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Study on the Potential of Agricultural Trade between China and RCEP Member Countries

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Keywords: RCEP, agricultural trade, trade gravity model, trade potential

Abstract: This paper adopts the trade gravity model for empirical analysis, and analyzes the total agricultural trade and trade structure of China based on the data related to the import and export trade of agricultural products between China and RCEP member countries in the past ten years from 2010 to 2020, in addition to the basic situation and structural characteristics of the agricultural trade of other 14 RCEP member countries in the past ten years, as well as their agricultural products trade with China. The results show that the scale of economic development, population, population, and the potential of agricultural trade with China. The results show that the scale of economic development, population, distance and the ratio of agricultural exports from other RCEP countries to China to their total agricultural exports to the world have significant positive effects on the trade potential. By measuring the trade potential, it is concluded that the highest index of agricultural trade potential with China is Australia, and the agricultural trade potential between the two countries has been almost fully exploited. China's agricultural trade potential index with ASEAN and South Korea is at a moderate stage and still has some room for improvement, while China's agricultural trade potential index with New Zealand and Japan is relatively low, and there is more room for trade development compared with Australia, ASEAN and South Korea. All in all, China has huge trade potential with RCEP member countries in agricultural trade, and there is still a huge room for growth in the future. Finally, this paper also puts forward corresponding suggestions to improve the cooperation and exchange between China and RCEP member countries in agricultural trade and to explore more trade potential.

1. Introduction

Against the backdrop of the new crown epidemic and the intensification of international trade conflicts, more multilateral trade cooperation among countries and the establishment of regional economic integration organizations can accelerate the recovery of economic and trade stability of the world and its countries. As the world's largest trading country and the second largest economy, China is actively involved in the world trade and plays a very important role. The RCEP was proposed in 2011, and until November 15, 2020, China signed the Regional Comprehensive Economic Partnership Agreement with Japan, South Korea, Australia, New Zealand, and ten ASEAN countries, a total of 15 member countries, which not only have a large share of the world's population and GDP, but also account for more than 30% of the world's trade volume[1].

In 2021, the total import and export trade of agricultural products in China is up to USD 304.17 billion, of which the agricultural trade with RCEP member countries accounts for 30.8%, reaching about USD 9,369,875,000, and the agricultural export trade with RCEP member countries is about USD 38,461,519,000, and the import trade is about USD 55,237,226,000. Japan, South Korea, Australia and ASEAN are the top fifteen countries in China's export trade of fruits and vegetables, livestock products and aquatic products, while Japan and ASEAN rank to the top five in China's agricultural trade[2]. What is the trade potential of China's agricultural products import and export with RCEP member countries, how much room there is for growth and how should the total agricultural products trade between member countries be improved, which is important for China to promote the diversification of agricultural products import and export channels, improve the smooth level of trade between member countries and effectively reduce trade costs, and also to ensure food security under the unstable supply chains of major agricultural exporting countries caused by the conflict between Russia and Ukraine It has important value[3].

2. RCEP Construction and the Current Situation of Agricultural Trade among Member Countries

2.1 Basic Information of China's Agricultural Trade

In agricultural trade, China's total trade with RCEP member countries is large. In 2021, China's agricultural imports and exports amounted to USD 304.17 billion, China's agricultural exports amounted to USD 84.35 billion, and China's agricultural imports amounted to USD 219.82 billion, of which the total agricultural trade with RCEP member countries was USD 93.7 billion, with exports amounting to USD 38.4 billion and imports amounting to USD 55.3 billion. Imports amounted to US$55.3 billion[4].

(1) Analysis of total trade characteristics

In general, China's agricultural trade volume has been expanding year by year, while the deficit has been increasing. Specifically, China maintained a surplus for four years after 2000, but since 2004, China's deficit in agricultural trade seems to have become irreversible, with the value of the deficit continuing to expand, soaring from $4.64 billion in 2004 to $135.47 billion in 2021, while the trade volume of agricultural products rose from $51.42 billion to $304.17 billion. billion, an increase of up to 45%, with exports of $84.35 billion and imports of $219.82 billion, thus showing that China is a larger importer of agricultural products[5].

