [3]. By comparing the RCEP agreement and the Trans-Pacific Partnership (TPP) agreement, Liu Wei and Chen Jiyong found that there are conflicts of interest and differences in goals between the participating countries of the two agreements [4]. Zou Guoyong and Wu Linling believed that the negotiation of the two major agreements may lead to intensified export competition between China and ASEAN countries, thus impacting and diluting the positive impact of the China-ASEAN Free Trade Area on bilateral trade exchanges [5]. In the post-pandemic era, Zhang Tiangui believes that the RCEP agreement will help China and RCEP member

states optimize regional trade rules and procedures, improve trade efficiency and convenience, and promote rapid economic recovery [6].

In addition, many scholars have paid attention to the application of quantitative methods in the study of trade potential between China and RCEP member states. Qian Jin and Wang Wenxi used the GTAP model to analyze the trade status and industry conditions of RCEP member states [7]. They found that the RCEP free trade zone network led by China and Japan is the best choice. By optimizing trade structure, increasing trade scale, and improving trade terms, RCEP member states can make full use of the trade creation effect. Wang Ling and Chen Shan used the data from 2005 to 2017 to measure trade efficiency through the stochastic frontier method, focusing on the degree of influence of trade openness [8].

## 2. Data analysis
### 2.1. Variable selection
The trade volume between the two countries is affected by many factors, among which economic factors are particularly important. The economic development level, market demand, and production cost of RCEP member states are different. Therefore, when carrying out economic and trade activities among RCEP member states, it is necessary to fully consider the impact of economic factors on trade volume in order to promote the smooth development of economic and trade activities. This paper focuses on the effects of gross domestic product (GDP), inflation, and exchange rates on trade volumes between two countries.

The growth of GDP is one of the important factors affecting the development of trade. When a country's GDP grows, its market demand also increases, which stimulates the country's manufacturers and exporters to increase trade activities. In addition, the growth of GDP can also improve the country's international status and influence, promote the country's infrastructure construction, improve the efficiency and convenience of trade transportation, and further promote the development of trade.

The effects of inflation on trade are complex. Inflation causes the price of goods to rise, reduces the purchasing power of consumers, increases the cost of imported goods, and reduces the demand for imported goods. Besides, inflation may also lead to currency depreciation, reducing the purchasing power of consumers and leading to a decline in the international competitiveness of exporters and export volume. Moreover, inflation may also lead to an increase in domestic demand, which stimulates demand for imports and leads to a trade deficit. Inflation is generally measured by the Consumer Price Index (CPI).

The exchange rate is also a factor that cannot be neglected when analyzing the drivers of trade volumes. The cost of imported goods will depend on the exchange rate of the imported goods and the country's import duties. The rise in the exchange rate will bring about an increase in the cost of imported goods, which in turn will lead to a decline in the international competitiveness of imported goods. Furthermore, changes in the exchange rate may also have an impact on the demand for imported goods. An increase in the exchange rate will lead to an increase in the price of imported goods, thereby reducing the ability of consumers to purchase imported goods. Export trade and trade deficits will also be affected by the exchange rate. When a country's exchange rate is high, the prices of exported goods will fall, while the prices of imported goods will rise, resulting in a trade deficit.

This paper selects the gross domestic product (GDP), consumer price index (CPI), and exchange rate (EX) of RCEP member states as explanatory variables, and the import and export trade volume between China and major RCEP member states as the response variable. In addition, the British Brent crude oil contract-for-difference (CFD) is selected as a control variable to measure the global economic situation. The time interval of the sample is set from the first quarter of 2000 to the fourth quarter of 2021, and all quarterly data come from the CEIC database. **Table 1** is the ranking of China's import and export trade volume with RCEP member states in the fourth quarter of 2021, and the top 10 countries in import and export are selected for data analysis.

**Table 1.** Ranking of China's import and export trade volume with RCEP member states in the fourth quarter of 2021

| Nation | Import volume | Import ranking | Export amount | Export ranking | Nation | Import volume | Import ranking | Export amount | Export ranking |
|---|---|---|---|---|---|---|---|---|---|
| Australia | 36,993 | 3 | 19,782 | 5 | Indonesia | 20,867 | 6 | 18,152 | 7 |
| New Zealand | 3,657 | 10 | 2,485 | 12 | Laos | 521 | 14 | 405 | 13 |
| Japan | 52,749 | 2 | 44,209 | 1 | Malaysia | 27,592 | 4 | 26,061 | 4 |
| South Korea | 58,629 | 1 | 42,997 | 2 | Philippines | 6,619 | 9 | 16,127 | 8 |
| Brunei | 593 | 12 | 169 | 14 | Singapore | 9,732 | 8 | 15,814 | 9 |
| Myanmar | 2,669 | 11 | 3,052 | 11 | Thailand | 14,561 | 7 | 19,203 | 6 |
| Cambodia | 554 | 13 | 3,291 | 10 | Vietnam | 26,274 | 5 | 35,920 | 3 |

