

The Trade Effects of Free Trade Agreement between China and Costa Rica

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Abstract—From the perspective of China, using the combination of theoretical analysis and empirical analysis, the trade effects of China-Costa Rica Free Trade Agreement(CCRFTA) were analyzed from panel data of China and Costa Rica in 2002-2016 and 133 other countries in the world. On the basis of the Gravity Model of Trade, the empirical analysis was carried out, The import and export effect of the FTA was analyzed. The empirical results show that CCRFTA were promoted the import and export between China and Costa Rica. The establishment of the CCRFTA not only promoted China's imports to Costa Rica, but also increased China's exports from Costa Rica, and the export effect was better than the import effect.

Keywords—CCRFTA, Trade Effect, Gravity Model of Trade

I. INTRODUCTION

CCRFTA was signed in April 2010 and officially came into effect in August 2011. The China-Georgia Free Trade Agreement is the first package of free trade agreements signed between China and Central American countries and is a new milestone in the history of the development of bilateral relations. We analyzes the impact of the establishment of the FTA on the import and export trade between the two countries through quantitative and qualitative analysis and construction of corresponding models. The second part is the trade status of CCRFTA. The third part is the empirical analysis of CCRFTA. Four is results and five is conclusions and recommendations.

II. TRADE STATUS

Costa Rica is China's important partner in Central America. In recent years, cooperation in the fields of bilateral trade, investment, and contracted labor has been steadily moving forward. According to China Customs statistics, the bilateral trade between China and Colombia reached 3.18 billion U.S. dollars in 2009. At present, Costa Rica is China's ninth largest trading partner in Latin America, and China has become the world's second largest trading partner after the United States. The trade situation of the two in the past 10 years is shown in Table I below:

TABLE I. CHANGE OF TRADE SCALE UNIT:HUNDRED MILLION U.S. DOLLARS;%

year	import	Growth rate	export	Growth rate	Total trade	Growth rate	Trade balance
2007	23.07	1.23	5.68	19.43	28.75	0.12	-17.39
2008	22.71	-1.56	6.19	8.98	28.7	-0.173	-16.52
2009	26.46	16.51	5.38	-13.08	31.84	10.94	-21.08
2010	31.07	17.42	6.88	27.88	37.95	19.18	-24.19
2011	38.44	23.72	8.85	28.63	47.29	24.61	-29.59
2012	52.70	37.10	9.02	2.26	61.72	30.51	-43.68
2013	47.58	-9.71	9.27	2.77	56.85	-7.89	-38.31
2014	41.86	-12.02	11.10	19.74	52.96	-6.84	-30.76
2015	8.26	-80.27	13.31	19.91	21.57	-59.27	5.05
2016	6.97	-15.61	14.95	12.32	21.92	1.62	7.98

Data Sources: UN Comtrade database

As can be seen from the above table, China's exports to Costa Rica have maintained a trend of growth, except for a slight decrease in the financial crisis in 2009. After the implementation of the CCRFTA, in 2011 by 2010. The US\$688 million increased to US\$885 million, and the export volume in the next few years also showed an increasing trend, which was not affected by the 2008 financial crisis. In addition to the increasing trend of China's imports to Costa Rica from 2009 to 2012, the rest of the years showed a downward trend. Among them, the impact of the financial crisis in 2008 has decreased. In 2015, it has plummeted because of Costa Rica. Insufficient production capacity can not meet China's import demand. China's import growth rate to Costa Rica showed a high positive growth in the two or three years after the implementation of the FTA in China, but after 2013, there was a large negative growth; while the export growth rate was negative except 2009, the remaining years. Both show positive growth in addition to increasing.

From 2007 to 2012, China's total import and export volume to Costa Rica showed an overall upward trend, with a decline from 2013 to 2016, and the most significant decline in 2015. From the perspective of trade volume, the trade volume between China and Colombia is small, but Costa Rica is an important partner of China in Central America, and trade between the two sides is also crucial.

From the perspective of the trade balance, China has consistently been in an unfavorable situation during the past 10 years and has maintained a deficit throughout the year. In 2012, the deficit was \$4.368 billion, more than twice as much as in 2008.

Since 2013, the trade deficit has shown a decreasing trend, but the reduction is not very large. In 2015, the trade deficit has maintained a positive growth.