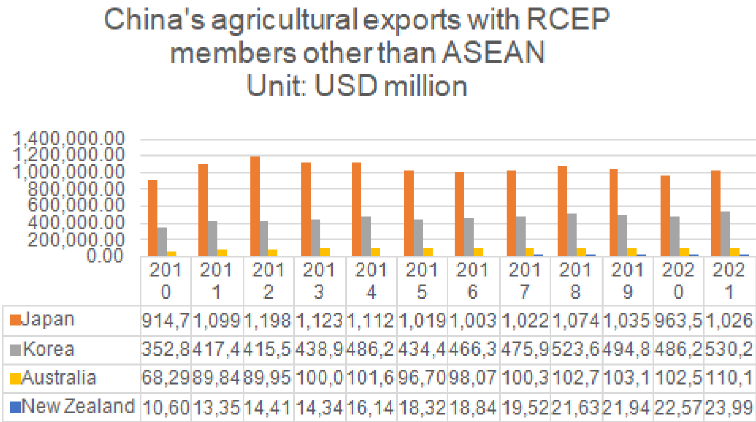
(2) Analysis of trade structure characteristics

China is in a continuous trade deficit in agricultural products, and the import demand for agricultural products is increasing year by year, and the import value of agricultural products will be $219.82 billion by 2021, with a deficit of $135.47 billion; secondly, China mainly exports vegetables and aquatic products, and mainly imports grains, livestock products and edible oilseeds. Then, when the import scale of most of China's agricultural products is much larger than the export scale, it may bring import impact on the domestic supply of agricultural products such as grain, beverages and tobacco, oil and grease, intensifying the structural contradiction between domestic supply, storage and import and export of China's agricultural products, which in turn will lead to safety problems of other agricultural products such as grain.

2.2 Total Analysis of Agricultural Trade between China and other RCEP Member Countries

2.2.1 Import and Export of Agricultural Products between China and RCEP Member Countries Other Than ASEAN

From the data of 2010-2020, Japan and South Korea among RCEP members are in the top position in China's agricultural export trade, while Australia and New Zealand are in the bottom position. As shown in Figure 1, during 2010-2012, China's agricultural exports to Australia, New Zealand, South Korea and Japan showed a very rapid increase, amounting to USD 89,959,993,000, USD 144,142,000, USD 41,556,661,000 and USD 11,981,994,000 respectively in 2012, with the highest agricultural exports to Japan. And in 2012-2015 was a declining trend, but after that slightly increased, but in 2018 and back down, in 2020, agricultural exports to Japan, South Korea, Australia, New Zealand is a significant upward trend, possibly because of the global epidemic, resulting in some force majeure problems in the supply chain and industry chain, and China's prevention and control of the epidemic is better, and the faster resumption of work makes the output of agricultural products China's relatively good prevention and control of the epidemic, and the quicker resumption of work has led to a certain guarantee of agricultural output and thus an increase in exports[6]. In 2021, China's agricultural exports to Australia, New Zealand, South Korea, and Japan were $110,162,000, $239,919,000, $530,205,000, and $10,268,821,000, respectively. China's export trade of agricultural products to overall, between China and the four RCEP member countries except ASEAN, is relatively stable and on an upward trend, while China's agricultural exports to Japan are the largest.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Japan	914,7	1,099	1,198	1,123	1,112	1,019	1,003	1,022	1,074	1,035	963,5	1,026
Korea	352,8	417,4	415,5	438,9	486,2	434,4	466,3	475,9	523,6	494,8	486,2	530,2
Australia	68,29	89,84	89,95	100,0	101,6	96,70	98,07	100,3	102,7	103,1	102,5	110,1
New Zealand	10,60	13,35	14,41	14,34	16,14	18,32	18,84	19,52	21,63	21,94	22,57	23,99

Data source: Based on data from the Ministry of Commerce of the People's Republic of China (URL: http://www.mofcom.gov.cn)

Figure 1: China's agricultural exports with RCEP member countries other than ASEAN

According to Figure 2, it can be seen that from 2010-2014, China's agricultural imports to Australia, New Zealand, Japan and South Korea are a continuous increasing trend, and in 2014, China's agricultural imports were divided into $8,151,326,000, $679,506,000, $551,768,000 and $76,051,000, of which the agricultural products to Australia After a sudden decline in 2015, China's agricultural imports to Australia continue to rise from 2015 to 2019, while after 2019 to 2021, China's agricultural imports to Australia decrease, probably due to the impact of sanctions related to Australia's agricultural exports to China, but imports to New Zealand continue to increase. In 2021, China's agricultural imports to Australia, New Zealand, South Korea, and Japan are $938,469,000, $1,113,344,000, $1,434,521,000, and $1,628,508,000, respectively. Overall, China's agricultural imports to Australia and New Zealand maintain an upward trend, and China's agricultural imports to Japan and South Korea are smaller.

