China's Cross-Border E-Commerce: Evolution Pattern and Influencing Factors*

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Abstract: *In recent years, while the traditional trade sectors have been shrinking, China's cross-border e-commerce has undergone rapid development and has become a new driver of its international trade. Based on analysis of the evolution pattern of China's cross-border e-commerce, this paper uses a revised gravity model to test empirically the driving factors and the resistance factors in the development of the country's cross-border e-commerce. The results show that the total GDP, per capita disposable income of urban residents, total imports and exports, and the scale of the online shopping market have a positive relationship with cross-border e-commerce transactions, which are conducive to the development of cross-border e-commerce, while logistics costs inhibit the development of cross-border e-commerce. Accordingly, the paper puts forward several policy recommendations.*

Keywords: *cross-border e-commerce, revised gravity model, per capita disposable income of urban residents, influencing factors*
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1. Introduction

At present, the global trade environment is undergoing significant changes. With the rapid growth of digital, intelligent and global e-commerce, cross-border e-commerce enterprises in China are faced with unprecedented opportunities for development. In 2017, China entered the deepening stage of supply-side reform. According to China's cross-border e-commerce market data monitoring report, in the first half of 2018, China's cross-border e-commerce exports accounted for 77.1% of the country's total e-commerce trade, while imports accounted for 22.9%, and both exports and imports grew very quickly. Cross-border e-commerce is conducive to optimizing the structure of import and export commodities, promoting consumption upgrading and boosting the export of high-quality products. With China's consumption upgrading, the demand for cross-border e-commerce imports is growing. This vigorously developing cross-border e-commerce can adjust China's trade structure, and promote the development of China's import trade. It is of great significance to boost China's supply-side reform.

Since the end of the last century, scholars have studied cross-border e-commerce. Among them, Gero and Oommen (1999) pointed out the important role of the Canadian government in promoting the development of cross-border e-commerce, and found that cross-border e-commerce was conducive

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to the expansion of international trade. Blum and Goldfarb (2006) used a gravity model to study the factors affecting the non-physical commodity trade of cross-border e-commerce in the United States. Nuray (2011) discussed the impact of e-commerce on international trade and employment. Nuray believed that e-commerce would bring great benefits to developed countries in the short run and be beneficial to developing countries in the long run. At the same time, e-commerce could create or damage employment opportunities. Based on the iceberg cost theory, He et al. (2011) pointed out that cross-border e-commerce will influence the international trade mode by affecting the output, price and profit of commodity trade, and promote the development of trade. Gomez et al. (2014) concluded that cross-border e-commerce reduces distance-related trade costs and increases language-related trade costs. The efficiency of the online payment system is the driving factor of EU cross-border e-commerce.

Although the development of cross-border e-commerce in China is leading in the world, there are presently only a small number of studies on China's cross-border e-commerce. Overall, domestic scholars mainly focus on cross-border e-commerce from the perspective of the status quo, problems and methodological suggestions. There are relatively few studies based on empirical analysis. Jiang (2017) used a gravity model to analyze the cross-sectional data of 9 countries and regions, and obtained various factors affecting the scale of cross-border e-commerce in China. Using questionnaires, Lu (2018) made an empirical analysis of the factors influencing the development of agricultural products cross-border e-commerce, and obtained the direction and degree of the influencing factors.

The paper first describes the development of cross-border e-commerce in China, and then makes an empirical analysis of the factors influencing it. GDP, per capita disposable income, the scale of the online shopping market, the logistics development level, and the foreign trade development level are included in the model. The per capita disposable income is divided into the per capita disposable income of urban residents and the per capita disposable income of rural residents, so as to analyze the impact of per capita disposable income on cross-border e-commerce trade more closely.

2. Evolution Patterns of Cross-Border E-Commerce in China

2.1 Growth Scale of Cross-Border E-Commerce

In comparison to traditional foreign trade, cross-border e-commerce has a reduced complexity of transaction links, and an improved quantity and efficiency of transactions. Therefore, it plays an important role in the development of our foreign trade. China's cross-border e-commerce industry grew significantly in 2011-2017 (shown in Figure 1), but the growth rate gradually slowed. At present, it shows a steady growth trend. In 2017, China's cross-border e-commerce accounted for 40% of the world's total e-commerce trade. The scale of China's cross-border e-commerce has reached 750 billion US dollars, and it has steadily ranked first in the world.[1] China's cross-border e-commerce transactions are estimated to reach 12 trillion yuan in 2020.[2] This means that the growth rate of cross-border e-commerce in China will exceed the traditional trade mode.