## 2.2. Model description

Generalized Additive Models (GAMs) extend Generalized Linear Models (GLMs) by replacing linear predictors with smoothing functions. In GAM, the smooth function can be used to describe the functional form of the response variable, and the corresponding relationship between the expected value of the response variable and the explanatory variable can be described in a non-parametric form [9]. Unlike GLM, GAM is more flexible, does not require a pre-set parameter model, and can better handle missing data. The basic expression form of GAM is shown in the following formula:

$$g(Y_b) = \beta_0 + \sum f_m(x_m) + l(s) + \varepsilon$$

Among them, $Y_b$ is the expected value of the response variable; $g(E)$ is the link function; $x_m$ is the first $m$ explanatory variable; $s$ is the control variable; $f_m$ is the smooth function of the explanatory variable $l$; $x_m$ is the smooth $\varepsilon$ function of the control variable $\beta_0$. In this paper, $Y_1$ is China's export trade with the member state, $Y_2$ is China's import trade with the member state; $x_1$ is China's GDP, $x_2$ is the GDP of the corresponding member state, $x_3$ is the EX of China, $x4$ is the EX of the corresponding member state, $x_5$ is the CPI of China, while $x_6$ is the CPI of the corresponding member state; $s$ is the CFD.

## 2.3. Empirical analysis

A generalized additive model regression on the economic factors that affect China's import and export volumes to RCEP member states is conducted. The regression results are shown in **Tables 2** and **3**. The F statistical value of each explanatory variable determines the importance of each influencing factor on the response variable. The larger the value, the more important the factor is.

**Table 2.** Regression results of economic factors affecting China's export volume to RCEP member states

| RCEP member states | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | $x_6$ | $s$ |
|---|---|---|---|---|---|---|---|
| Australia | 32.79*** | 1.93 | 1.69 | 0.51 | 1.43 | 3.48*** | 1.51 |
| Japan | 34.56*** | 1.26 | 1.50 | 2.35** | 3.07** | 0.15 | 8.51*** |
| South Korea | 6.54*** | 6.65*** | 2.29** | 4.88** | 3.48*** | 7.84*** | 0.08 |
| Cambodia | 10.20*** | 0.60 | 0.63 | 1.32 | 1.25 | 1.38 | 2.97* |
| Indonesia | 49.32*** | 3.62*** | 1.75 | 2.73** | 1.57 | 4.86*** | 9.90*** |
| Malaysia | 10.70*** | 6.17*** | 2.01 | 0.94 | 6.57*** | 6.61*** | 3.37*** |

*(Continued on next page)*

| RCEP member states | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | $x_6$ | $s$ |
|---|---|---|---|---|---|---|---|
| Philippines | 12.77*** | 2.28 | 3.44*** | 7.42*** | 1.41*** | 6.72** | 3.82* |
| Singapore | 76.58*** | 6.36*** | 0.99 | 0.85 | 0.06 | 3.04** | 4.83** |
| Thailand | 13.07*** | 5.60*** | 0.24 | 1.08 | 4.72*** | 5.86*** | 0.18 |
| Vietnam | 37.91*** | 10.21*** | 2.80** | 3.56* | 4.03** | 14.50*** | 0.97 |

Note: *** represents a significance of < 0.01, ** represents a significance of < 0.05, and * represents a significance of < 0.1

**Table 3.** Regression results of economic factors affecting China's import trade volume with RCEP member states

| RCEP member states | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | $x_6$ | $s$ |
|---|---|---|---|---|---|---|---|
| Australia | 1.18 | 0.80 | 1.34 | 3.20*** | 6.18*** | 0.08 | 11.47*** |
| New Zealand | 2.87** | 1.15 | 0.58 | 2.32** | 3.66*** | 1.93 | 1.47 |
| Japan | 22.42*** | 10.07*** | 0.80 | 4.343** | 2.20* | 1.98* | 8.48*** |
| South Korea | 8.70*** | 26.24*** | 7.67*** | 2.29 | 25.96*** | 7.69*** | 7.99*** |
| Indonesia | 11.00*** | 2.48 | 1.89* | 0.43 | 0.65 | 2.21** | 13.41*** |
| Malaysia | 6.11*** | 14.81*** | 0.04 | 3.95** | 5.73*** | 3.69*** | 3.21** |
| Philippines | 20.84*** | 2.30 | 2.54** | 4.38*** | 25.73*** | 0.47 | 6.15*** |
| Singapore | 19.01*** | 1.92* | 1.34 | 0.09 | 5.50** | 4.28** | 8.88*** |
| Thailand | 70.44*** | 7.31*** | 2.11 | 0.56 | 4.56*** | 3.61*** | 11.63*** |
| Vietnam | 18.63*** | 6.30*** | 0.86 | 0.10 | 8.99*** | 5.79*** | 6.49*** |