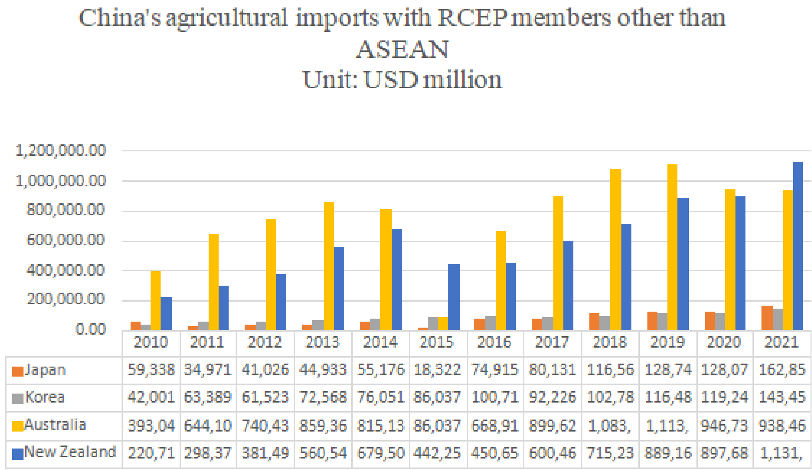


Figure 2: China's agricultural imports with RCEP member countries other than ASEAN

2.2.2 China's Agricultural Trade with ASEAN

As shown in Figure 3 from 2010 to 2021, China's agricultural trade with ASEAN shows a continuous upward trend, including import and export trade. In 2010, the total agricultural trade between China and ASEAN was US$18,166,420,000, of which the total import was US$107,840,300 and the total export was US$7,458,090,000, with a deficit of US$325,039,000. In 2021, China's total agricultural trade with ASEAN is USD 53,025,516.50 million, of which total imports are USD 31,470,606.09 million, total exports are USD 215,490,996 million, and the deficit is USD 992,697.03 million. In 2021, compared to 2010, total trade increased by USD 348,583.753 million, of which total imports In 2021, compared to 2010, total trade increased by USD 348,583,000, of which total imports increased by USD 207,766,000, total exports increased by USD 14,091,087,000, and the trade deficit increased by USD 667,657,000. It is not difficult to conclude that although the trade volume of agricultural products between China and ASEAN is increasing, the import value is always larger than the export value in the trade deficit.

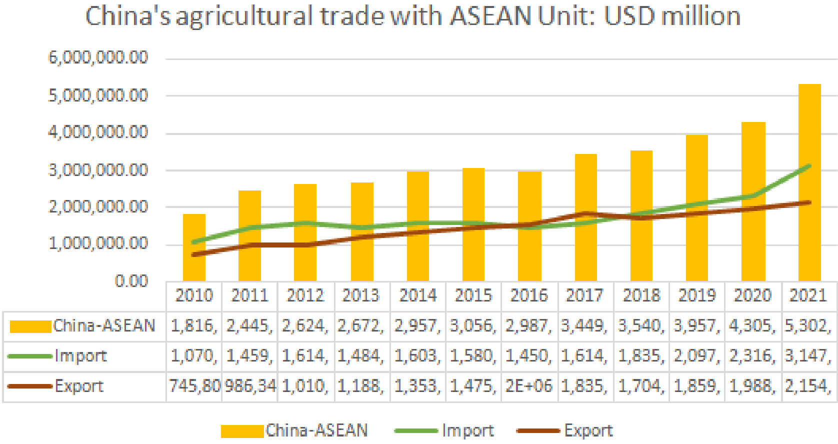


Figure 3: China's trade in agricultural products with ASEAN

To sum up, China exported the most agricultural products to ASEAN in the RCEP region, followed by Japan, and in third place by South Korea; the largest export of agricultural products was from ASEAN, followed by Australia, and in third place by New Zealand. China's total agricultural exports to the 14 member countries of RCEP partners rose from $38.7 billion in 2010 to $93.7 billion in 2021, with a value-added of about $55 billion. Second, due to the U.S.-China trade war in 2018, which led to an increase in China's trade with RCEP member countries, for example, China's agricultural trade with ASEAN rose from $35.4 billion in 2018 to $53 billion in 2021, an increase of nearly $17.6 billion.

3. Empirical Evidence Based on Trade Gravity Model Research

3.1 Data Selection

This paper aims to measure the agricultural trade potential between China and RCEP countries from 2010 to 2020 with the help of the trade gravity model, taking China, Japan, South Korea, Australia, New Zealand and ASEAN as the sample countries[7,8]. The agricultural imports and exports of China to other RCEP countries are obtained from the Ministry of Commerce of the People's Republic of China and the Ministry of Agriculture and Rural Affairs of the People's Republic of China, and the agricultural trade of RCEP countries to the world is obtained from the CEPII database and the WITS database. The distances between the two countries are obtained from the website.wwwwww.geobytes.com (city (distance tool), compiled by taking the distance between Beijing, China and the capital of one of the RCEP countries[9]. The population, GDP and GDP per capita are compiled from the World Bank database (WDI).

3.2 Variable Description

The trade gravity model designed for this study involves six variables with a prediction sign of "+", indicating a positive correlation between the variables and a negative correlation in the opposite direction. The detailed explanation is shown in Table 1 below.

