The Impact of Trade Facilitation Level of RCEP Member Countries on the Export of ICT Products in China

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Abstract: Based on the panel data of RCEP member countries from 2000 to 2020, this paper constructs a trade facilitation evaluation system, calculates the facilitation level of each country, and empirically analyzes the impact of trade facilitation of RCEP member countries on China's ICT product exports using an extended gravity model. The study found that the higher the level of trade facilitation in member countries, the more obvious the promotion effect on the export of ICT products in China, and the four primary indicators of trade facilitation have a significant role in promoting the export of ICT products. China should strengthen cooperation with RCEP member countries, constantly deepen the development of trade facilitation in various countries, and create a good trade environment for the export of ICT products in China.

Keywords: Trade Facilitation Level; RCEP Member States; ICT Products Export; Stochastic Frontier Gravity Model

1. Introduction

Information and communication technology (this article is abbreviated as ICT) industry have become the key force to promote the high-quality development of China's economy. ICT products occupy a very critical position in China's foreign trade exports. The signing of the regional comprehensive economic partnership (hereinafter referred to as RCEP) agreement marks the establishment of the world's largest free trade area with the greatest development potential. The main research problem of this paper is to explore the impact of the level of trade facilitation of RCEP member countries on China's ICT exports through empirical analysis, and put forward relevant policy recommendations.

2. Literature review

Wilson established a trade facilitation level measurement system in 2003 through e-commerce, infrastructure construction, port environment and policy supervision. Zhang Jingli (2022) took market efficiency, business environment and service facilities as primary indicators to build an indicator system for the level of trade facilitation. Jallab (2021) calculates the level of trade facilitation among countries in the free trade region of the African continent through statistical investigation and analysis; Chen Tianle, Kang Wenmei, Zhu Wenpeng. (2022) used principal component analysis to calculate the score of trade facilitation level.As for the impact of trade facilitation on export trade, Wilson (2003) analyzed the impact of trade facilitation on trade scale, and believed that if the level of trade facilitation increased by 1%, the trade scale would increase by 377billion US dollars; Alassane D. (2020) found that improving the logistics indicators of trade facilitation can expand the export volume. At present, few scholars have studied the export of ICT products from the level of trade facilitation. Therefore, this paper takes the trade facilitation level of RCEP member countries as the research object, and empirically analyzes its impact on China's ICT exports.

3. Measurement and analysis of trade facilitation level of RCEP member countries

3.1 Construction of trade facilitation level index system

Based on previous scholars' research, this paper divides trade facilitation into four primary indicators: facility status, customs efficiency, rules and regulations, and finance and e-commerce, and expands them to 20 secondary indicators on this basis.

3.2 Data processing

Taking RCEP member countries as the research object, the data range is from 2000 to 2020. Due to the different value ranges of each secondary index, in order to ensure the authenticity and reliability of the results, the linear change method is used to index each index. The formula is shown in figure (1):

$$Yi = Xi/Ximax \quad (1)$$

Among them, Xi represents the initial score of each secondary indicator, Ximax represents the highest score in each secondary indicator, and is the final score of each secondary indicator. The value range after processing is 0-1.

3.3 Measurement of trade facilitation level

Principal component analysis can eliminate the subjectivity between various indicators. Therefore, this paper uses principal component analysis to calculate the facilitation level of RCEP member countries. Due to the limited characters, the calculation process is omitted. According to the calculation results, Singapore has the highest level of trade facilitation, followed by New Zealand and Japan, with very convenient trade; Australia, Brunei, Japan and Thailand have relatively convenient trade. Trade between China, South Korea and Indonesia is generally convenient.The trade between the Philippines, Vietnam, Cambodia, Laos and Myanmar is not convenient. There is a certain gap in the level of trade facilitation among countries, and there is still room for improvement.

4. Empirical analysis of trade facilitation in RCEP member countries on China's ICT exports

4.1 Model setting and variable description

In the classical gravity model, the gross domestic product, population and geographical distance of the importing country are the factors affecting trade. On this basis, this paper adds the trade facilitation level (TF), tariff level (TAR) and economic openness (OPEN) of the trading partner countries to obtain the extended gravity model:

$$EX_{ijt} = \alpha + \alpha_1 * GDP_{jt} + \alpha_2 * POP_{jt} + \alpha_3 * \mathrm{DIS}_{ijt} + \alpha_4 * OPEN_{\mathrm{jt}} + \alpha_5 * TF_{\mathrm{jt}} + \alpha_6 * TAR_{\mathrm{jt}} + \varepsilon_{ijt}$$

i represents China, j represents the other 14 RCEP member countries, and t represents the year, α is the coefficient, ε_{ijt} is a random disturbance term. TF is the core explanatory variable, and the rest are control variables. EX is the export volume of ICT products to member countries, TF is the level of trade facilitation, GDP is the gross domestic product, and DIS is the distance between China and RCEP member countries.