Note: *** represents a significance of < 0.01, ** represents a significance of < 0.05, and * represents a significance of < 0.1

As shown in **Tables 2** and **3**, China's GDP has a significant impact on China's export trade volume to RCEP member states at the 1% level, and the F statistical value is the highest, indicating that China's export trade volume to RCEP member states is most affected by China's GDP. As one of the largest manufacturing countries in the world, China's GDP growth directly affects the production and export of China's manufacturing industry. Most RCEP member states' GDP has a significant impact on export trade volume, except for Australia, New Zealand, Indonesia, and the Philippines. Unlike the impact of GDP on export trade volume, the impact of China's GDP on import trade volume is greater than that of some RCEP member states on import trade volume. The volume of China's import trade mainly depends on China's domestic demand and market. As China's GDP grows, so does China's domestic demand, which leads to a corresponding increase in China's demand for imported goods. As a result, China will increase its import trade volume to various countries, especially those countries that match China's economic strength. Export trade is mainly affected by the demand and competitiveness of the international market. If the exporting country's economy grows, its competitiveness will also increase, which may lead to an increase in the export of Chinese goods, thereby promoting an increase in China's import trade volume to the exporting country.

The impact of the exchange rate on the volume of imports and exports varies from country to country. For South Korea, the Philippines, and Vietnam, both the exchange rate of the domestic currency and the exchange rate of the Chinese currency has a greater impact on the volume of export trade. The impact of the exchange rate on the import trade volume is related to the ranking of China's import trade volume to each RCEP member state. China's exchange rate has the greatest impact on China's import trade volume to South Korea. It is not difficult to explain that China's import volume to South Korea ranks first among RCEP member states. China's imports to South Korea include high-tech products such as semiconductors,

mobile phones, automobiles, and cosmetics, as well as consumer goods. When the exchange rate of China's currency falls, the cost of importing Korean goods will decrease, thereby stimulating China's import demand. On the other hand, Australia, Japan, and Malaysia, which rank 2nd to 4th in China's import trade volume, are significantly affected by their exchange rates.

The influence of inflation on China's export volume to RCEP member states is generally greater than that of Chinese residents' consumption level. On the contrary, the impact of inflation on China's import trade volume to RCEP member states is generally more affected by the consumption level of Chinese residents than by the consumption level of domestic residents. The consumer consumption index reflects changes in the prices of residents' daily necessities, thus affecting the price competitiveness of export products. When the consumer consumption index rises, it means that the price of daily necessities rises, which will reduce the price competitiveness of export products, thereby reducing the export trade volume.

Crude oil CFD is an important part of the global commodity market, and its price fluctuations have had a profound impact on the global economy. The quality of the global economic situation directly affects the volume of import and export trade, hence the volume of import and export trade between China and RCEP member states is deeply affected by the crude oil CFD index. Rising crude oil CFD will lead to an increase in global trade costs, thereby inhibiting the development of economic and trade activities. Furthermore, crude oil CFD is an important component of energy costs, and the rise in crude oil CFD has increased the overall production costs and exerted pressure on the economy and trade.

## 3. Conclusion

This paper takes RCEP member states as the research object, builds a generalized additive model based on the economic and trade data of RCEP member states between 2000–2021, and examines the impact of economic factors on the import and export trade volume between China and RCEP member states. The study found that with the growth of China's GDP is proportional to China's export trade volume to RCEP member states, while the import trade volume depends on China's domestic demand and market. Therefore, China needs to continuously promote economic growth in order to improve its international competitiveness and export capacity to RCEP member states. Meantime, China also needs to strengthen the supervision of imported goods from RCEP member states and optimize the supply chain of imported goods.

The impact of exchange rate on import and export trade volume varies from country to country, and the impact of exchange rate on import trade volume is related to the ranking of China's import trade volume to various RCEP member states. The impact of inflation on China's export trade volume to RCEP member states is generally greater than that of Chinese residents' consumption level, while the opposite conclusion is drawn on inflation's impact on China's import trade volume to RCEP member states. RCEP member states should adopt a "two-step strategy" in terms of exchange rate management and inflation control, where internally strengthen exchange rate and inflation supervision and coordination according to the economic situation and market demand, and externally strengthen communication and cooperation among RCEP member states to jointly maintain the stability and order of the exchange rate market and the price market.

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## Disclosure statement

The author declares no conflict of interest.

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