In the past, China's cross-border e-commerce mainly focused on exports. The proportion of cross-border e-commerce exports is much larger than that of imports, which greatly promotes the development of China's trade and provides a new growth potential for China's foreign trade. However, the import growth rate was as high as 26.7% in 2018,[3] and the proportion of imports is expanding, which promotes the upgrading of consumption and meets people's demand for imported goods. After policy dividends

[1] Source: Annual Report on China's Electronic Commerce in 2017
[2] Source: Ali Institute
[3] Source: China's Import Cross-Border E-Commerce Development Report 2018

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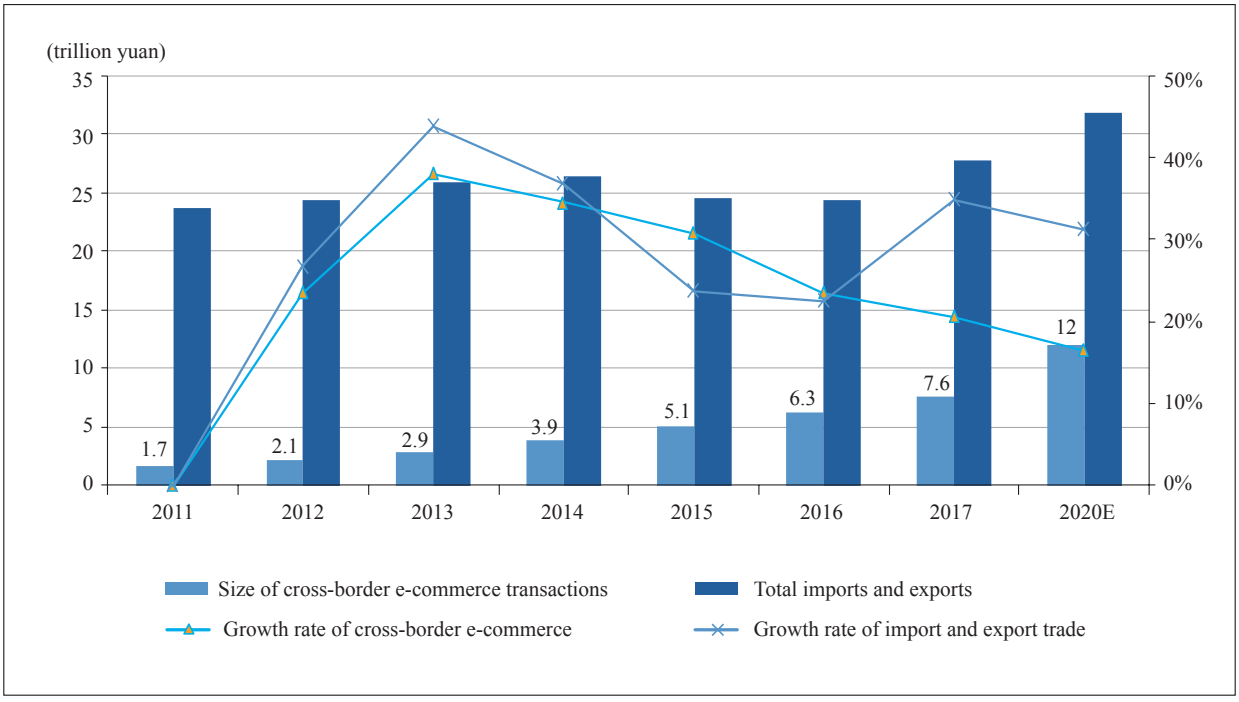

Figure 1: Comparison of Cross-Border E-Commerce and Traditional Trade in China
Source: In-depth research series on cross-border e-commerce (export), http://www.100ec.cn/detail--6446409.html

such as the first China International Import Expo in 2018 and several rounds of tariff reduction, it is expected that the volume of the import trade will continue to show explosive growth in the next three to five years.

2.2 Regional Structure of Cross-Border E-Commerce Exports

At present, China's cross-border e-commerce exports are mainly to developed areas such as the United States and the European Union, but more and more to emerging markets, such as Southeast Asia and South America (See Figure 2 for details). With the popularization of network informatization, cross-border e-commerce will play an important role in international trade. It can be seen that China is facing a growing emerging cross-border e-commerce development market.

2.3 Export Commodity Structure of Cross-Border E-Commerce

The high quality and low price of Chinese commodities have been widely praised in the world and have laid a good foundation for the development of cross-border e-commerce exports. Figure 3 shows that most of China's cross-border e-commerce export products are 3C electronic products, clothing accessories, shoes, bags, and outdoor goods. These products have a strong cost advantage and a high degree of standardization, characterized by light weight, high value, low transportation cost, and high timeliness, which is suitable for cross-border e-commerce enterprises pursuing timeliness. With the renewal of consumer demand and the development of information technology, more and more new products appear. More and more products will adapt to the development of cross-border e-commerce. Therefore, the types of export products of cross-border e-commerce are bound to become more and more abundant.