Table 1: Explanatory notes and prediction results of the variables of interest

Variables	Meaning	Prediction Symbols	Explanatory notes
yij	Import and export trade volume.	None	Total import and export of agricultural products between countries and China
GDP-GDPij	GDP of importing and exporting countries i and j.	+	The larger the economy of the importing and exporting country, the greater the supply and demand.
GDP_P	GDP per capita ($/person) in country j, the importing country.	-	The lower the GDP per capita, the greater the trade in agricultural products.
DISTij	denotes the distance between the two capitals in period t.	-	The greater the distance cost, the greater the deterrent effect on bilateral trade.
popij	The population size of the exporting country j.	+	The larger the population, the greater the demand for and supply of agricultural products.

3.3 Model Construction

In this paper, the traditional trade gravity model is reasonably extended to a certain extent, and the distance factor is adjusted by using the international fuel price multiplied by the distance between the two countries by drawing on the previous research methods such as Du Xiaoyan and Lin Qingquan, and the farther the distance between the two countries, the higher the transportation cost, the more unfavorable the trade between the two countries, where Y_{jt} represents China's total exports of agricultural products to country j in period t, while considering the two countries' economic The trade gravity model 1 is proposed by considering the joint influence of the scale of[14]‚[14].

$$ln\, Y_{jt} = c + \beta_1\, ln\, GDP \cdot GDP_{jt} + \beta_2\, ln\, DIST_{jt} + \varepsilon_{jt}(1)$$

The population size of a country affects a country's demand for agricultural products, so the difference in population size will affect the import and export of agricultural products to some extent, denoting population as pop. GDP per capita reflects the average income and standard of living of a country's inhabitants, and since the amount of income affects the proportion of total consumption of agricultural products purchased by them, this will affect a country's supply and demand for agricultural products as well as import and export[12,13]. Therefore, incorporating population and GDP per capita, the trade gravity model 2 is obtained as shown below.

$$ln\, Y_{jt} = c + \beta_1\, ln\, GDP \cdot GDP_{jt} + \beta_2\, ln\, DIST_{jt} + \beta_3 lnpop_{jt} + \beta_4\, ln\, GDP\_P_{jt} + \varepsilon_{jt}(2)$$

In addition, the export volume share (the ratio of the country's agricultural exports to China to the country's total agricultural exports to the world) can affect the trade potential to a certain extent, and can reflect the size of agricultural trade between other RCEP countries and China, which is helpful to measure how much room for development of agricultural trade between China and other RCEP countries[14-16]. By including the percentage of exports in the model, we get the trade gravity model 3.

$$ln\, Y_{jt} = c + \beta_1\, ln\, GDP \cdot GDP_{jt} + \beta_2\, ln\, DIST_{jt} + \beta_3 lnpop_{jt} + \beta_4\, ln\, GDP\_P_{jt} + \beta_5 percent + \varepsilon_{jt}(3)$$

3.4 Data Analysis

3.4.1 Descriptive Statistics

Table 2: Descriptive statistics of variables

Variables	Number of samples	Average value	Standard deviation	Minimum value	Maximum value
lny	55	22.949	0.740	21.326	24.486
lnGDP-GDP	55	57.944	1.169	55.148	59.572
lndist	55	8.221	0.917	6.862	9.309
lnpop	55	17.802	1.657	15.286	20.319
lnGDP_P	55	10.158	0.957	8.111	11.130
percent	55	0.010	0.010	0.001	0.044

As Table 2 showing, the results of descriptive statistics for each variable show that the natural log lny of the explanatory variable of this paper is 22.949, with a standard deviation of 0.740, a minimum value of 21.326, and a maximum value of 24.486. The natural log lnGDP-GDP of the product of the two countries' GDP of the explanatory variable is 57.944, with a standard deviation of 1.169, a minimum value of 55.148, and a maximum value of 59.572. The natural log of distance lndist has a mean of 8.221, a standard deviation of 0.917, a minimum of 6.862 and a maximum of 9.309. The natural log of population lnpop has a mean of 17.802, a standard deviation of 1.657, a minimum of 15.286 and a maximum of 20.319. The natural logarithm of GDP per capita, lnGDP_P, has a mean value of 10.158, a standard deviation of 0.957, a minimum value of 8.111, and a maximum value of 11.130. The mean value of per cent of exports (the ratio of national agricultural exports to China to total national agricultural exports to the world) is 0.010, with a standard deviation of 0.010, a minimum value of 0.001, and a maximum value of 0.001. It can be concluded from the results of descriptive statistics that the volatility of the six variables is relatively small, but it can also be seen that the differences in distance lndist are larger and the differences between countries in lnpop are more obvious.

