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# SUGGESTIONS FOR ESTABLISHING A CHINA AND RUSSIA FREE TRADE ZONE

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## Аннотация

China and Russia have a long history of trade. After entering the 21st century, China and Russia joined the World Trade Organization successively, and China-Russia trade has entered a new stage. In 2025, China-Russia bilateral trade continued to grow, surpassing 228,1 billion U.S. dollars. The construction of the China-Russia Free Trade Area is conducive to exploring the trade potential between the two countries and enhancing the previous trade cooperation between the two countries.

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**Analysis of the trade effect of the China-Russia Free Trade Zone**

1. Model introduction

The trade gravity model is used to analyze the trade flow between countries. It evolved from Newton's law of gravity in 1960. Tinbergen and Poyhonen were the first to apply the gravity model to the field of international trade. These two economists conducted a quantitative analysis on the trade between two countries. They believed that the scale of bilateral trade flows between the two countries is related to the respective economies of these two countries. The scale is directly proportional and inversely proportional to the spatial distance between the two countries. This analysis conclusion of Tinbergen and Poyhonen has opened up a new space for the study of international trade theory in the field of econometrics. Subsequently, as the research continued to deepen, more and more explanatory variables were brought into the model to meet the needs of research. For

example,

economic factors, including per capita GDP, per capita national income, foreign direct investment, tariff rates, consumer price index, etc.;

geographic factors, including climate, territorial borders, etc.;

demographic factors, including language , Religion, population, etc.;

related political factors, including whether to sign a free trade agreement, whether to establish an FTA, whether it is a developed country, etc.

Because of its simple principles and strong data availability, the trade gravity model has gradually been widely used in the field of economics and has become one of the main empirical research tools for studying trade flows in international trade.

In 1962, the Dutch economist Jan Tinbergen summarized the basic form of the trade gravity model based on the universal gravitation formula, namely the trade gravity equation:

$$T_{ij}=A(Y_iY_j)/D_{ij}, \qquad (1)$$

where Tij – represents the export of exporting country i to importing country j; A – a constant;

Yi – the GDP of country i;

Yj – the GDP of country j, is the product of the GDP of the

two countries;

Dij – is the distance between country i and country j (is generally expressed by the distance between the capitals of the two countries).

The model is a non-linear model. Therefore, taking the natural logarithm on both sides of the formula becomes the linear form as follows:

$$lnT_{ij}=\beta_0+\beta_1 ln(Y_iY_j)+\beta_2 lnD_{ij}+\mu_{ij} \quad (2)$$

2. Description of model data

The data extracted in this article comes from the China Statistical Yearbook. The main trading member countries and regions selected are: Russia, India, South Korea, Thailand, Vietnam, Singapore, Malaysia, the Philippines and Indonesia. The time span selected in this article is from 2011 to 2019. The total bilateral trade and foreign direct investment data are from the China Statistical Yearbook. The data on GDP and GDP per capita are from the official website of the World Bank. The geographical distance is selected between the capitals of the two countries. The distance, the data comes from Google Earth, and the information on whether China has signed a free trade agreement with its trading partner countries comes from the official website of the China Free Trade Zone Service. See

the table below for specific data:

Table 3.1 – Total bilateral trade between China and other countries from 2011 to 2019, US$100 million