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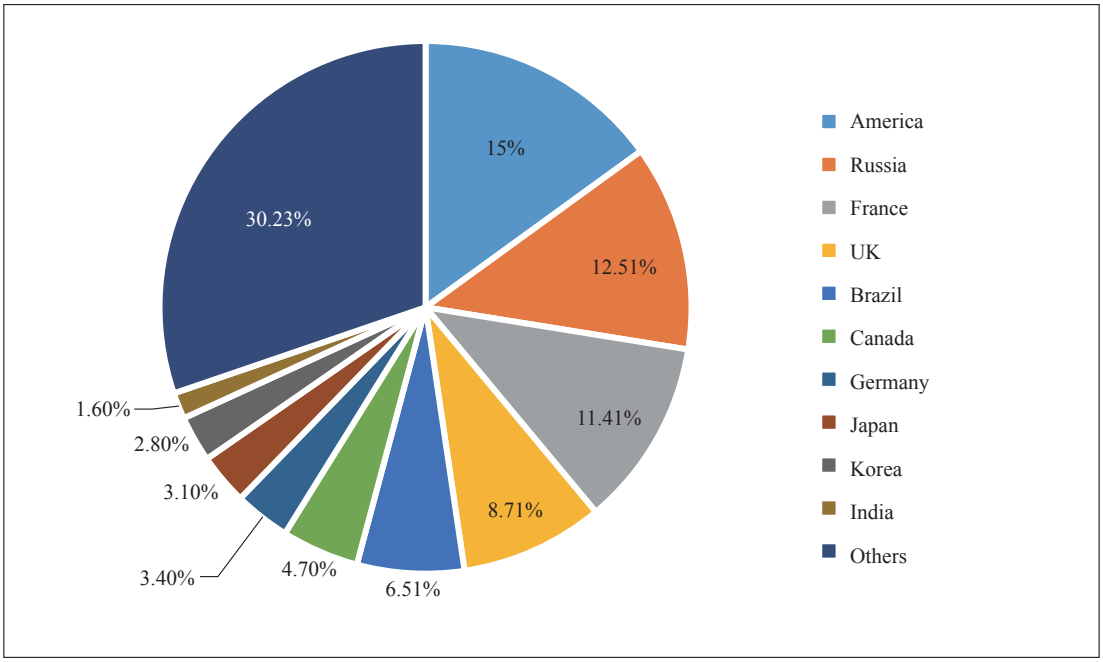

Figure 2: Distribution of Cross-Border E-Commerce Export Countries and Regions in China in 2017
Source:https://www.qianzhan.com/analyst/detail/220/181206-ff17d527.html

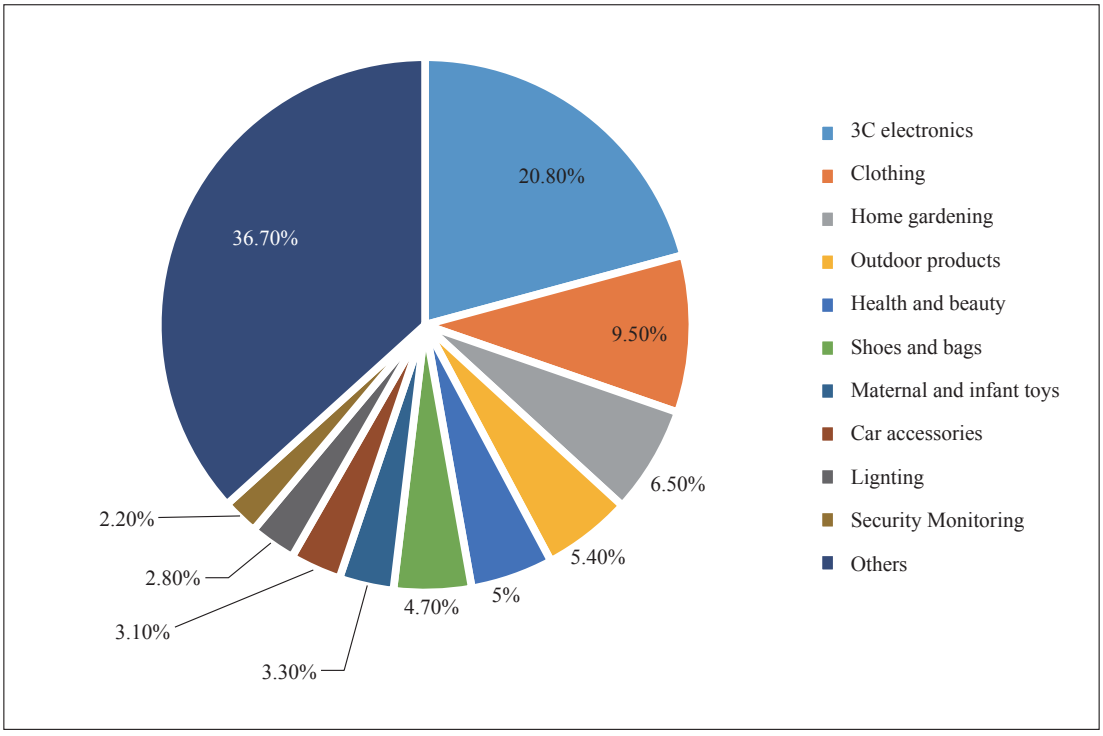

Figure 3: China's Export Cross-Border E-Commerce Product Mix in 2017
Source: https://www.qianzhan.com/analyst/detail/220/181206-ff17d527.html