3.4.2 Correlation Test

As Table 3 showing,this paper further conducts a two-by-two correlation test between the variables and calculates the Pearson correlation coefficient between the variables, which shows that the correlation coefficient between the explanatory variables lny and lnGDP-GDP is as high as 0.6053 and reaches a significance level of 0.1, indicating that the higher the economic scale of GDP between the two countries, the higher their agricultural trade volume is, and the two have a very positive correlation[16,17]. However, the correlation coefficient between lny and lndist did not reach a significant level with a value of -0.0756, indicating a weak negative correlation between distance and agricultural trade volume between the two countries, but it cannot be generalized to the overall. The correlation coefficient between population lnpop and lny is the highest at 0.7990 and reaches a significance level of 0.1, which indicates that population, like GDP, has a highly significant positive correlation with agricultural trade volume. However, GDP per capita and lny have a significant negative correlation, with a correlation coefficient of -0.7180 and a significance level of 0.1, which indicates that the lower the GDP per capita, the greater the agricultural trade volume. The first point is that if a country's GDP per capita is lower, it means that its economic development level is not very high in comparison, and the proportion of its daily consumption in agricultural products may be higher, thus the demand for agricultural products is more; secondly, the lower the GDP per capita is, the more its industrial development favors primary agriculture, and it may produce and export more agricultural products. The correlation between the export share PERCENT and LNY is only -0.0334 and does not reach the significance level, indicating that the export share has no significant effect on China's export share on its trade volume with other variables held constant[18,19].

Table 3: Correlation test of variables

	lny	lnGDP-GDP	lndist	lnpop	lnGDP_P	percent
lny	1					
lnGDP-GDP	0.6053*	1				
lndist	-0.0756	-0.5748*	1			
lnpop	0.7990*	0.8018*	-0.5213*	1		
lnGDP_P	-0.7180*	-0.2449*	0.2	-0.7561*	1	
percent	-0.0334	-0.7000*	0.6196*	-0.5037*	-0.0377	1

3.4.3 Unit Root Test

The results are shown in Table 4.Regression analysis of panel data, first determine whether there is a unit root in each variable and whether it is smooth, this is to avoid the phenomenon of pseudo-regression, the author used three methods such as LLC, ADF and PP for the following five variables unit root test, where the distance lndist is not changing with time, so there is no unit root test for it. The results are as follows, where the original hypothesis of the existence of a unit root was rejected by conducting the test on lny to all 3 test values, which indicates that the lny variable is smooth. The explanatory variables lnGDP-GDP, lnpop, lnGDP_P, and percent also show smoothness. Therefore, none of the variables have unit roots and can be subjected to gravity model regression analysis[20].

Table 4: Unit root test of variables

Method	lny	lnGDP-GDP	lnpop	lnGDP_P	percent
LLC	-3.002 (0.00)	-4.314 (0.00)	-5.440 (0.00)	-2.958 (0.00)	-2.296 (0.01)
ADF	22.093 (0.01)	21.661 (0.02)	33.954 (0.00)	19.284 (0.04)	18.154 (0.05)
PP	59.718 (0.00)	37.939 (0.00)	78.303 (0.00)	23.802 (0.01)	55.255 (0.00)
Conclusion	Smooth and stable	Smooth and stable	Smooth and stable	Smooth and stable	Smooth and stable

Note: Significance is in parentheses

3.4.4 Regression Analysis

Since the logarithm of distance lndist does not change over time among the variables selected in this paper, individual fixed effects regression analysis could not be taken, and random effects regression analysis was selected in this paper. In order to better compare the changes of each variable after adding other variables, three regression models are set up in this paper. firstly, only the effects of economic development scale (lnGDP-GDP) and distance (lndist) on agricultural trade volume (lny) are considered, and gravity model 1 is established. secondly, population scale (lnpop) and GDP per capita (lnGDP_P) to consider their effects on agricultural trade volume. Finally, in model 3, the variable of the proportion of agricultural exports to China to total exports (per cent) is added to see whether the proportion of agricultural exports to China has a pulling effect on its total agricultural trade volume. the regression results of the three models are as follows.

Model 1 fits well and is applicable overall, with an R put of 47.71% and reaching a significance level of 0.01. Among the regression coefficients of the two variables, the regression coefficient of GDP size (lnGDP-GDP) is 0.619 and reaches the significance level of 0.01, indicating that GDP size can significantly boost total agricultural trade, which is consistent with the correlation analysis above, and the hypothesis of this paper that the higher the economic size, the higher the agricultural trade volume is verified. The distance variable lndist did not reach the significance level of 0.1, and its regression coefficient was 0.393, indicating that the effect of distance on the trade volume of agricultural products was not significant for the time being.