| Years | Russia | India | Korea | Thailand | Vietnam | Singapore | Malaysia | Philippines | Indonesia |
|---|---|---|---|---|---|---|---|---|---|
| 2011 | 792.7 | 739.1 | 2456.3 | 647.3 | 402.1 | 637.1 | 900.2 | 322.5 | 605.5 |
| 2012 | 882.1 | 664.7 | 2564.2 | 697.5 | 504.4 | 692.7 | 948.3 | 363.8 | 662.3 |
| 2013 | 892.6 | 654 | 2742.4 | 712.4 | 654.8 | 759 | 1060.8 | 380.5 | 683.5 |
| 2014 | 952.7 | 705.8 | 2904.4 | 726.2 | 836.4 | 797.4 | 1020.1 | 444.6 | 635.4 |
| 2015 | 680.2 | 716 | 2757.9 | 754.6 | 958.5 | 795.2 | 972.6 | 456.4 | 542.3 |
| 2016 | 696.2 | 701.8 | 2527 | 757.3 | 928.8 | 705.3 | 869.4 | 472.4 | 535.4 |
| 2017 | 842.2 | 843.9 | 2802.6 | 801.4 | 1219.9 | 792.7 | 961.4 | 513.1 | 633.3 |
| 2018 | 1071.1 | 955.1 | 3134 | 875.1 | 1478.3 | 827.6 | 1085.8 | 556.5 | 773.4 |
| 2019 | 1109.4 | 928.1 | 2845.3 | 917.5 | 1619.8 | 900.4 | 1240.5 | 609.6 | 797.6 |

Table 3.2 – The actual amount of foreign investment by country from 2011 to 2019, Ten thousand U.S. dollars

| Years | Russia | India | Korea | Thailand | Vietnam | Singapore | Malaysia | Philippines | Indonesia |
|---|---|---|---|---|---|---|---|---|---|
| 2011 | 3102 | 4217 | 255107 | 10120 | 129 | 609681 | 35828 | 11185 | 4607 |
| 2012 | 2992 | 4406 | 303800 | 7772 | 316 | 630508 | 31751 | 13221 | 6378 |
| 2013 | 2208 | 2705 | 305421 | 48305 | 0 | 722872 | 28053 | 6726 | 12623 |
| 2014 | 4088 | 5075 | 396564 | 6052 | 7 | 582668 | 15749 | 9707 | 7802 |
| 2015 | 1312 | 8080 | 403401 | 4438 | 0 | 690407 | 48048 | 3867 | 10754 |
| 2016 | 7343 | 5181 | 475112 | 5615 | 0 | 604668 | 22113 | 7760 | 6399 |
| 2017 | 2384 | 15772 | 367253 | 11023 | 353 | 476318 | 10836 | 500 | 4076 |
| 2018 | 5677 | 4754 | 466688 | 4574 | 13883 | 521021 | 21162 | 4986 | 3246 |
| 2019 | 5402 | 2563 | 553817 | 10580 | 1720 | 759064 | 7013 | 1383 | 1242 |

Table 3.3 – 2011-2019 GDP of China and other countries, US$100 million

| Years | Russia | India | Korea | Thailand | Vietnam | Singapore | Malaysia | Philippines | Indonesia | China |
|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 20459 | 18230 | 12532 | 3708 | 1355 | 2793 | 2979 | 2342 | 8929 | 75515 |
| 2012 | 22082 | 18276 | 12784 | 3975 | 1558 | 2950 | 3144 | 2619 | 9178 | 85322 |
| 2013 | 22924 | 18567 | 13707 | 4203 | 1712 | 3075 | 3232 | 2839 | 9125 | 95704 |
| 2014 | 20592 | 20391 | 14843 | 4073 | 1862 | 3148 | 3380 | 2974 | 8908 | 104756 |
| 2015 | 13634 | 21035 | 14657 | 4012 | 1932 | 3080 | 3013 | 3064 | 8608 | 110615 |
| 2016 | 12767 | 22947 | 15001 | 4134 | 2052 | 3186 | 3012 | 3186 | 9318 | 112332 |
| 2017 | 15741 | 26527 | 16239 | 4562 | 2337 | 3418 | 3191 | 3284 | 10156 | 123104 |
| 2018 | 16575 | 27131 | 17248 | 5065 | 2452 | 3732 | 3587 | 3468 | 10422 | 138948 |
| 2019 | 16998 | 28689 | 16467 | 5435 | 2619 | 3720 | 3646 | 3767 | 11191 | 142799 |