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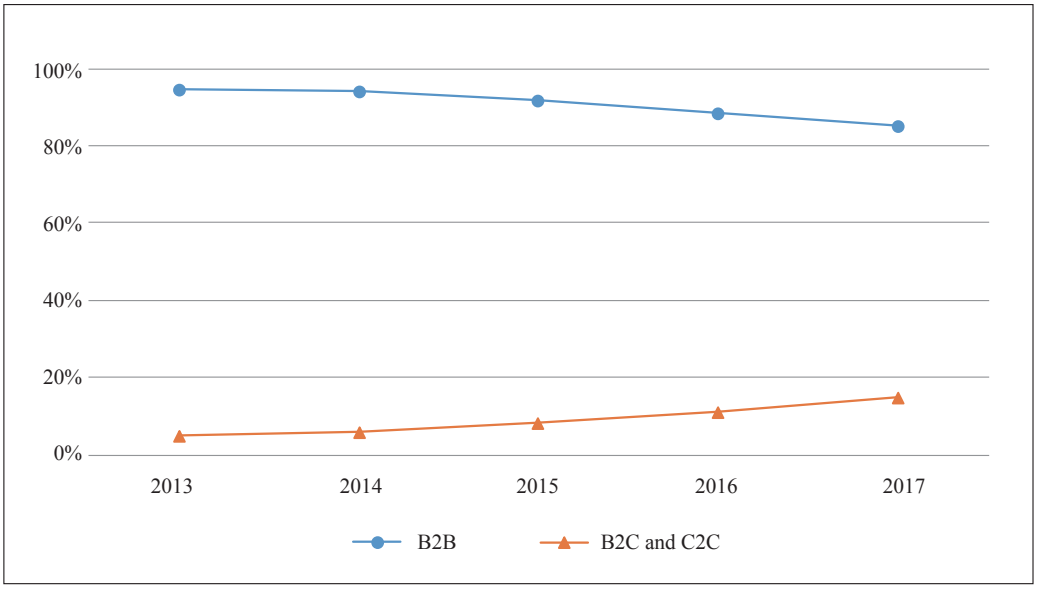

Figure 4: The Proportion Structure of China's Cross-Border E-Commerce Transaction Mode from 2013 to 2017
Source: In-depth research series on cross-border e-commerce (export), http://www.100ec.cn/detail--6446409.html

2.4 Cross-Border E-Commerce Transaction Model and Platform

Cross-border e-commerce transactions are generally divided into three modes: B2B, B2C and C2C. In 2017, B2B accounted for 85.2% and B2C and C2C accounted for 14.80%. At present, B2B has become the main mode of cross-border e-commerce development in China. Meanwhile, with the rise of smart phones, online shopping consumption, the improvement of logistics and payment systems, and the continuous increase of consumers' personalized demand, B2C and C2C are also on an increasing trend (see Figure 4). However, there are still some problems, such as insufficient timeliness of cross-border logistics, inadequate after-sales service, and many difficulties to guarantee the authenticity of goods.

At present, whether import or export cross-border e-commerce, there are huge market opportunities. In terms of export e-commerce, the number of online shopping users in developed countries and regions such as Europe and the United States is increasing, which leads to the growth of demand for Chinese goods. In this context, China's cross-border e-commerce enterprises continue to expand, contributing to the emergence of many influential cross-border e-commerce platforms. As shown in Table 1, the top ten export e-commerce platforms in China in 2018 include such as Alibaba International, Made-in-China.com and dhgate.com. They are the largest and the most influential in the market adopting the B2B trading mode.

Under the background of an increasing domestic income level and consumption upgrading, the huge market demand for imported goods promotes the rapid development of cross-border e-commerce. Figure 5 shows that China's imported cross-border e-commerce mainly adopts a B2C trading mode, which is directly oriented to end-users. Influential import cross-border e-commerce includes NetEase Koala, Tmall International, VIPSHOP International, JD Global Purchase and JUMEI Goods, accounting for 84% of China's total e-commerce imports.

3. Analysis of the Factors Influencing China's Cross-Border E-Commerce Trade Based on the Gravity Model

In order to maintain the rapid and healthy development of China's cross-border e-commerce, this

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Table 1: China's Cross-Border E-Commerce TOP 10 Export Platforms (2018)

Business name	Platform type	Export or import
Alibaba International	B2B	Export
Made-in-China.com	B2B	Export
TOOCLE3.0	B2B	Export
Global Market Group	B2B	Export
jumore.com	B2B	Export
China.osell.com	B2B	Export
Amazon Global Stores	B2B	Export
eBay	B2B	Export
Alibaba Express	B2B	Export
dhgate.com	B2B	Export