Model 2 adds population size lnpop and GDP per capita, and the R-square of the model has a significant increase, reaching 86.15% and also reaching a significance level of 0.01, indicating a better fit of the model. Among the regression coefficients of the variables, the regression coefficient of economic size lnGDP-GDP is still significantly positive with a value of 0.688, which is consistent with model 1. The regression coefficient of Indist is 0.370, and unlike model 1, after controlling for population (lnpop) and GDP per capita, the regression coefficient of distance is highly significant, reaching a significance level of 0.01, indicating that distance can significantly increase the amount of agricultural trade. This is different from the general common knowledge that the further the distance, the smaller the trade volume between two countries is usually considered, mainly due to trade difficulty and cost considerations. However, in the subject of this paper, the import and export of agricultural products tend to be less affected by distance, which is a rigid demand[20]. Secondly, the sample countries and regions selected in this paper are mainly in the Western Pacific region, and Japan, South Korea, and ASEAN, which are close to China, are not significantly higher than Australia and New Zealand, which are farther away, in terms of agricultural products' import and export. For example, the total import and export of agricultural products between Australia and China in 2020 was 10.492 billion, while Korea, which is closer, was only 6.055 billion, and Japan was not significantly higher than Australia at 10.916 billion. Thus, in terms of agricultural products, a relatively specific trade good, distance does not play a negative role as it does for other trade goods, but instead has a greater trade volume of agricultural products because it is not part of the mountainous region of East Asia. The effect of the variable population lnpop did not reach significance, but GDP per capita was significantly negative with a value of -0.714 and reached a significance level of 0.01, indicating that the lower the GDP per capita, the higher the trade volume of agricultural products, which is consistent with the correlation test above[21].

In Model 3, the variable PERCENT of agricultural exports to China as a percentage of agricultural exports to the world is added. The model fit is further improved, with an R-squared of 92.55% and reaching a significance level of 0.01. The regression coefficients of each variable, lnGDP-GDP and lndist, are still significantly positive, while Lnpop changes from insignificant to significant in model 3 with a value of 0.314 and reaches the significance level of 0.05, indicating that population size has a positive effect on agricultural trade volume, which is significant after controlling for the effect of the percent variable. The hypothesis of this paper that trade volume of agricultural products is significantly and positively related to population size is verified. The regression coefficient of the Percent variable is significantly positive with a value of 36.535 and reaches the significance level of 0.01, indicating that for the major economies in the Western Pacific, the share of agricultural trade to China The share of agricultural exports is significant in pulling up the total agricultural trade between the two countries.

The results are shown in Table 5.The results of the three gravity models show that the scale of economic development, population and the share of exports to China have significant positive effects on the trade volume of agricultural products between each country or economy and China, while the effect of distance is equally positive, which differs from common sense and reflects the characteristics of agricultural products that are different from other trade commodities.

Table 5: Regression results of each gravity model

	Model 1	Model 2	Model 3
lnGDP-GDP	0.619*** (6.140)	0.688*** (4.820)	0.353*** (2.930)
lndist	0.393 (1.070)	0.370*** (4.130)	0.251*** (5.900)
lnpop		-0.237 (-1.400)	0.314** (2.140)
lnGDP_P		-0.714*** (-3.730)	-0.071 (-0.440)
percent			36.535*** (6.420)
Constants	-16.165** (-2.280)	-8.510* (-1.790)	-4.819 (-1.420)
R-side	47.71%	86.15%	92.55%
Wald chi2	37.73	127.17	608.97
Prob.	0.000	0.000	0.000

Note: *, **, *** indicate significant at the 0.1, 0.05, and 0.01 levels, respectively; t-values are in parentheses.

3.4.5 Trade Potential Estimation

After establishing the agricultural trade gravity model, this paper further measured the trade potential of each country. Firstly, the theoretical value of the total import and export of agricultural products from each country's economy to China is measured by the above model3, and the trade potential index is obtained by comparing the actual value with the theoretical value. Generally speaking, when the value is less than 0.8, it indicates that the development potential of trade between the two countries is high and there is much room for trade to be explored. When the value is between 0.8 and 1.2, it indicates that the scale of trade is appropriate and there is certainly some room for development. When the value is above 1.2, it indicates that the trade scale is excessive and the trade potential has been fully exploited. This paper presents the results of the agricultural trade potential index between countries and China for the most recent year 2020, as shown in Table 6 below.

Table 6: Countries' Agricultural Trade Potential Index with China

Annual	Country / Region	Actual trade value	Measured trade value	Trade Potential Index
2020	Australia	10,492 million	8,848 million	1.19
2020	ASEAN	43.50 billion	392.39 billion	1.10
2020	Korea	6,055 million	6,019 million	1.01
2020	New Zealand	9,203 million	10,986 million	0.84
2020	Japan	10.916 billion	134.03 billion	0.81

From the results, it can be seen that Australia has the highest agricultural trade potential index with China at 1.19, and the agricultural trade potential between the two countries has been almost fully explored. In recent years, China and Australia have complemented each other in agricultural products, and Australia has a large land area but a small population, but its agricultural products but high output, and the scale of trade with China has been increasing. In contrast, ASEAN and Korea's agricultural trade potential index with China is 1.10 and 1.01 respectively, which are at a moderate stage and still have some room for improvement. ASEAN and South Korea, as East Asian Southeast Asian countries and regions close to China, also have a large scale of agricultural trade with China, but they can still further explore their potential. New Zealand and Japan's agricultural trade potential index with China is relatively low, at 0.84 and 0.81 respectively, which is higher than 0.8, but there is more room for improvement compared with Australia, ASEAN and Korea. Both countries are still able to achieve a higher scale of agricultural trade with China in terms of population and GDP, and thus have great potential.

