Research on the Impact of Digital Currency on Cross-Border E-Commerce Under RCEP: Based on Entropy Method and Regression Model

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Abstract. The development of digital technology has changed the socio-economic mode and spawned new forms of foreign trade such as cross-border e-commerce. As the world's largest free trade agreement, the regional comprehensive economic partnership agreement (RCEP) has made many provisions on e-commerce and cross-border e-payment, which has injected new development vitality into the application of digital currency. Digital currency has the characteristics of distributed ledger technology and real-time point-to-point payment. It can overcome the shortcomings of traditional international settlement system, such as long settlement time and high cost. Therefore, the RCEP signing opportunity can be used to build a distributed cross-border payment network of Digital currency and blockchain to further promote the development of cross-border e-commerce. Combined with the application theory of blockchain scenarios, this paper constructs a Digital currency development index system, calculates China's Digital currency development index through entropy method, and uses regression model to analyse the driving effect of Digital currency development on cross-border e-commerce between China and RCEP member states. This paper constructs the Digital currency development index system for the first time, analyses the path relationship between the development of Digital currency and cross-border e-commerce, and provides an evaluation reference system for the development of Digital currency, which is not only conducive to the research on the mechanism relationship between the development of Digital currency and cross-border e-commerce, but also conducive to promoting the innovative development of industrial digitization.

Keywords: RCEP · Digital currency · Cross-Border E-Commerce · Entropy Method · Regression Model

1 Introduction

In recent years, digital technologies represented by big data, cloud computing and blockchain have changed the socio-economic mode and spawned new business forms such as cross-border e-commerce, online services, and remote office. While promoting the development of China's digital economy industry, it also provides a wide range

of payment application scenarios for central bank digital currency (CBDC). CBDC can achieve a high degree of unity between capital flow and information flow, and its point-to-point real-time payment characteristics will play a great role in international settlement [3]. The new cross-border e-commerce development model of "blockchain + cross-border e-commerce" has become an important trend in future development. CBDC can simplify cross-border payment procedures, improve the efficient operation of cross-border e-commerce, and reshape the cross-border e-commerce Ecology (Ding et al., 2020). With the increasingly close trade cooperation between China and countries in the Asia Pacific region, in November 2020, China signed the world's largest free trade agreement, the regional comprehensive economic cooperation partnership agreement (RCEP), with ASEAN, Japan, South Korea, Australia and New Zealand, which officially came into force on January 1, 2022. Since the beginning of COVID-19, the new form of foreign trade, represented by cross-border electricity providers, has played an important role in trade dealings. The RCEP agreement also sets up a special chapter on e-commerce, which lists the specific provisions of cross-border e-payment and promotes the ecological development of multilateral cross-border e-commerce [7].

According to the statistics of ecosoc.com, the scale of China's cross-border e-commerce transactions reached 12.5 trillion yuan in 2020, with a year-on-year increase of 19.04%. The development of cross-border e-commerce will become an important opportunity for China's foreign trade market, orders, and share. RCEP also contains a large number of rules such as tariff reduction and reduction of non-trade barriers to promote trade and economic cooperation among RCEP countries and bring new profit growth points to China's cross-border e-commerce. The cross-border payment in cross-border e-commerce also provides a wide range of application scenarios for. Digital currency. The scale of China's cross-border payment will exceed trillion yuan in 2021, and the cross-border payment in cross-border e-commerce also provides a development stage for Digital currency. According to the statistical report of the people's Bank of China, there are more than 8.0851 million e-CNY pilot scenarios, 261 million personal wallets have been opened, and the transaction amount is 87.565 billion yuan. Under the background of RCEP's entry into force, how to seize the important development trend of "blockchain + cross-border e-commerce" and apply digital currency to the cross-border payment of RCEP Member States has important practical significance for actively utilizing the positive role of industrial digitization and promoting the high-quality development of China's trade.