Source: https://www.maigoo.com/news/516388.html

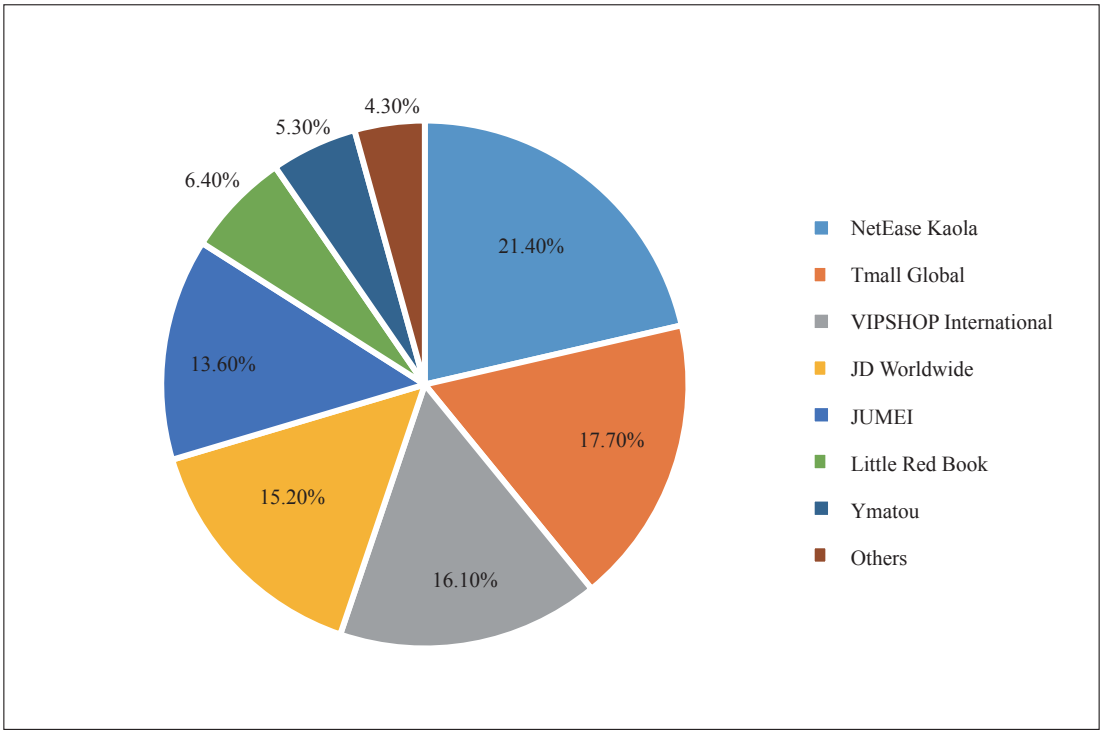

Figure 5: The Distribution of China's Import E-Commerce Platform (B2C) Trading Pattern in 2017
Source: In-depth research series on cross-border e-commerce (export), http://www.100ec.cn/detail--6446409.html

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paper uses the gravity model, introduces relatively complete and detailed variable indicators, and makes an empirical analysis of the factors influencing China's cross-border e-commerce development based on the data from 2007 to 2017, to provide more targeted suggestions for the development of China's cross-border e-commerce.

3.1 Factors Influencing Cross-Border E-Commerce Trade Development in China

China's cross-border e-commerce trade are mainly affected by six factors, namely GDP, per capita disposable income, scale of the online shopping market, logistics level, electronic transaction law, and foreign trade development level.

(1) GDP. According to the 2018 Cross Border E-commerce Industry Market Survey and Analysis Report, the scale of the e-commerce market in an economy is positively correlated with its total GDP level, but the relationship between per capita GDP and cross-border e-commerce development may not be linear. It depends on the impact of other factors on cross-border e-commerce, such as the state's support for cross-border e-commerce, the level of logistics development, the size of the domestic online shopping market, the degree of perfection of the electronic trading law, etc. When per capita GDP is low or median, the increase of per capita GDP may promote the development of cross-border e-commerce. However, when per capita GDP is at a high level, people are generally well off. Demand for cross-border e-commerce transactions may decline, while consumption offline with better experience and services may increase. Therefore, the correlation between per capita GDP and cross-border e-commerce is uncertain.

(2) Per capita disposable income. Generally speaking, as the per capita disposable income level rises, people will spend more on cross-border e-commerce purchasing, thus driving the development of cross-border e-commerce trade. Of course, there is another situation, as per capita disposable income decreases, people will tend to buy more economical and inexpensive goods from the Internet. For example, according to Li (2017), per capita disposable income is negatively correlated with cross-border e-commerce. The continuous "shrinking" of the income of ordinary residents in Russia makes more customers switch from offline to online, because online products are richer in variety and cheaper in price, thus increasing the volume of e-commerce transactions. In addition, some analysis shows that there is a correlation between the marginal propensity to consume and the income level of Chinese residents. The relationship between them is generally an "inverted U". That is to say, the marginal propensity to consume of low-income and high-income groups is lower, while the marginal propensity to consume of middle-income groups is higher (Yang and Zhu, 2007). In the field of cross-border e-commerce consumption, this rule may be manifested in the fact that the low-income and high-income groups participate in cross-border e-commerce transactions less with the increase of income, while middle-income groups are more involved in cross-border e-commerce transactions with the increase of income, which makes the relationship between per capita disposable income and cross-border e-commerce quite complex. It is not solely positive or negative. This paper further divides the per capita disposable income into the per capita disposable income of urban residents and that of rural residents, in order to analyze the effect of per capita disposable income on cross-border e-commerce trade more closely.