4. Conclusions and Recommendations

4.1 Research Findings

This paper has clarified that the signing of RCEP will be of great practical significance to the development of China, RCEP member countries and even the global economy by sorting out the main contents and significance of RCEP. The analysis is based on China's import and export trade of agricultural products from 2010 to 2020 and data related to China's agricultural trade with 14 other RCEP member countries. In agricultural trade, China mainly exports vegetables and aquatic products, and mainly imports cereals, livestock products, and edible oil seeds; China exports the most agricultural products to ASEAN in the RCEP region, followed by Japan and South Korea; the largest scale of agricultural exports is from ASEAN, followed by Australia and New Zealand. Secondly, according to the results of the three trade gravity models constructed, it is found that the scale of economic development, population and the share of exports to China have significant positive effects on the trade volume of agricultural products between each country or economy and China, while the effect of distance is also positive, which is different from common sense and reflects the characteristics of agricultural products that are different from other trade commodities. Finally, the measurement of trade gravity shows that China has the highest agricultural trade potential index with Australia, and the agricultural trade potential between the two countries has been almost fully exploited. China's agricultural trade potential index with ASEAN and South Korea is at a moderate level, and there is still some room for trade development, while China's agricultural trade potential index with New Zealand and Japan is relatively low, and there is more room for trade development compared with Australia, ASEAN and South Korea. In short, the agricultural trade market and potential to be explored by China and RCEP member countries are huge, and there is still a huge room for growth in the future.

4.2 Policy Recommendations

Based on the results of the author's previous analysis and predictions, the following three feasible suggestions are proposed for possible realization.

First of all, the member countries should do a good job of coordination and cooperation to accelerate the implementation process of the RCEP agreement, trade in agricultural products should be given more weight in the negotiations, especially in reducing trade and non-trade barriers related to agricultural products to make efforts. For the rules of RCEP, China and other member countries should consciously comply with them, continue to maintain the openness of the market, maintain good economic and trade relations and "China should actively and effectively combine the "Belt and Road" strategy on the basis of the RCEP agreement to strengthen the infrastructure construction with countries along the route China should accelerate the interconnection of China-Thailand Railway, China-Laos Railway, China-Myanmar Railway and Trans-Asian Railway to reduce the impact of trade costs on the efficiency of agricultural trade."[15] At the same time, China should seize the opportunity of the "21" and "21" to develop its agricultural products. At the same time, China should seize the opportunity of "21st Century Maritime Silk Road" to increase more transportation channels and improve the construction of ports to upgrade the logistics system, so that RCEP countries can be interconnected and contribute to the sustainable development of agricultural trade. The project will contribute to the sustainable development of agricultural trade.

Second, pay attention to the differences in agricultural trade among RCEP countries. For countries with higher efficiency but lower potential in agricultural imports with China, such as Vietnam and Indonesia, the application of digital trade can be promoted on the basis of existing trade; for countries with relatively lower efficiency but higher potential in agricultural imports with China, such as New Zealand and Singapore, agricultural import trade can be further promoted through trade policies and negotiations. At the same time, China should strengthen cooperation with countries with high export efficiency while promoting the growth of trade volume, and also pay special attention to countries with low trade efficiency but high trade potential to increase the development of agricultural markets of member countries. For example, the trade efficiency and potential of agricultural products between China and Japan and South Korea are larger than those of other countries, so we should accelerate the construction of China-Japan-Korea FTA to improve the smooth flow of trade, reduce unnecessary costs and improve the efficiency of transactions. For countries with low agricultural trade efficiency but high trade potential with China, such as Cambodia, Laos and Myanmar, we should further strengthen bilateral trade cooperation by making full use of sea, land and air transportation and geographical advantages to create a freer and more convenient trade environment, and work to gradually open up the trade markets of these member countries. We also aim to open up the trade markets of these member countries.