2   Typical Factual Features

RCEP is the free trade area with the largest global economic volume, population size and total trade volume, and will become China's largest trading partner region. The economic and trade cooperation in RCEP region will promote the development of cross-border payment business, which will also indirectly promote the popularization of CBDC and inject new development impetus into cross-border e-commerce.
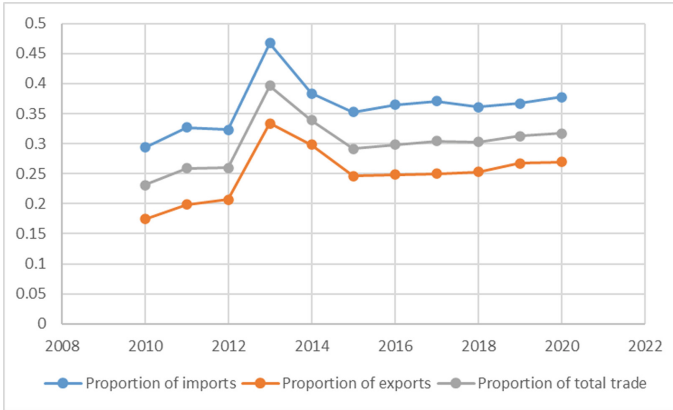
Fig. 1. RCEP's contribution to Global trade.

2.1 RCEP Member Countries Have a Large Volume of Trade and a Diverse Membership Structure

The effective layout of the production network represented by trade can accelerate the international process of a country's currency (Zhang et al., 2021). The huge economic volume and trade scale shown by RCEP provide a development stage for cross-border e-commerce and facilitate the practical application of digital currency (Fig. 1).

To intuitively reflect the contribution of RCEP member countries to Global trade and the volume of trade, the proportion of RCEP countries in the total world trade in goods from 2010 to 2020 is calculated. From 2010 to 2013, the proportion of imports, exports, and total trade volume of RCEP member countries in the global trade volume showed a downward trend, falling to a range near 0.2. However, it rebounded after 2013, and the proportion of exports rose to 0.315 in 2020. The active trade of RCEP member countries not only benefits from the excellent economic volume of member countries, but also lays the foundation for trade development.

According to OECD data, RCEP members cover high-income countries, middle-income countries, and low-income countries. The diversification of national development level helps each member country to make full use of its own comparative advantages, realize trade complementarity and form a mutually beneficial and win-win situation, which is also conducive to the development of cross-border e-commerce platform ecology in RCEP members.

2.2 Cross-Border E-Commerce Cooperation Between China and RCEP Countries is Close

China has long-standing China cooperation with RCEP one belt, one road ahead of the Sino ASEAN cooperation agreement on "10 + 1" free trade agreement. There is also a "one belt" road infrastructure cooperation to deepen cross-border electricity supplier cooperation in RCEP countries. The close trade between the two countries is the basis for

carrying out new business forms of cross-border e-commerce foreign trade, and cross-border e-commerce provides a wide range of scenario applications for digital currency. Therefore, the trade intensity index (TII) proposed by Brown (1947) and Kojima (1958) is used to analyse the trade tightness between China and RCEP member countries, and its formula is expressed as follows:

The close trade between the two countries is the basis for carrying out new business forms of cross-border e-commerce foreign trade, and cross-border e-commerce provides a wide range of applications scenario for CBDC Therefore, referring to the trade intensity index (TII) proposed by Brown (1947) and Kojima (1958) to analyse the trade closeness between China and RCEP members. The formula is expressed as:

$$\text{TII}_{ij} = \frac{X_{ij}/X_i}{M_j/(M_w - M_j)} \tag{1}$$

Among them, X_{ij} represents China's export value to RCEP member j, X_i represents China's total export value, M_j represents the total import value of RCEP member j, and M_w represents the world's total import value. If $\text{TII}_{ij} > 1$, it means that the trade between China and RCEP member j is relatively close; otherwise, it means that the trade is relatively loose. The results are shown in Table 1.

It can be seen from Table 1 that the countries with high trade closeness between China and RCEP member countries are mainly concentrated in developing countries, such as Myanmar, Indonesia, and Thailand and so on, while only developed countries

Table 1. Trade intensity index between China and RCEP Countries.