(3) Scale of the online shopping market. In 2017, the volume of global online retail transactions reached US$2.304 trillion, an increase of 24.8% over 2016, and the total global retail sales reached US$22.64 trillion. The proportion of online retail transactions in global retail sales also increased to 10.2%, while that of 2016 was about 8.6%, which shows that online sales have become a strong driving force of the market. The development of cross-border e-commerce is the result of the development of network sales. In recent years, with the improvement of the Internet and information technology, the online shopping market has developed rapidly in various countries. The development of cross-border

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e-commerce relying on the Internet is bound to be inseparable from the development of the domestic online shopping market. How can we measure the scale of the online shopping market? This paper uses the number of netizens (internet users), which reflects the level of Internet informatization in various countries, and is also the basis for the development of the online shopping market. Therefore, the higher the level of information technology in a country and the more netizens, the more obvious is the driving role of cross-border e-commerce transactions. So, the number of netizens is expected to be positively correlated with the cross-border e-commerce transactions.

(4) Logistics development level. The efficiency and cost of product transportation affect the scope of e-commerce. The logistics level affects the development of cross-border e-commerce trade and is an important factor restricting the development of cross-border e-commerce. From placing orders to distribution, the speed and cost of distribution have direct restrictions on the development of cross-border e-commerce. Therefore, it is very important to ensure the efficient and smooth flow of goods. In this paper, logistics cost is used to stand for the level of logistics development. The low logistics cost indicates that the level of logistics development is high, which is conducive to the development of cross-border e-commerce. Therefore, the logistics cost has a negative correlation with the volume of cross-border e-commerce transactions.

(5) Improvement of China's electronic transaction law. With the increase of cross-border e-commerce transaction volume and the globalization of operation, trade frictions and disputes hinder the development of cross-border e-commerce, and the formulation of the norms of e-commerce transaction law has become the basic element to ensure the development of cross-border e-commerce. The laws of developed countries in the field of e-commerce are relatively complete. In developing countries, the enactment of laws on e-commerce is still lagging behind. At present, more than 70% of countries have enacted electronic trading laws. The more perfect the electronic trading laws are, the more beneficial it will be to maintain trade order, protect consumers' rights, interests and consumer safety, and further promote the development of cross-border e-commerce.

(6) Foreign trade development level. Generally speaking, cross-border e-commerce and traditional trade go hand in hand. When the trade environment is favorable and the level of trade development is high, cross-border e-commerce will also thrive. When the trade environment becomes worse and external demand weakens, the development of cross-border e-commerce will also be restrained. Therefore, the degree of foreign trade development and cross-border e-commerce trade show a positive correlation.

3.2 Variable Selection and Data Sources

As mentioned above, there are many factors affecting cross-border e-commerce, but not all of them can be quantified. For example, the perfection of electronic transaction law cannot be quantified, so this variable is eliminated in the modeling. Based on quantifiable variables and different effects on cross-border e-commerce, this paper chooses GDP, per capita disposable income, per capita disposable income of urban residents, per capita disposable income of rural residents, the scale of the online shopping market, total import and export, and logistics costs as explanatory variables, and establishes different models to analyze them. The meanings and expected symbols of each explanatory variable are shown in Table 2. The empirical analysis is based on data from the national level in 2007-2017 years, which comes from the China Statistical Yearbook (2008-2018) and the network economic service platform (2007-2017).

3.3 Modeling

Tinbergen (1962) and Pehonen (1963) first introduced the law of gravitation into the field of international trade. They studied the flow of bilateral trade and concluded that the scale of bilateral

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Table 2: The Meaning of Explanatory Variables and Expected Symbols of Variables

Variables	Meaning	Expected symbols	Data sources
GDP_i	GDP	Uncertain	China Statistical Yearbook
PIN_i	Per capita disposable income	Uncertain	China Statistical Yearbook
$UPIN_i$	Per capita disposable income of urban residents,	Uncertain	China Statistical Yearbook
$RPIN_i$	Per capita disposable income of rural residents	Uncertain	China Statistical Yearbook
IE_i	Total import and export	+	China Statistical Yearbook
NUS_i	The scale of online shopping market	+	China Electronic Commerce Research Center
LOG_i	Logistics costs	-	China Statistical Yearbook

trade of two countries has a positive relationship with the total economic volume of each country, while the distance between two countries has a negative relationship. Subsequent research has studied and explored the gravitational model in depth, and revised it. At the same time, population, exchange rate and whether they have a common language and border or not are included in the model.

The basic form of the gravitational model is:

$$X_{ij} = A(Y_i Y_j)/D_{ij.} \quad (1)$$

Among them, X_{ij} denotes the export volume from country i to country j; A is a constant term; Y_i and Y_j denote the GDP of country i and country j respectively; D_{ij} denotes the distance from country i and country j. In practical application, logarithms are usually taken on both sides of the model and it is transformed into linear form. That is:

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

According to the actual situation of China's cross-border e-commerce development, this paper chooses China's GDP level, per capita disposable income, per capita disposable income of urban residents, per capita disposable income of rural residents, total import and export, scale of the online shopping market, and logistics cost, and constructs three revised gravity models, respectively.

