

# Research on the Influencing Factors of Sino-Indian Trade Imbalance

## — Based on the Stochastic Frontier Gravity Model of Trade

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**Abstract:** India is a populous country second only to China and the second largest developing country in the world. Although the trade level between the two countries has achieved significant results, the trade situation between India and China does not match the market size caused by its population and economic size. India should have become an important destination for China to expand trade, but the issue of trade imbalance between China and India is becoming increasingly serious, constantly hindering the development of trade between China and India. This article selects factors such as economic development level and population size to analyze the influencing factors of Sino-Indian trade. This article expands on the traditional gravity model and adopts a new model for empirical regression experiments. Based on the regression results, summarize the factors that affect the trade imbalance between China and India and draw a conclusion.

**Keywords:** Sino-Indian Trade; Trade Imbalance; Trade Gravity Mode

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## 1. Introduction

According to statistics, the trade volume between China and India in 2019 was 97.637 billion US dollars. Among them, the export volume from China to India is 78.619 billion US dollars, while the import volume from India is 18.898 billion US dollars. The trade deficit is as high as 59.797 billion US dollars, and the problem of trade imbalance is gradually becoming serious. Since China's accession to the WTO, the trade between China and India has shown a surplus and gradually increased in most years, making the situation very severe. The urgent task of maintaining Sino-Indian economic and trade relations is to maintain the stability of Sino-Indian trade, and the key lies in how to solve the problem of trade imbalance between China and India. However, after repeated research by domestic and foreign scholars, it has been found that the industrial structure, economic development stages, and economic development models of China and India are not the same, which poses many challenges for both sides in solving the issue of trade imbalance between China and India. Therefore, this article takes the trade imbalance between China and India as the research object and uses a gravity model to explore the factors behind the trade imbalance between China and India.

## 2. Method

**Empirical analysis method:** In order to analyze the influencing factors of Sino-Indian trade, this article selects relevant data from China and India from 2001 to 2019, constructs a model, and conducts empirical regression. Eviews 6.0 software is used for empirical regression to calculate the influencing factors of Sino-Indian trade.

**Random Frontier Gravity Model:** The random frontier gravity model combines traditional gravity models and random frontier methods, overcoming certain shortcomings and improving the accuracy of trade potential estimation. In 1962, Tinbergen first combined the gravity model with international trade, which had a profound impact on the development of international trade.

## 3. Empirical analysis

### 3.1 Variable Selection

The trade between the two countries will be influenced by the economic development level of the two countries, and the

difference in demand between the two peoples is also a factor. Similarly, the level of economic openness will also be affected, and trade barriers will also serve as a factor affecting trade; And it will be influenced by non-economic factors such as the population size of both countries.

### 3.1.1 Economic development level

The level of economic development is a symbol of a country's supply and demand capabilities. According to the theory of comparative advantage, the higher the level of economic development of a country, the stronger its production capacity, the lower its production costs, and the more goods available for trade, which gives it a comparative advantage in trade and leads to an increase in its exports; At the same time, the level of economic development is also a symbol of a country's wealth level. The higher the level of economic development, the stronger the purchasing power, and the larger the scale of trade. This article selects the per capita GDP of China and India as the proxy variable for the level of economic development.

### 3.1.2 Demand Differences

The impact of demand differences on bilateral trade can be demonstrated by the theory of demand overlap. The difference in per capita income levels between China and India reflects the differences in industrialization levels between the two countries, indicating that there are differences in production levels and verticality between the two countries. Therefore, the absolute value of the difference in per capita income level between China and India is selected to measure the level of demand difference between the two countries.

### 3.1.3 Population size

On the one hand, population size can measure a country's market size, and on the other hand, it can represent the quantity of labor resources in a country. The larger the population of a country, the greater the demand, and thus the more imports; At the same time, the larger the population size of a country, the more abundant the labor resources, the higher the production and supply capacity, and thus the more exports. Therefore, the population size of China and India is chosen as the variable.

## 3.2 Variable Description and Data Source

This article selects relevant data from China and India from 2001 to 2019, and Table 3.1 lists the variables, data sources.