	2010	2014	2018	2020	average value
Australia	0.98	1.65	0.69	0.80	1.21
Brunei	1.06	4.72	1.32	0.28	2.17
Myanmar	5.25	5.61	1.88	2.23	4.19
Cambodia	2.02	3.28	1.19	1.35	2.49
New Zealand	5.26	8.92	3.40	3.53	6.15
Indonesia	4.58	8.12	2.66	3.20	6.15
Japan	0.54	1.09	0.48	0.55	0.87
Laos	1.37	6.93	0.86	0.95	2.83
Malaysia	0.84	2.28	0.72	0.94	1.48
Philippines	0.35	0.68	0.21	0.17	0.41
Singapore	0.21	0.60	0.33	0.40	0.48
Korea	0.44	0.88	0.31	0.38	0.64
Thailand	0.67	2.68	1.15	1.73	1.82
Vietnam	1.27	3.11	0.58	0.75	1.67
average value	2.26	4.60	1.43	1.57	-

such as New Zealand has high TTI. From the average value over the years, the TTI between China and RCEP member countries is all greater than 1, indicating that China has close trade relations with RCEP member countries. Affected by the "South China Sea issue" and "Sino-US trade frictions", the TTI between China and RCEP member countries declined significantly in 2014 and 2018. However, it has rebounded after 2019. Even under the influence of COVID-19 pandemic, the TTI between China and RCEP member countries will still improve in 2020, reflecting strong trade resilience.
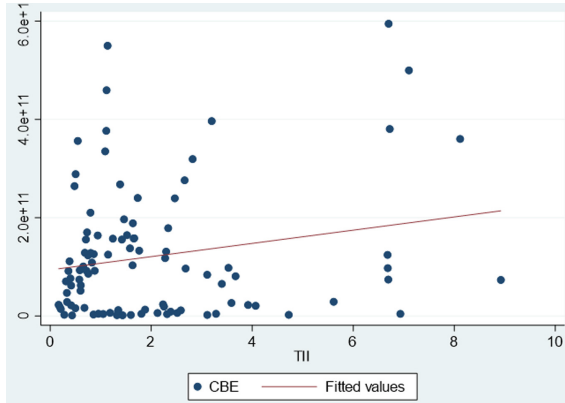
To further explore the cross-border e-commerce transactions between China and RCEP Member States, the current situation of cross-border e-commerce transactions between China and RCEP Member States is analysed. Due to the lack of data on cross-border e-commerce between China and RCEP countries, the cross-border e-commerce transaction scale (CBE) between China and RCEP countries is estimated with reference to the method of Chai et al. (2019). The formula is as follows:

$$CBE_{ij} = TCBE \times \frac{\text{trade}_{ij}}{\text{trade}} \tag{2}$$

Among them, TCBE represents the total scale of cross-border e-commerce transactions in China, trade_{ij} is the total import and export volume between China and RCEP member countries j, and trade is the total import and export volume of China's trade. The data on the scale of cross-border e-commerce transactions in China comes from 100EC. The results are shown in Table 2.

Table 2. Scale of cross-border e-commerce transactions between China and RCEP countries (trillion-yuan RMB).

	2012	2017	2018	2020	average value
Australia	0.597	2.678	1.286	2.102	1.657
Brunei	0.008	0.019	0.016	0.024	0.017
Myanmar	0.034	0.264	0.129	0.236	0.187
Cambodia	0.014	0.114	0.062	0.119	0.071
New Zealand	0.323	1.243	0.652	0.979	0.797
Indonesia	1.608	5.947	2.761	3.965	3.688
Japan	1.252	5.500	2.643	3.562	3.384
Laos	0.008	0.059	0.029	0.044	0.037
Malaysia	0.463	1.887	0.920	1.638	1.264
Philippines	0.047	0.284	0.142	0.226	0.173
Singapore	0.178	1.007	0.469	0.764	0.604
Korea	0.338	1.556	0.703	1.113	0.968
Thailand	0.246	2.394	1.248	2.401	1.410
Vietnam	0.341	1.573	0.741	1.232	0.979
average value	0.390	1.752	0.843	1.315	—

Fig. 2. Fitting trend of cross-border e-commerce transaction volume and trade intensity

From the data results in Table 2, it can be seen from the trend of the annual average that the scale of cross-border e-commerce transactions between China and RCEP is generally fluctuant rising, from 0.390 trillion yuan in 2012 to 1.315 trillion yuan in 2020. In 2017, the scale of cross-border e-commerce transactions between China and RCEP member countries reached a peak of 1.752 trillion yuan in the year under investigation, but it fell to 0.843 trillion yuan in 2018 due to the impact of the "Sino-US trade war". Due to the impact of the epidemic, traditional trade transactions are difficult to carry out under the control of the epidemic, and cross-border e-commerce has the characteristics of non-contact, globalized supply chain, overseas warehouse layout, etc., cross-border e-commerce transactions between China and RCEP member countries in 2020 Compared with the previous year, the scale has increased by 0.281 trillion yuan, and the growth rate is relatively large.