Finally, increase government support to promote agricultural research and development. One of the reasons for the inefficiency of our agricultural export trade is that countries have set up to higher protection for the agricultural sector. On the one hand, they have set up higher entry thresholds making our agricultural products in the export of greater barriers; on the other hand, the member countries through subsidies, export tax rebates and other ways to encourage domestic exports of agricultural products, making our agricultural products less competitive. Therefore, China should take into account the actual situation and, under the premise of complying with trade rules, increase financial support for the agricultural sector, promote the development of research projects and improve mechanization in the agricultural sector, so as to increase agricultural productivity. We should further increase financial and fiscal support for agricultural science and technology cooperation between China and RCEP member countries, set up special funds for agricultural science and technology cooperation, coordinate the direction of support for agricultural science and technology cooperation between the central and local governments, and carry out diversified personnel training through the establishment of joint-lease platforms. The government should also coordinate the direction of support from the central and local governments for agricultural science and technology cooperation, and carry out diversified personnel training by establishing joint platforms.

References

[1] Li M, Yu Y, Xu Yueyan et al. Efficiency and potential of China's agricultural trade export to RCEP member countries--an analysis based on stochastic frontier gravity model. World Agriculture, 2021(08):33-43+68+119.

[2] Sun Lifang. Research on the competitiveness of China's agricultural exports to RCEP and its influencing factors. Guangdong: Guangdong University of Foreign Studies, 2019.

[3] Ding Li. "Study on the Impact of Regional Comprehensive Economic Partnership Agreement on China's Agricultural Economy. Ningxia: Ningxia University, 2021.

[4] Cheng Yunjie, Liu Xian. Study on the efficiency and potential of agricultural import trade between China and RCEP countries. China Agricultural Resources and Zoning: 1-12[2022-03-09].

[5] Liu Yizhuo, Kong Weisheng, Wang Dan. The impact of RCEP on China's agricultural trade and investment and countermeasures. China Foreign Investment, 2021 (01):50-52.

[6] Zheng J, Wang Xue-Mei. Agricultural trade potential and influencing factors of RCEP member countries-an empirical analysis based on stochastic frontier gravity model. Xinjiang Agricultural Reclamation Economy, 2019 (08): 28-36+64.

[7] Chen Yusheng, Wang Yanmei. A study on the structure, efficiency and influencing factors of agricultural trade between China and RCEP member countries--an empirical analysis based on product segmentation. World Agriculture, 2021 (12): 72-83+106+128.

[8] Feng Zongxian, Li Cheng. Analysis of China's competitive advantages and drivers of agricultural exports in the context of RCEP. Journal of Xi'an Jiaotong University (Social Science Edition): 1-17 [2022-03-09]. DOI:10.15896/j.xjtuskxb.202202006.

[9] Flach Lisandra, Hildenbrand Hannah Maria, Teti Feodora. The Regional Comprehensive Economic Partnership Agreement and Its Expected Effects on World Trade. Intereconomics, 2021, 56(2).

[10] Uttama Nathapornpan Piyaareekul. International Investment Agreements Provisions and Foreign Direct Investment Flows in the Regional Comprehensive Economic Partnership Region. Economies, 2021, 9(1).

[11] Qiao Cuixia, Wang Xiaocheng, Serenity Bo. Agricultural rules under RCEP framework: opportunities and challenges. Learning and Exploration, 2021(09): 98-106.

[12] Ge M, Gao YD. Study on the fluctuation factors of China's agricultural exports to RCEP. Statistics and Information Forum, 2021, 36(07): 41-51.

[13] Du Xiaoyan. An empirical study on China's agricultural export trade potential to RCEP countries. Jiangxi Social Science, 2021, 41(08): 50-59+254-255.

[14] Lin, Qingquan, Zheng Yi, Yu Jianhui. A study on the competitiveness and complementarity of agricultural trade between China and other RCEP member countries. Asia-Pacific Economy, 2021 (01): 75-81+151.

[15] Xia Wenhao, Zhang Yizhuo. RCEP and agricultural trade expansion and efficiency improvement. World Agriculture, 2021(10): 70-80+127-128.

[16] Liu Y. The impact of RCEP on the development of agricultural trade between China and Japan. Hebei Enterprise, 2021 (05): 27-28.

[17] Tong Tong. Vietnam: RCEP is good for agricultural exports. China Fruit Industry Information, 2021, 38(03): 40.

[18] Hoang Thien Trang. Study on the factors influencing intra-industry trade of agricultural products between Vietnam and RCEP member countries. Hubei: Huazhong Normal University, 2021.

[19] Zhang Lichen, Wang Yanqing, Guo Liping. The impact of RCEP on China's agricultural development and the

analysis of opportunities for the development of agricultural industry in our province. Heilongjiang Grain, 2020(12): 31-33.
[20] Li, Jiamin, He Wei. Comparison of international competitiveness of agricultural products between China and RCEP member countries. Agricultural Outlook, 2021, 17(08): 172-177.
[21] Qiu Shuqin, Wang Yanqing. Effectiveness, problems and countermeasures of China-ASEAN agricultural science and technology cooperation under RCEP framework. "One Belt and One Road" and China-ASEAN Cooperation and Development Research. 2021(00): 42-51.