III. EMPIRICAL

A. Model

This paper mainly uses the gravity model to analyze the trade effect of FTA on the import and export of member countries. This paper uses the “single country model” of gravity model and the panel data to analyze the impact of CCRFTA on the import and export. Tinbergen (1962) and Poyhonen (1963) developed and extended its economics field, and proposed a relatively complete and simple economic model-gravitational model. This model argues that the individual trade flows between the two economies are directly proportional to their respective economies of scale (generally expressed in terms of GDP) and inversely proportional to the distance between them. An important feature of the gravity model is that its basic form remains the same, and the gravitational model can be applied to different problems as long as appropriate changes are made to the definition of parameters and components. Researchers can start with the basic model and estimate its parameters. The simplified form of the usual gravity model is:

$$T_{ij} = A(Y_i * Y_j) / D_{ij} \quad (1)$$

The logarithmic linear form after conversion is:

$$\ln T_{ij} = \beta_0 + \beta_1 \ln Y_i Y_j + \beta_2 \ln D_{ij} + \mu \quad (2)$$

Among them T_{ij} is the total bilateral trade; Y_j is the GDP of the country i and j respectively; D_{ij} is the distance between the country i and the country j . The distance mentioned here is not limited to geographical distance, but also includes cultural gap, transportation cost and transaction cost; A is the proportionality constant and μ is the random error term.

This paper applies the gravity model to analyze the impact of the construction of bilateral FTA on the import and export between China and trading partners. Since the population of the two countries will also have a certain effect on it, it is necessary to increase the explanatory variables that reflect the demographic factors. In the previous studies, some introduced the population of the two countries, and some introduced the per capita GDP of the two countries. In order to avoid the problem of multiple collinearity, this paper will introduce the population of the two countries in the explanatory variables, using and respectively. At the same time, the virtual variable FTA is set to distinguish between countries that have established free trade zones with China and those that have not established free trade zones with China. FTA=1 indicates that the country has established a free trade agreement with China, and FTA=0 means that the country has not establish a free trade agreement with China. Then the formula for the final gravitativity model is:

$$\ln T_{ij} = \beta_0 + \beta_1 \ln Y_i Y_j + \beta_2 \ln P_i P_j + \beta_3 \ln D_{ij} + \beta_4 FTA + \mu \quad (3)$$

B. Sample selection and data source

The sample involved in the article consists of 133 countries, of which other FTA partners in China other than Costa Rica have been excluded. The data needed for empirical analysis include China's exports to sample countries, imports, GDP and population of China and sample countries. Quantity, distance between the two countries. These sources of these data are as follows:

T_{ij} : Import and export volume: UNCTAD's international trade database (UN COMTRADE DATABASE), in US dollars, and based on 2015, the import and export volume is converted into actual value to eliminate the impact of inflation and improve the measurement. accuracy.

Y_i, Y_j : Total GDP in China and sample countries: GDP in the World Bank's public data (current US dollars), in US dollars.

P_i, P_j : Population size in China and sample countries and: Total population in the World Bank public data, in human terms.

D_{ij} : Distance between China and the sample countries: Cepii Database, the distance between China and the sample country capital, in kilometers.

IV. RESULTS

We take the import and export volume of China to the sample countries as the explanatory variables, and use the panel version from 2002 to 2016 to perform the mixed model regression on the above data with stata14.0, and draw the following conclusions.

TABLE II. IMPORT EFFECT OF CCRFTA

variable	(1)	(2)
FTA	0.165** (0.60)	0.705*** (2.85)
LN $Y_i Y_j$	0.388*** (4.64)	0.132** (2.95)
LN $P_i P_j$	0.366*** (3.52)	
LND ij	-1.588*** (-9.78)	-1.906*** (-13.08)
Number of samples	133	133
Adjusted R2	0.794	0.761
F-Statistic	72.35	79.56
Prob (F-statistic)	0.001	0.000
_cons	31.617	33.762

Note: The coefficients in the above table are the coefficients of each variable, and the values in the brackets are T values, where *, **, and *** indicate the significance test at the level of 10%, 5%, and 1%, respectively.