To intuitively reflect the relationship between cross-border e-commerce transaction scale and trade intensity index, a fitting trend chart is drawn. As shown in the Fig. 2.

The high trade tightness between China and RCEP member countries has also indirectly promoted the development of cross-border e-commerce transaction scale and provided a practical basis for the integration of digital currency into cross-border e-commerce platforms.

2.3 The Development of CBDC Has Made Steady Progress

China has been planning the research and development of digital currency since 2014 and set up a digital currency Research Institute in 2016. The pilot implementation of digital RMB was carried out in April 2020, and the cross-border payment mode of digital RMB was explored. The pilot was carried out in Qianhai Free Trade Zone in September. In February 2022, digital RMB was applied to the Winter Olympics, breaking Visa's monopoly on payment services for the Olympic Games for 36 years.

At present, there is a lack of literature on the construction of index system for the development of digital currency, but we can find relevant indicators from the theoretical

literature of digital currency. The development of CBDC requires four conditions: R & D, social acceptance, infrastructure and use basis [5, 8].

The level of digital currency R & D capability determines that digital currency can be implemented into the social economy. The higher the digital currency R & D capability, the faster the digital currency can be applied. The research and development ability of digital currency can be investigated from two aspects: one is investment, and the other is research and development results. Due to the lack of data, the R & D investment of digital currency is measured by the internal R & D expenditure, and the R & D results are measured by the number of digital currency patents.

The degree of social acceptance of digital money can directly reflect the degree of implementation of digital money in society. The social acceptance of digital currency is investigated by digital currency e-wallet, the number of digital currency pilot projects and the transaction scale of digital currency. However, since digital currency is officially implemented in 2020, the data year is relatively short. Therefore, it is measured by the amount of blockchain investment and the number of new blockchain enterprises.

Good infrastructure can quickly integrate digital currency into socio-economic mode. Digital currency is essentially a derivative of digital economy. Therefore, the relevant infrastructure of digital economy is used for investigation. Measure the length of optical cable line, the number of Internet ports and Internet penetration respectively.

The use of digital currency is also based on online transactions. Therefore, the more popular the current online trading mode is, the easier it is to trade digital currency in the socio-economic mode. This paper measures the scale of e-payment, e-commerce sales, digital inclusive financial index, and the utilization rate of online payment. Specifically, the index system is as in Table 3.

Table 3. Digital currency development index system.

Primary index	Secondary index	Tertiary indicators
Digital currency development indicators	Digital currency R&D capability	Digital currency patent
		R&D internal expenditure
	Digital currency acceptance	Blockchain investment
		Number of new blockchain enterprises registered
	Digital currency infrastructure	Optical cable line length
		Internet port
		Internet penetration
	Basis of digital currency use	Electronic payment scale
		E-commerce sales
		Digital inclusive financial index
		Utilization rate of online payment

Because the index system has multidimensional characteristics, it needs to be processed by dimension reduction method. There are few data samples in this paper, so it is easy to lose more data and information by using principal component analysis, and Delphi method has the disadvantage of subjectivity. Therefore, the entropy method is used to calculate the development index of digital currency. The calculation process of entropy method is as follows:

Firstly, we have to standardized treatment. Since the measurement units of the data are different, it is necessary to normalize the index, and because the value of 0 may appear in the normalization process, it is necessary to carry out translation processing, and the translation method is added by 0.0001. The calculation formula is as follows:

$$Z_i = \frac{X_i - \min(X_i)}{\max(X_i) - \min(X_i)} + 0.0001 \tag{3}$$

Secondly, we should determine the weight. The weight is determined by entropy weight method, which is characterized by the variability of the index. Entropy weight method determines the degree of variability by calculating the information entropy. To calculate the information entropy, we must first calculate the proportion of each sub index in its primary index ρ_i. Namely:

$$\rho_i = \frac{Z_i}{\sum_{i=1}^{n} Z_i} \tag{4}$$

Information entropy e_i is calculated as follows:

$$e_i = -(\ln\left(\frac{1}{n}\right)) \sum_{i=1}^{n} \rho_i \ln \rho_i \tag{5}$$