Table 3.4 – Per capita GDP of China and other countries from 2011 to 2019, USD

| Years | Russia | India | Korea | Thailand | Vietnam | Singapore | Malaysia | Philippines | Indonesia | China |
|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 14311 | 1458 | 25096 | 5492 | 1525 | 53890 | 10399 | 2450 | 3122 | 5618 |
| 2012 | 15420 | 1443 | 25466 | 5860 | 1735 | 55546 | 10817 | 2694 | 3643 | 6316 |
| 2013 | 15974 | 1449 | 27182 | 6168 | 1886 | 56967 | 10970 | 2871 | 3694 | 7050 |
| 2014 | 14095 | 1573 | 29249 | 5951 | 2030 | 57562 | 11319 | 2959 | 3623 | 7678 |
| 2015 | 9313 | 1605 | 28732 | 5840 | 2085 | 55646 | 9955 | 3001 | 3491 | 8066 |
| 2016 | 8704 | 1732 | 29288 | 5994 | 2192 | 56828 | 9817 | 3073 | 3562 | 8147 |
| 2017 | 10720 | 1981 | 31616 | 6592 | 2365 | 60913 | 10259 | 3123 | 3837 | 8879 |
| 2018 | 11370 | 2005 | 33422 | 7295 | 2566 | 66188 | 11377 | 3252 | 3893 | 9976 |
| 2019 | 11584 | 2099 | 31846 | 7806 | 2715 | 65233 | 11414 | 3485 | 4135 | 10216 |

Table 3.5 – Additional calculation parameters

| Country | Distance between country and China, km | Availability of a free trade agreement with China |
|---|---|---|
| Russia | 5806 | No |
| India | 3788 | No |
| Korea | 960 | No |
| Thailand | 3309 | Yes |
| Vietnam | 2328 | Yes |
| Singapore | 4473 | Yes |
| Malaysia | 4354 | Yes |
| Philippines | 2841 | Yes |
| Indonesia | 5224 | Yes |

3. Model construction and regression

Based on the status quo of bilateral trade between China and the world's major trading members and regions, this article analyzes the variables that affect the bilateral trade volume, and rationally introduces and removes relevant variables, so as to establish an economy that conforms to the bilateral trade between China and the world's major trading members and regions Correlation analysis between variables. Through the analysis of the correlation between these variables, it can be seen that there are certain correlations among variables such as economic aggregate, investment level, geographic distance, bordering, absolute value of per capita balance, and whether to sign a free trade agreement, and so on. It will make an intuitive and effective judgment on the economic, political, and geographic factors generated by the bilateral trade between China and the world's major trading member countries and the impact on the development of bilateral trade. Based on the

analysis of the original trade gravity model and the selected indicators, the panel data model is constructed as follows:

$$Ln(T_{cpy})=\beta_0+\beta_1 ln(Y_{cy}Y_{py})+\beta_2 ln(I_{cpy})-\beta_3 ln(GDP_{cpy})+\beta_4 ln(D_{cp})-\beta_5 F_{cpy}-\mu_{cpy}, \quad (3)$$

where c – represents China;

p – represents the trading partner country;

y – represents the year.

The explanation of specific explanatory variables is shown in Table 3.6.

Table 3.6 – Explanation of explanatory variables, expected symbols and theoretical analysis

| Explanatory variables | Variable description | Expected symbol | Analysis |
|---|---|---|---|
| $T_{cpy}$ | The total bilateral trade volume between China $c$ and its trading partner country $p$ in $y$ year | | If the bilateral trade volume continues to increase, it indicates that the trade between the two countries is developing in a positive manner |
| $I_{cpy}$ | Trading partner country $p$'s direct investment in China $c$ in $y$ year | + | Foreign direct investment is conducive to the development of bilateral trade. The greater the investment, the greater the bilateral trade. |
| $Y_{cy}Y_{py}$ | The product of the GDP of China $c$ and its trading partner country $p$ in $y$ year | + | GDP reflects the total economic volume and economic scale of a country or region. The larger the economic scale, the greater the capacity for supply and demand and the greater the bilateral trade volume. |
| $GDP_{cpy}$ | The absolute value of the difference in GDP per capita between China $c$ and its trading partner country $p$ in $y$ year | - | The larger the difference, the more the two countries will focus on inter-industry trade and the smaller the bilateral trade volume. The smaller the difference, the more the two countries will focus on intra-industry trade and the larger the bilateral trade volume. |
| $D_{cp}$ | Geographical distance between China $c$ and trading partner country $p$ | - | The farther the distance, the higher the transportation cost and the reduction of bilateral trade. |
| $F_{cpy}$ | China $c$ and its trading partner country $p$ sign a free trade agreement in $y$ year | + | Signing a free trade agreement to reduce trade barriers will help increase the bilateral trade volume between the two countries. |