$$\ln Y_i = \beta_0 + \beta_1 lnGDP_i + \beta_2 ln PIN_i + \beta_3 lnIE_i + \beta_4 lnNUS_i + \beta_5 lnLOG_i + \mu_i \quad (3)$$

$$\ln Y_i = \beta_0 + \beta_1 lnGDP_i + \beta_2 lnUPIN_i + \beta_3 ln RPIN_i + \beta_4 lnIE_i + \beta_5 lnNUS_i + \beta_6 lnLOG_i + \mu_i \quad (4)$$

$$\ln Y_i = \beta_0 + \beta_1 lnGDP_i + \beta_2 lnUPIN_i + \beta_3 lnIE_i + \beta_4 lnNUS_i + \beta_5 lnLOG_i + \mu_i \quad (5)$$

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3.4 Empirical Process and Result Analysis

As cross-border e-commerce began to develop rapidly in 2007, this paper selected data from 2007 to 2017 to make empirical analysis on different factors. In order to ensure the accuracy of the empirical results, we carried out the multiple co-linearity test, the unit root test and the co-integration test.

First, the multiple co-linearity test shows that there is no multiple co-linearity among the variables of each model.

Second, in order to eliminate possible heteroscedasticity, the variables in each model are processed logarithmically. Then we get $\ln Y_i$、$lnGDP_i$、$ln\mathrm{PIN}_i$、$lnUPIN_i$、$lnRPIN_i$、$lnIE_i$、$lnNUS_i$、$lnLOG_i$.

Third, the trend line of $\ln Y_i$、$lnGDP_i$、$ln\mathrm{PIN}_i$、$lnUPIN_i$、$lnRPIN_i$、$lnIE_i$、$lnNUS_i$、$lnLOG_i$ is drawn after the logarithm of treatment on the variable value. Preliminary judgment of the sequence by time series diagram is not stable. There may be trend items in the sequence, which need to be tested by ADF.

The results of the ADF test show that all variables have not passed the stationarity test, but the

Table 3: Unit Root Test for Each Variable

Variables	ADF value	1% significant level	5% significant level	10% significant level	Result
$\ln Y_i$	-3.046587	-5.521860	-4.107833	-3.515047	Unstable
$d\ln Y_i$	-3.476448	-5.521860	-4.107833	-3.515047	Stable
$lnGDP_i$	-1.241993	-5.295384	-4.008157	-3.460791	Unstable
$d(lnGDP_i)$	-3.037852	-5.835186	-4.246503	-3.590496	Stable
$ln\mathrm{PIN}_i$	-2.225458	-5.295384	-4.008157	-3.460791	Unstable
$d(ln\mathrm{PIN}_i)$	-2.886483	-5.521860	-4.107833	-3.515047	Unstable
$d^2(ln\mathrm{PIN}_i)$	-3.911480	-5.835186	-4.246503	-3.590496	Stable
$lnUPIN_i$	-0.566723	-5.295384	-4.008157	-3.460791	Unstable
$d(lnUPIN_i)$	-4.249149	-6.292057	-4.450425	-3.701534	Stable
$ln\mathrm{RPIN}_i$	-0.401128	-5.295384	-4.008157	-3.460791	Unstable
$d(ln\mathrm{RPIN}_i)$	-2.168742	-5.521860	-4.107833	-3.515047	Stable
$lnIE_i$	-1.903616	-5.295384	-4.008157	-3.460791	Unstable
$dlnIE_i$	-4.723616	-5.835186	-4.246503	-3.590496	Stable
$lnNUS_i$	-1.776457	-5.295384	-4.008157	-3.460791	Unstable
$dlnNUS_i$	-4.139471	-5.521860	-4.107833	-3.515047	Stable
$lnLOG_i$	-0.693517	-5.295384	-4.008157	-3.460791	Unstable
$dlnLOG_i$	-4.677937	-5.835186	-4.246503	-3.590496	Stable

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Table 4: Co-Integration Test of Variables

No. of co-integration equations	Characteristic value	Trace statistics	Critical value of 5% significant level
None *	0.012351	0.111849	3.841466
At most 1	0.260761	2.719202	3.841466
At most 2	0.243315	2.509272	3.841466
At most 3	0.197552	1.980799	3.841466
At most 4	0.148523	1.447050	3.841466
At most 5	0.130460	1.258119	3.841466
At most 6	0.480835	5.899806	3.841466
At most 7	0.289179	3.072007	3.841466

Table 5: Regression Results of Factors Influencing Cross-Border E-Commerce in China

Explanatory variables	(1)	(2)	(3)
c	1.19	4.18	3.36
	(1.62)	(1.49)	(2.01)
lnGDP	4.32***	0.02	1.10*
	(8.49)	(0.005)	(0.39)
$d(ln\text{PIN}_i)$	0.08		
	(0.52)		
$ln\text{UPIN}_i$		2.94	4.82**
		(0.54)	(2.28)
$ln\text{RPIN}_i$		0.80	
		(0.38)	
$lnIE_i$	0.34	1.23	1.35**
	(0.35)	(1.74)	(2.35)
$lnNUS_i$	0.22**	0.36	0.38**
	(2.72)	(1.95)	(2.33)
$lnLOG_i$	-2.62***	-2.98**	-2.81***
	(-3.82)	(-2.43)	(-2.71)
Adjusted R^2	0.9982	0.9887	0.9906
F-test	463.89	146.35	211.81

Note: "*","**" and "***" respectively indicate the significance level of 10%, 5% and 1%. The first line is the regression coefficient, and the second line is t value. The software used is Eviews.