Calculate the difference coefficient g_j. The smaller the information entropy and the greater the difference, the more information it contains:

$$g_i = 1 - e_i \tag{6}$$

$$w_i = \frac{g_i}{\sum_{i=1}^{n} g_i} \tag{7}$$

Finally, calculate the comprehensive score of digital currency level. The calculation formula is as follows:

$$m_i = w_i \times Z_i \tag{8}$$

The calculation results are shown in Table 4.

Among the many three-level indicators, the blockchain investment and newly registered blockchain enterprises have the highest weight, indicating that the social acceptance of digital currency is an important reason affecting the development index of digital currency. Secondly, the number of patents for digital currency, with a weight of 0.0991. Finally, the index with the lowest weight is the scale of electronic payment, which is 0.0647. From the overall scoring trend, China's digital currency development index is increasing year by year and has a great improvement in 2018. This is due to the rapid popularity of bitcoin in 2017, which has driven the overall development of digital currency.

Table 4. Digital currency development index results.

Index weight		Comprehensive score	
Index	Weight	Year	Score
DCP	0.0991	2014	0.0034
R&D	0.0879	2015	0.1763
BCI	0.1583	2016	0.2850
BCC	0.1256	2017	0.4264
OCL	0.0826	2018	0.7749
IP	0.0717	2019	0.8167
IPR	0.0893	2020	0.8413
EP	0.0647		
EC	0.0868		
EPR	0.0718		

3   Empirical Analyses

3.1   Model Building

Since the beginning of COVID-19, the scale of cross-border e-commerce transactions has continued to grow and has created many cross-border payment needs. Digital currency has natural application advantages for cross-border e-commerce and pays attention to the application scenarios at the retail end, which can significantly promote the development of cross-border logistics. The operation of cross-border logistics can also accelerate the development of cross-border e-commerce (Wan et al., 2022). Based on this, this paper establishes the following regression model based on previous theories:

$$lnCBE_{ijt} = \alpha_1 DCI_{it} + \alpha_2 TII_{ijt} + \alpha_3 ECODIS_{ijt}$$
$$+ \alpha_4 NET_{jt} + \alpha_5 FTA_{ijt} + \mu_j + \gamma_t + \varepsilon_{ijt} \tag{9}$$

$$lnEXPORT_{ijt} = \alpha_1 DCI_{it} + \alpha_2 TII_{ijt} + \alpha_3 ECODIS_{ijt}$$
$$+ \alpha_4 NET_{it} + \alpha_5 FTA_{ijt} + \mu_j + \gamma_t + \varepsilon_{ijt} \tag{10}$$

$$lnIMPORT_{ijt} = \alpha_1 DCI_{it} + \alpha_2 TII_{ijt} + \alpha_3 ECODIS_{ijt}$$
$$+ \alpha_4 NET_{jt} + \alpha_5 FTA_{ijt} + \mu_j + \gamma_t + \varepsilon_{ijt} \tag{11}$$

Among them, the following tables i, j and t represent China, RCEP Member States and the year of investigation respectively. The dependent variables represent CBE, EXPORT, and IMPORT respectively, and represent the logarithm of the total scale of cross-border e-commerce transactions, cross-border e-commerce exports and cross-border e-commerce imports of China to RCEP member states respectively. DCI, TII, ECODIS, NET and FTA respectively represent the development index of digital currency, the trade intensity

Table 5. Variable description.

Variable name	Variable processing
Cross border e-commerce transaction	$CBE_{ij} = TCBE \times \frac{trade_{ij}}{trade}$
Cross border e-commerce exports	$EXPORT_{ij} = EXPORT \times \frac{trade_{ij}}{trade}$
Cross border e-commerce imports	$IMPORT_{ij} = EXPORT \times \frac{trade_{ij}}{trade}$
Digital currency development indicators	Entropy method.
Trade intensity index	$TII_{ij} = \dfrac{X_{ij}/X_i}{M_j/(M_w - M_j)}$
Economic distance	$ECODIS_{ij} = \frac{\max(PGDP_{ij})}{\min(PGDP_{ij})}$
Internet infrastructure	Number of Internet users per 100 people.
Free trade agreement	The value of signing free trade agreement is 1, otherwise it is 0.

index between China and RCEP Member States, the economic distance between China and RCEP Member States, the Internet infrastructure of RCEP Member States, and whether China and RCEP member states have signed bilateral trade agreements.