Use the data collected in the China Statistical Yearbook to analyze the trade gravity model through the Stata software of econometrics:

Table 3.7– Descriptive Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Tcpy | 81 | 1000.107 | 663.666 | 322.5 | 3134 |
| Icpy | 81 | 119426.33 | 219658.3 | 0 | 759064 |
| YcyYpy | 81 | 997900000 | 896200000 | 102300000 | 4097000000 |
| GDPcpy | 81 | 11271.728 | 15192.377 | 126 | 56212 |
| Dcp | 81 | 3675.889 | 1425.644 | 960 | 5806 |
| Fcp | 81 | 0.667 | 0.474 | 0 | 1 |

It can be seen from Table 3.7 that, except for dummy variables, the standard deviation of each variable is extremely large, indicating that the sample data is extremely scattered, so in the following empirical steps, the above variables are processed logarithmically.

Table 3.8 – Matrix of correlations

| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| (1) LnT | 1.000 | | | | | |
| (2) LnI | 0.470*** | 1.000 | | | | |
| (3) LnYY | 0.413*** | 0.038*** | 1.000 | | | |
| (4) LnGDP | 0.331*** | 0.579*** | 0.035 | 1.000 | | |
| (5) LnD | -0.646*** | -0.307*** | -0.031 | -0.313*** | 1.000 | |
| (6) Fcp | -0.492*** | -0.087 | -0.826*** | -0.101 | 0.269** | 1.000 |

From Table 3.8 we can see the correlation between the two variables. The sign of the coefficient can reflect the positive or negative correlation of the two variables to a certain extent. *** means significant at the 99% confidence level, ** Indicates that it is significant at the 95% confidence level. It can be seen that the correlation between most indicators and the explained variable

is very significant, indicating that the model is effective.

In the Hausman test, if the P value is greater than 0.1, the null hypothesis is accepted and the random effects model is selected. If the P value is less than 0.1, the null hypothesis is rejected and the fixed effects model is selected. The specific results are as follows:

– Chi-square test value is 3.02;

– P-value is 0.6969

According to the output result, the value of Hausman statistic is 3.02, and the corresponding P value is 0.6969, which means accepting the null hypothesis and establishing a random effects model.

Breusch and Pagan (1980) provided an LM test to test individual random effects. The original hypothesis is H0: = 0, and the alternative hypothesis is H1: ≠ 0. Through the LM test, we can know that the p value is 0.0000, which strongly rejects the null hypothesis, indicating that the original model should include the random disturbance item ui that reflects the individual characteristics, instead of using mixed regression, and choosing to use random effects regression.

Table 3.9 – Regression results

| *LnT* | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
|---|---|---|---|---|---|---|---|
| *LnI* | 0.032 | 0.015 | 2.07 | 0.038 | 0.002 | .061 | ** |
| *LnYY* | 0.568 | 0.067 | 8.47 | 0.000 | 0.437 | .7 | *** |
| *LnD* | -0.709 | 0.296 | -2.40 | 0.017 | -1.288 | -.129 | ** |
| *LnGDP* | 0.004 | 0.025 | 0.18 | 0.860 | -0.044 | .053 | |
| *F* | 0.604 | 0.34 | 1.77 | 0.076 | -0.063 | 1.271 | * |
| *Constant* | 0.264 | 2.597 | 0.10 | 0.919 | -4.827 | 5.355 | |

| | | | |
|---|---|---|---|
| Mean dependent var | 6.762 | SD dependent var | 0.511 |
| Overall r-squared | 0.559 | Number of obs | 78.000 |
| Chi-square | 149.001 | Prob > chi2 | 0.000 |
| R-squared within | 0.686 | R-squared between | 0.528 |