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second-order difference of $ln\text{PIN}_i$ and the first-order difference of $\ln Y_i$、$lnGDP_i$、$lnUPIN_i$、$lnRPIN_i$、$lnIE_i$、$lnNUS_i$、$lnLOG_i$ are stable (see Table 3). So one of the variables is a second-order mono-integer sequence, and all the other variables are a first-order mono-integer sequence. After first or second order difference, all variables pass the data stationary test, avoiding spurious regression.

In order to test the possible co-integration relationship among variables, we continue the co-integration test. The test results showed that the variables passed the co-integration test at the 5% significance level (see Table 4), indicating that there was a long-term stable equilibrium relationship between variables. Therefore, regression can be carried out on this basis. After the differential treatment of $ln\text{PIN}_i$ and the standardization of other variables, the following regression results are obtained (see Table 5).

The empirical analysis results show that the total GDP, per capita disposable income of urban residents, total imports and exports, the size of the online shopping market, and cross-border e-commerce transactions show a co-directional relationship, while logistics costs and cross-border e-commerce transactions show a reverse relationship.

The effect of China's GDP on cross-border e-commerce transaction volume is positive. It indicates that the improvement of China's comprehensive economic strength can support the various conditions required for cross-border e-commerce development and accelerate the development of cross-border e-commerce.

The effect of per capita disposable income on cross-border e-commerce transaction volume is not significant, but a separate list of per capita disposable income of urban residents has a significant impact. This may be due to the characteristics of the dual economic structure between urban and rural areas in China. The income gap between urban and rural areas is large, and the per capita disposable income of urban residents is generally higher than that of rural residents. With the increase of urban residents' income, the development level of cross-border e-commerce in large and medium-sized cities is getting higher and higher, and the transaction volume of cross-border e-commerce is also increasing. The empirical results show that if the per capita disposable income of urban residents increases by 1%, cross-border e-commerce transactions will increase by 4.82%.

In addition, the total import and export volume has a positive effect on cross-border e-commerce. For every 1% increase in total import and export volume, the cross-border e-commerce trade volume will increase by 1.35%. It can be seen that the internal and external market demand has a positive role in promoting the development of cross-border e-commerce.

The scale of the online shopping market is also positively related to cross-border e-commerce transactions. With the increasing popularity of Internet informatization, the number of online shopping users using computers or mobile phones is increasing, which leads to the increase of the number of online shopping consumers. Each 1% increase in the number of netizens will increase the cross-border e-commerce transaction volume by 0.38%, indicating that the number of online consumers is the basic factor affecting the cross-border e-commerce transaction volume.

Logistics cost has a reverse effect on cross-border e-commerce transaction volume; its coefficient is -2.81, and this negative effect is significant. Every 1% increase in logistics cost will reduce cross-border e-commerce transaction volume by 2.81%, which is in good agreement with our initial expectations.

4. Conclusions and Policy Implications

Nowadays the scale of cross-border e-commerce in China has steadily ranked first in the world. Although cross-border e-commerce in China has developed rapidly, there are still many problems. At the same time, empirical analysis of the factors influencing cross-border e-commerce transaction volume in China shows that the total GDP, per capita disposable income of cities and towns, and the scale of the

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online shopping market play a positive role in promoting cross-border e-commerce transaction volume in China, while the logistics cost restrains the development of cross-border e-commerce, to a certain extent. In addition, there is a positive correlation between total import and export volume and cross-border e-commerce trade volume, and they interact with each other. Therefore, the following suggestions are put forward to promote the development of cross-border e-commerce in China.

Based on the above analysis, we suggest that macro-policy efforts should be made to develop the economy through various policies and measures to maintain a stable economic growth rate and ensure that the total GDP of the country continues to enjoy a relatively high growth, so as to provide a good macro-environment for the development of cross-border e-commerce. We should take comprehensive measures to increase rural residents' disposable income, such as increasing agricultural productivity, improving agricultural subsidies and social security, and strengthening farmers' skills training, so that they can also enjoy the fruits of economic development and participate in the development of cross-border e-commerce. The disposable income of urban residents should be further increased to meet the growing needs of the people for a better life.

We also suggest policymakers take some measures to strengthen the strategic combination of expanding domestic demand and stabilizing external demand to provide a domestic and foreign market basis for further development of cross-border e-commerce, and to strengthen the construction of the network infrastructure to improve the level of information technology in China and further expand the users of online shopping. In addition, it is necessary to integrate logistics enterprises with the advantages of multi-party logistics to achieve efficient logistics supply chain management to smooth the procurement, production, sales, return and exchange links, and to reduce manpower and time costs, to improve the operational efficiency of the whole enterprise and reduce the after-sales problems caused by logistics.

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