μ_j and γ_t represents the fixed effect of unobservable area and the fixed effect of time respectively, ε_{ijt} is a random error term.

3.2   Digital Selection and Processing

The data and processing methods of the empirical model in this paper are shown in the Table 5.

3.3   Analysis of Empirical Results

The following table reports the regression results of China's digital currency development level and RCEP cross-border e-commerce level. Among them, column 1 is the name of the variable, and columns 2, 3 and 4 respectively represent the regression results of the explained variables being the total amount of cross-border e-commerce transactions, exports, and imports. *, ** and *** are significant at the level of 10%, 5% and 1% respectively, and the parentheses are the statistical value t (Table 6).

It can be seen from the results that the development of digital currency can significantly promote the increase of cross-border e-commerce transaction volume, whether from the total amount or from the three aspects of export and import, which shows that digital currency is conducive to the improvement of cross-border payment system, reduce the risk of capital and exchange rate, and then promote the development of cross-border e-commerce. From the perspective of trade intensity index, the more intensive trade is, the more conducive it is to promote the overall transaction volume and

Table 6. Regression analysis.

Variable	(1)	(2)	(3)
	CBE	EXPROT	IMPORT
DCI	0.546***	0.539***	0.843***
	(3.05)	(3.15)	(3.11)
TII	0.072*	0.106*	0.001
	(2.16)	(2.03)	(0.01)
ECODIS	0.025	0.013	0.055
	(1.44)	(1.03)	(1.35)
NET	0.011	−0.017	0.034
	(0.61)	(−0.86)	(1.31)
FTA	−0.030	0.022	−0.146
	(−0.37)	(0.21)	(−0.96)
R-squared	0.749	0.607	0.697
Country FE	YES	YES	YES
Year FE	YES	YES	YES

export volume of cross-border e-commerce, but the promotion effect on cross-border e-commerce import is not obvious. In addition, the promotion effect of economic distance, Internet infrastructure of RCEP member countries and free trade agreement on cross-border e-commerce transactions is not obvious.

4   Problems in CBDC Cross-Border Payment

Digital currency may break the monopoly of US dollar in cross-border payment, avoid the impact of US dollar unlimited quantitative easing on domestic economy, and prevent international financial blockade and sanctions. As a new thing, digital currency is really considered to be used in social economy in recent years. Its application is not mature, and there may be the following problems.

4.1   Blockchain Payment Application Scenario Technology and Relevant Laws and Regulations Are Still Imperfect

Since 2016, China's blockchain technology has developed by leaps and bounds. The number of blockchain patents has increased from 529 in 2016 to 15985 in 2021. The patent categories cover 11 aspects such as information retrieval, system security and identification technology (data source: zero one finance and Economics). However, the proportion of digital currency circulation technologies such as payment scenarios and e-commerce platforms are relatively low, accounting for 11.24% and 7.73% respectively. The technical basis for the implementation of digital currency is weak. In addition, as the circulation of sovereign digital currency belongs to the research field of emerging

things, due to the principle of prudence, China's legal provisions on digital currency lag to some extent, and its relevant legal provisions have not yet had a clear definition and provisions on digital currency [10].

4.2 International Settlement Still Has Strong Path Dependence on the US Dollar

China launched the RMB cross border payment system (CIPS) in 2015. By the end of 2020, it had handled a total of 2.2049 million cross-border RMB businesses, with an amount of 45.27 trillion yuan. However, CIPS system is still developed based on the traditional financial account system. Due to foreign exchange control and financial risk control, CIPS only accepts the exchange between other currencies and RMB and cannot achieve the mutual exchange of multi-national currencies of the Global Banking Financial Telecommunication Association (Swift). Moreover, the message processing format of swfit has become an international unified standard, which is difficult to get rid of the "new stove" of swift [11]. In addition, as the economic and technological strength of the United States provides strong international competitiveness for the US dollar, according to swift data, in December 2021, the amount of US dollar accounted for 40.51% of the global payment currency ranking, while RMB payment accounted for 2.7%. It can be seen that the current international settlement is still dominated by US dollars, and the cross-border payment of digital currency is easy to form the dollarization of digital currency.