*** p<.01, ** p<.05, * p<.1

Table shows the random effects regression results. From the data in the table, it can be seen that the R2 of the model is 0.686, and the model has a high degree of goodness of fit, indicating that the model setting is effective.

The following conclusions can be drawn from the results of the equation:

The p-value of the direct investment (LnI) of trading partner countries in China is 0.038, which is significant at the 95% confidence level, and the coefficient is 0.032, indicating that foreign direct investment is beneficial to the development of bilateral trade.

The explanatory variable has a product coefficient of 0.568 for the GDP of the two countries, indicating that the higher the GDP, the larger the economic scale and the larger the bilateral trade volume. Therefore, for every 1% increase in the logarithm of the product of the GDP of the two countries, the logarithm

of the bilateral trade volume between the two countries will increase by 0.568%. It further shows that the increase in GDP of China and Russia, the increase in total economic volume and economic scale, and the increase in economic level have a significant promotion effect on the bilateral trade between the two countries.

The p-value of the distance between China and its trading partners (LnD) is 0.017, which is significant at the 95% confidence level, and the coefficient is - 0.709, indicating that the distance is negatively correlated with the bilateral trade volume. Although the Chinese capital Beijing is relatively far from the Russian capital Moscow, the Northeast region represented by Heilongjiang is very close to the Russian Far East. Strengthening trade cooperation between Northeast China and the Russian Far East will be more conducive to the expansion of China and Russia trade.

The p-value of the per capita GDP difference (LnGDP) between the trading partner country and China is 0.860, and there is no significant correlation under the random effects model.

The p-value of the dummy variable whether to sign a free trade agreement (F) is 0.076, which is significant at the 90% confidence level, and the coefficient is 0.604, indicating that the signing of a free trade agreement does promote the growth of bilateral trade volume, which also shows that China and Russia The establishment of a free trade zone will produce trade

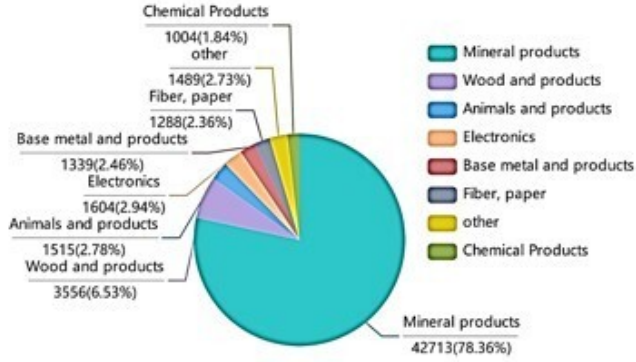
creation effects, further showing that the establishment of a China and Russia free trade zone has a positive role in promoting the economic development of China and Russia.

# 2. Main problems found in China and Russia trade relations

The commodity structure of China and Russia bilateral trade is unitary

The problem of the structure of bilateral commodity trade between Russia and China still exists. Low-quality and low-tech commodities account for a large share of the trade volume, and the share of high-tech and high-value-added commodities is still small. In particular, the share of electromechanical products in the total trade volume between Russia and China is only 30%. At the same time, the share of mechanical and electrical products exported from Russia to China dropped from 30% in 1992 to 2.9% in 2018. The share of footwear, clothing, textiles, consumer goods, household appliances and daily necessities exported from China to Russia is about 75%.