Table 3.1 Variable Description and Data Source

Variables		Symbol	Data Sources
Bilateral Trade Volume		$T_{ijt}$	UN Comtrade Database
Level of economic development	China's per capita GDP	$PGDP_{it}$	World Bank Database
	India's per capita GDP	$PGDP_{jt}$	
Population size	China's population	$POP_{it}$	World Bank Database
	India's population	$POP_{jt}$	
Demand Differences	Absolute value of the difference in per capita income levels between the two countries	$DD_{ijt}$	Calculated based on relevant data

## 3.3 Model specification

The traditional form of gravity model is:

$$T_{ij} = A \frac{Y_i^a \times Y_j^b}{D_{ij}^c}$$

Among them,  $T_{ij}$  is the trade scale between country  $i$  and country  $j$ ,  $A$  is a constant, and  $Y_i$  and  $Y_j$  is the gross domestic product of country  $i$  and country  $j$ , respectively,  $D_{ij}$  is the geographical distance between the two countries. The parameters  $a$ ,  $b$ ,  $c$  represent the coefficients of the GDP of the exporting country, the GDP of the importing country, and the difference between the two countries on the map.

Through the ADF test of each variable, the variables  $\ln T_{ijt}$ ,  $\ln PGDP_{it}$ ,  $\ln PGDP_{jt}$ ,  $\ln POP_{it}$ ,  $\ln POP_{jt}$ ,  $\ln DD_{ijt}$  has passed the ADF test, and the final model setting is shown in equation (3.1).

$$\ln T_{ijt} = \beta_0 + \beta_1 \ln PGDP_{it} + \beta_2 \ln PGDP_{jt} + \beta_3 \ln POP_{it} + \beta_4 \ln POP_{jt} + \beta_5 \ln DD_{ijt} + \varepsilon_{ij} \quad (3.1)$$

### 3.4 Empirical results

According to the model set in equation (3.1), select data from China and India from 2001 to 2019 and use Eviews 6.0 for regression. This paper uses the traditional gravity model as the basic model, and adopts the stepwise Law of Return method. The regression results are shown in Table 3.2.

Table 3.2 Empirical results

	$\ln T_{ijt}$	$\ln T_{ijt}$	$\ln T_{ijt}$	$\ln T_{ijt}$	$\ln T_{ijt}$
$\ln DD_{ijt}$	1.36 (17.21)	3.62 (9.14)	3.63 (9.68)	2.91 (6.82)	3.40 (4.62)
$\ln PGDP_{it}$		-2.10 (-5.74)	-1.59 (-3.46)	-1.49 (-3.75)	-1.18 (-2.13)
$\ln POP_{jt}$			-5.57 (-1.67)	-8.91 (-2.84)	-37.22 (-1.07)
$\ln PGDP_{jt}$				1.39 (2.55)	1.32 (2.37)
$\ln POP_{it}$					53.70 (0.81)
C					-371.42 (-0.56)

Note: Data source: Compiled based on Eviews 6.0 software

### 4. Conclusion

Through empirical analysis, the following conclusions are drawn:

(1) There is a positive correlation between India's per capita GDP and the scale of bilateral trade. However, China's per capita GDP and bilateral trade scale fluctuate in the opposite direction. China's per capita income level has increased, consumption capacity has improved, and consumer goods have shifted from low-end primary goods to high-end goods. As a result, India's low-end manufacturing products have decreased their attractiveness to China's consumption, reducing bilateral trade. The change in India's consumption structure caused by the increase in per capita economic level coincides with China's positioning of imported goods from India, such as mechanical and electrical industrial goods and electronic equipment.

(2) There are differences in the impact of population size on bilateral trade between China and India. The negative change between Demographics of India's population size and bilateral trade size indicates that the larger India's population size, the less trade. The population size of China is positively correlated with the size of bilateral trade. The larger the population size of China, the more trade increases.

(3) The difference in demand and the positive changes in the scale of bilateral trade between the two countries. Although there is intra industry trade between the two countries in bilateral trade, their industrialization levels are different. India is in the early stages of industrialization and has a significant demand for China's machinery and transportation equipment. The inter industry trade caused by demand differences is also very important. This leads to a positive impact of the difference in demand between the two countries on the scale of bilateral trade.

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