In the above table, column (1) represents the mixed regression model estimation (Pooled OLS), column (2) is the result of the mixed regression, fixed-time model and double fixed model regression of the removed population. According to the data in the table, China is the sample country. The import volume is positively correlated with the product of the two countries' GDP, and is negatively correlated with the distance between the two countries, consistent with the conclusions of the basic gravity model. The product of the population of China and the sample countries, whether or not to establish FTA, has an obvious impact on China's import of sample countries. Specifically, the effect of each explanatory variable on China's imports is as follows:

The GDP product of China and the sample countries has a significant positive impact on China's imports, and the GDP of the two countries has grown.

TABLE III. EXPORT EFFECT OF CCRFTA

Variable	(1)	(2)
FTA	0.660*** (3.56)	0.591*** (3.14)
LN $Y_i Y_j$	0.728*** (14.64)	0.790*** (18.75)
LN $P_i P_j$	0.142** (2.22)	
LND ij	-1.318*** (-12.99)	-1.156*** (-15.96)
Number of samples	133	133
Adjusted R2	0.911	0.907
F-Statistic	192.13	241.26
Prob (F-statistic)	0.000	0.000
_cons	-7.993	-7.512

Note: The coefficients in the above table are the coefficients of each variable, and the values in the brackets are T values, where *, **, and *** indicate the significance test at the level of 10%, 5%, and 1%, respectively.

Column (1) indicates general mixed regression, and column (2) results obtained by regression. As can be seen from the above table, in terms of exports, the coefficient of FTA is significantly positive, conforming to the general form of gravity model, and the coefficients of other variables are also It conforms to the general form of the gravitational model and passes the significance test. According to the data in the table, China's exports to the sample countries are positively correlated with the product of the two countries' GDP, and are negatively correlated with the distance between the two countries, consistent with the conclusions of the basic gravity model. The product of the population of China and the sample countries, whether or not to establish FTA, has an obvious impact on China's exports to sample countries. Specifically, the effects of the explanatory variables on China's exports are as follows:

The GDP product of China and the sample countries has a significant positive impact on China's exports, and the GDP of the two countries has grown 1%, China's imports to sample countries will increase by 0.728%. The impact of the population of the two countries on it is also positive, but the degree of product is lower than the GDP of the two countries. The population of the two countries has increased by 1%, and the import volume has only increased by 0.142%. The distance between the two countries is negatively correlated with China's imports. The distance between the two countries is 1%, and the export volume is reduced by 1.318%. Similarly, the impact of establishing a free trade zone on China's exports is also significantly positive. Under the same conditions, when China and the sample country establish a free trade zone, China's imports to the country and exports when the free trade zone is not established. The amount is 0.66% higher.

V. CONCLUSIONS

After empirical analysis and testing, the paper draws the following conclusions: (1) China and the United States FTA have a certain impact on China's import and export trade volume, and the impact on China's exports to Costa Rica is more significant; (2) the overall promotion of the FTA strategy China's trade with FTA partner countries can alleviate China's deficit to a certain extent; (3) FTA's export promotion effect has a certain time lag; (4) FTA strategy helps to improve China's foreign trade enterprises at the international level. The international competitiveness of the market, the full implementation of the "going out" strategy, on the other hand, can accelerate the promotion of China's economic system reform, give full play to the decisive role of the market in the process of resource allocation.

Based on the new normal of domestic economic development at the present stage and the general trend of global economic globalization, the development of China's FTA strategy needs to pay attention to several aspects: (1) further reducing tariffs and increasing trade between China and Colombia; (2) China It is necessary to actively develop high-tech industries, complete industrial restructuring, and gradually get rid of the situation of deficit in national trade; (3) further expand the FTA strategy, actively seek suitable FTA partners, and at the same time, attach importance to the economic structure and competition between China and partner countries. To facilitate the formation of an FTA cooperation program that is beneficial to China, and to pay more attention to the economic benefits of FTA to China; (4) Closely contact China's "One Belt, One Road" initiative, and use good opportunities to seek new FTA breakthroughs, prioritize and adapt The FTA is established along the Belt and Road countries. (5) Promote unified China FTA trade rules and standards, build a new model of development-oriented FTA that is mutually beneficial and win-win, and inject more Chinese elements into the formation and development of a new international economic order.

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