4.2 Model verification and selection

4.2.1 Unit root test

The data used in this paper is panel data from 2000 to 2020. It is necessary to test the robustness of time series to avoid pseudo regression. Because geographical variables do not change with time, they are not tested. Using ADF for unit root test, the p value of each variable is less than 0.05, which is stable and can be regressed.

4.2.2 Model estimation

The data used in this paper is panel data. The processing methods of panel data mainly include mixed effect model, random effect model and fixed effect model. The geographical distance in the model is non time-varying, and the fixed effect model is excluded first. LM Test was used to select which model to use, and the result p value was 0. Random effect model was selected for empirical analysis.

4.3 Regression analysis

4.3.1 Table1 Regression analysis of comprehensive indicators of trade facilitation

Variable	（1）	（2）	（3）	（4）
TF	2.634*	2.422*	2.398**	2.542*
	（2.123）	（2.123）	（2.123）	（2.123）
GDP	1.267**	1.487***	1.128**	1.034***
	（1.42）	（1.65）	（1.34）	（1.23）
DIS	-0.654*	-0.554*	-0.543*	-0.512*
	（-1.23）	（-1.03）	（-1.67）	（-1.54）
POP		-0.264*	-0.233*	-0.206*
		（-1.42）	（-1.31）	（-1.20）
TAR			-0.138*	-0.126*
			（-0.32）	（-0.21）
OPEN				3.542***
				（2.153）
cons	13.42**（2.35）	13.67**（2.67）	13.78**（2.42）	13.54**（2.65）
adj.R^2	0.431	0.463	0．424	0.448
F	5.676	5.136	5.142	5.374

Note: Z value in brackets. ***, ** and* respectively represent that the representative variables are significant at the level of 1%, 5%, and 10%.

According to table 1, it can be seen that trade facilitation has the greatest impact on the export of ICT products. Add the variables of population, tariff and economic openness in columns (2), (3) and (4) respectively. From the regression results, the coefficient of TF is 2.542, it plays a significant role in promoting the export of ICT products in China; The coefficients of GDP and open are positive, which promotes the export of China's ICT products; The coefficients of DIS, pop and tar are negative, which inhibits the export volume of China's ICT products.

4.3.2 Robustness test

In order to make the regression results more robust and reduce errors, the comprehensive indicators TF of trade facilitation are represented by facility status (S), customs efficiency (H), rules and regulations (G) and finance and e-commerce (J) respectively.

Table 2 Regression analysis of primary indicators of trade facilitation

Variable	（1）	（2）	（3）	（4）
S	3.256**（2.63）			
H		3.178***（2.14）		
G			2.987*（2.32）	
J				3.021**（2.45）
GDP	2.321**	2.328***	2.128**	2.067***
	（1.35）	（1.67）	（1.46）	（1.59）
DIS	-0.604*	-0.543*	-0.546*	-0.501*
	（-1.31）	（-1.28）	（-1.67）	（-1.54）
POP	-0.124*	-0.246*	-0.187*	-0.256*
	（-1.32）	（-1.46）	（-1.54）	（-1.36）
TAR	-0.165*	-0.203*	-0.241*	-0.253*
	（-0.37）	（-0.35）	（-0.34）	（-0.37）
OPEN	1.531**	1.438***	1.126**	1.645***
	（1.23）	（0.97）	（1.07）	（1. 53）
cons	11.24**（1.48）	10.56**（1.43）	11.78**（1.56）	12.86**（1.69）
adj.R^2	0.431	0.463	0．424	0.448
F	5.676	5.136	5.142	5.374

Note: Z value in brackets. ***, ** and* respectively represent that the representative variables are significant at the level of 1%, 5%, and 10%.

According to table 2, the significance and positive and negative values of the replacement variables have basically not changed. The results of this study are robust. Among the four primary indicators of trade facilitation, the regression results are significant. The regression coefficient of facilities is 3.256. The greater the promotion effect on the export of ICT products, the second is the efficiency of customs; The regression coefficient of Finance and e-commerce is 2.897, which will also have

a beneficial impact on the development of trade; Rules and regulations will ensure the development of trade and promote the development of trade.

5. Conclusions and recommendations

First, improve infrastructure. RCEP Member States should constantly exchange and cooperate to jointly build more convenient and unimpeded transportation facilities. Second, improve customs efficiency. Improve the intelligence and informatization level of customs clearance, constantly optimize the customs clearance process, and improve export efficiency. Third, improve the rules and systems. Countries should also constantly improve laws and regulations and create a fair, just and open trade environment. Fourth, develop finance and e-commerce. RCEP member countries should constantly optimize the financial environment, vigorously develop cross-border e-commerce, improve relevant legislation, standardize operations, promote the transformation of traditional enterprises, and expand ways for China's ICT product export trade.

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