4.3 The Infrastructure of Some RCEP Member States is not Perfect

RCEP countries have different levels of development, including developed countries, developing countries, underdeveloped countries, and very underdeveloped countries. Especially in non-developed countries, due to their low economic level and late international integration, their economic and legal system infrastructure is relatively backward. According to 2020 World Bank data, 34.54 people in Australia have fixed broadband per 100 people, while only 1.06 people in Laos. The economic level and infrastructure of various countries vary greatly, especially the cross-border e-commerce development of underdeveloped countries lags, making it difficult to promote the international use of digital RMB.

5 Conclusions and Policy Suggestions

5.1 Conclusions

(1) The development of digital currency has been promoted in an orderly manner and gradually applied in various fields of the economy. Based on the existing research on digital currency, this paper constructs the digital currency development index system from the five aspects of digital currency R & D ability, social acceptance, infrastructure and use foundation, and uses the entropy method to evaluate the development index of China's digital currency from 2014 to 2020. The results show that China's digital currency development index gradually rises, and has a

large increase during 2018, from 0.4264 in 2017 to 0.7749 in 2018. From the perspective of sub indicators, public acceptance accounts for a large weight in the digital currency development index system, and the R & D capacity of digital currency is the second weight.

(2) The trade intensity index between China and RCEP member countries is high, which is conducive to promoting the development of new foreign trade formats such as bilateral cross-border e-commerce. To investigate the trade cooperation between China and RCEP, the trade intensity index and the scale of bilateral cross-border e-commerce transactions between China and RCEP member states are constructed based on the existing literature. Although the trade intensity index between China and RCEP members fluctuates greatly, it is generally greater than 1, indicating that the spatial layout of the trade and production network between China and RCEP members is relatively close. To investigate the cross-border e-commerce transactions between China and RCEP Member States, this paper estimates the cross-border e-commerce transaction volume with reference to relevant literature. It is found that the cross-border e-commerce transaction volume between China and RCEP Member States is generally increasing year by year. Although it is affected by the "Sino US trade war" in 2018, its development is generally on the rise. From the perspective of the relationship between the two, the bilateral trade intensity index has a significant positive promoting relationship to the volume of cross-border e-commerce transactions.

(3) The development of digital currency has a significant role in promoting cross-border e-commerce. To further investigate the promotion mechanism of digital currency on cross-border e-commerce, this paper takes the development index of digital currency as the core explanatory variable, and regresses the transaction volume, export volume and import volume of cross-border e-commerce between China and RCEP as the explanatory variables respectively. The results show that the development of digital currency can significantly promote the increase of cross-border e-commerce transaction volume between China and RCEP. The reason is that the development of digital currency can improve the efficiency of cross-border payment, reduce the risk of exchange rate fluctuation, improve the speed of international trade capital flow, and then promote the development of cross-border e-commerce.

5.2 Policy Suggestions

(1) Take the cross-border e-commerce platform as a pilot to promote the circulation of CBDC in RCEP region. As a new form of trade, cross-border e-commerce can expand the use of digital currency. In cross-border payment, in addition to the central bank as credit endorsement, digital currency also has blockchain distributed technology, which is safe, efficient and traceable. As an important way of trade for SMEs in RCEP countries, cross-border e-commerce has the characteristics of cross-border small transactions. In this regard, we can use the cross-border e-commerce platform to carry out the pilot first way of digital currency. Through the cross-border trade cooperation of small and medium-sized enterprises, we can connect the payment system of the cross-border e-commerce platform with the cross-border payment system of other countries, build a regional cross-border payment platform,

make full use of the QR code payment habit, set up a unified payment coding standard, and improve the compatibility of digital currency, Cultivate the cross-border digital currency usage habits of businesses and consumers.