According to the data in Picture 3.2, raw materials and resource products exported from Russia to China, such as crude oil and petroleum products, unprocessed wood, steel, non-ferrous metals, ore, and cellulose, account for more than 85% of total exports. The low proportion of high value-added commodities in bilateral trade has severely restricted the further expansion of the scale of bilateral mutual assistance and cooperation between Russia and China.




Picture 3.2 – Major commodities exported from Russia to China in 2019 (unit: million U.S. dollars, %)

The trade relationship between Russia and China has lasted for a long time, and trade cooperation has become stronger every year, but trade cooperation is mainly based on the factor endowments of the two countries. The trade cooperation between Russia and China is based on major resource commodities, and the import and export of commodities between the two countries is not balanced, and the commodity structure is single. The main commodities that Russia imports from China are manufactured goods, with a share of over 80%. Russia imports a large amount of primary products. It should be pointed out that the structure of Russia's imports of manufactured products from China is unbalanced, and the

volume of mechanical and electrical products in 2018 exceeded that in 2017. In 2018, the import value of mechanical and electrical products was 26,450 million U.S. dollars, and in 2017 it was 25,445 million U.S. dollars. Imports of mechanical and electrical products increased by 50.7%, and the share of other industrial products did not exceed 10%. The main products exported by Russia to China are mineral products, timber and mechanical and electrical products. In 2018, the growth rate of exports of mineral products reached 77.9%, and the growth rate of exports of other commodities did not exceed 8%. Therefore, the commodity structure of Russia and China has a single structure. Russia mainly exports natural resources to China, which makes up for China's shortage of energy resources. Commodity prices are largely determined by price fluctuations in the world market. Prices in the world market affect the value of commodities in Russia and China, which seriously affects the scale of trade between Russia and China. The drop in prices on the world market has exerted a huge negative impact on the trade cooperation between Russia and China. The drop in oil prices in 2014 affected the trade relationship between Russia and China. Therefore, the decline in oil prices in 2014 affected the trade relationship between Russia and China. For Russia, this is a big blow to the Russian economy, because Russia is an oil exporter. Russia mainly imports light industrial products and mechanical and electrical products with low added value from China. The production of mechanical and electrical products

is labor-intensive and capital-intensive, and the development of high-tech requires a long period of time. High technology is the driving force for the development of domestic and foreign markets.

On the one hand, the trade volume of a single structure shows that only raw materials are competitive for other commodities that are not competitive in the world market. On the other hand, Russia's industrial structure has adjustment problems, as well as exports and imports. Therefore, this problem has led to the spontaneous and retrogressive development of trade cooperation. The internal structure of Russian industry is relatively low, which has led to a low level of imports and exports. The monotonic nature of the commodity structure of Russia- China trade cannot fully confirm that a real and promising competitive advantage becomes possible. Therefore, if the governments of the two countries do not take measures to diversify the trade between Russia and China, and if the cost of crude oil and other raw materials is reduced or continues to fluctuate significantly, it will be difficult to ensure a further steady increase in trade volume.

Imperfect trade management system

In Russia's strategic plan for the development of the Far East, the construction plan of transportation facilities cannot keep up with the speed and requirements of trade development, and the infrastructure and equipment required for cargo transportation are backward. Before the successful construction of the free trade zone, the transit period of goods was too

long and the procedures were cumbersome. Regardless of trade cooperation with any country, special regulatory agencies should be established to ensure the quality and safety of commodity trade. The bilateral trade volume between China and Russia continues to grow under the "One Belt, One Road" initiative. Realistic reasons have promoted the feasibility of the construction of a China-Russia free trade zone. However, the development of the China and Russia trade supervision mechanism is still very imperfect and mature. In terms of transportation management between China and Russia, the transportation departments of the two countries lack effective negotiation and the improvement of the docking work, such as the inconsistency of traffic regulations, whether the two countries can reach agreement in the negotiation of railway construction in the common area, and whether the formulation and planning of transportation policies Both countries can accept, these factors have hindered the pace of the construction of the China-Russia free trade zone.

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