(2) Promote the construction and improvement of RCEP CBDC cross-border payment supervision system and its risk governance system. Taking cross-border e-commerce as the starting point, making full use of the characteristics of small amount and multi samples, gradually explore a safe, efficient, and controllable cross-border payment mode, summarize the experience of regional digital currency cross-border payment, and establish a risk control system for digital currency cross-border payment. In this process, we should make full use of the technical advantages of big data and cloud computing, monitor the whereabouts of each cross-border payment, and dynamically analyse each cross-border payment transaction to prevent international hot money from impacting the digital RMB. In addition, we should strengthen the training of legal talents in relevant aspects of blockchain, carry out forward-looking legislation, focus on the protection of corporate and personal privacy, strengthen information security and data assets, and safeguard the rights and interests of multiple parties. Internationally, we should focus on cross-border payment system supervision, legal and policy cooperation with RCEP countries.

(3) Through economic and technical cooperation, realize the interconnection of cross-border e-commerce infrastructure such as finance and telecommunications. Network infrastructure is the basis for cross-border financial service cooperation [1]. One belt, one road, is to promote RCEP interconnection and cooperation with other RCEP countries. Due to the low level of economic development and backward infrastructure in some RCEP countries, China can optimize the market economic environment of underdeveloped countries by focusing on investment, e-commerce, and small and medium-sized enterprises, and cooperate with underdeveloped countries in relevant aspects through financial services and telecommunications services, to realize the interconnection of cross-border platforms. At the same time, China also needs to further carry out communication technology cooperation with developed countries within the agreement, jointly develop a digital currency cross-border payment platform and realize the coordinated development of regional trade and finance.

(4) Realize the connection between digital currency and CIPS, strengthen cooperation with swift, and improve the international externality of digital RMB. Focus on promoting the linkage between digital currency and CIPS, promote the cooperation and development with swift, strengthen the construction of cross-border e-commerce infrastructure, and form a combined development model of cross-border e-commerce payment + Digital RMB + internationalization. Based on CIPS, taking digital currency as the financial basis, improve its international settlement function, build a cross-border payment and cross-border clearing system of RMB financial products, and continue to adopt the two-tier operation mode of central bank and commercial bank currency with reference to the existing RMB management methods, to ensure the effective connection between paper currency and digital currency. In addition, we will cooperate with swift in terms of digital currency stability standards and processing rules and take this as a basis to deepen the cooperation and

development of cross-border payment systems with RCEP member countries, to create a good external environment for CBDC.

(5) Give full play to the advantages of domestic e-commerce and use the domestic circulation of digital RMB to drive the foreign circulation of digital RMB. In the process of implementing digital RMB, we can make full use of China's huge e-commerce industry scale. In 2020, China's e-commerce transaction volume reached 37.21 trillion yuan, which provides a huge digital currency payment scenario for China. For example, Suzhou connected it to the e-commerce platform for consumption for the first time by issuing digital RMB in December 2020. In the process of implementing digital RMB, we can use e-commerce as the platform and take cities with developed digital economy as the pilot to gradually cultivate domestic consumers' digital RMB payment habits. We will also accelerate the construction of 5g base stations, big data centres, artificial intelligence, and other new infrastructure, strengthen the optimization and development of domestic e-commerce platforms and payment systems, promote the compatibility of bank and non-bank payment institution systems, smooth domestic digital RMB payment channels, drive the cross-border flow of RCEP digital RMB region, and promote the internationalization of RMB. Form a complete closed loop of currency circulation, including domestic circulation, overseas circulation, and cross-border return of RMB.

(6) Strengthen the research on smart contracts in the blockchain and improve the security capabilities in key areas. Blockchain technology is gradually integrated with industrial Internet, artificial intelligence, cloud computing and other technologies, and promotes industrial innovation and development. Among them, whether it is payment means or blockchain application scenarios such as the Internet of things, the key to its underlying technology is the design of smart contract, which is also the key in the field of digital currency research. In general, China's blockchain technology research and development is at the forefront of the world, but the research field of blockchain smart contract is still lacking. Blockchain technology mostly involves research at the application level, and less involves basic research such as smart contract. In this regard, we can implement the interdisciplinary R & D mode of computer and economic management, design the payment scheme of smart contract through computer logic, build a safe and efficient ciphertext retrieval and payment scheme of smart contract, promote the fairness of transaction subjects, encourage people to consume with digital RMB, and expand the payment scenario for RCEP cross-border payment.

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