The Impact and Empirical Analysis of the Development Level of E-commerce Industry on China's Export Trade

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Abstract. With its advantages of low cost and high efficiency, e-commerce is not only favored by ordinary consumers, but also effectively promotes SMEs to find business opportunities and win the market. This article starts with the development scale of China's e-commerce industry and the status quo of export trade, and measures the overall index of China's e-commerce industry development level from 2008 to 2018 through empirical methods to analyze its impact on China's export trade. The results show that the development level of the e-commerce industry has a significant positive impact on China's export trade. Finally, it analyzes the existing problems in the development of China's e-commerce industry.

1 Analysis of the status quo and impact of China's e-commerce industry export trade

1.1 Development status of China's e-commerce industry

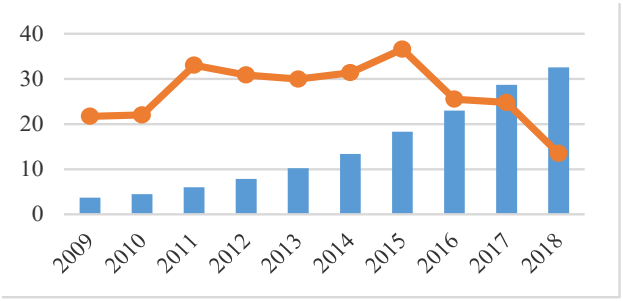

Fig1. Transaction scale of China's e-commerce industry market from 2009 to 2018
Data source: E-Commerce Research Center

Online retail sales amounted to According to data from the National Bureau of Statistics[1], the transaction volume of China's e-commerce industry in 2018 was 31.63 trillion yuan (the blue bar in Figure 1, the unit is trillion yuan), an increase of 8.5% year-on-year the orange9.01 trillion yuan, a year-on-year increase of 23.9%, as shown in the data in Figure 1.

1.2 China's e-commerce infrastructure construction status

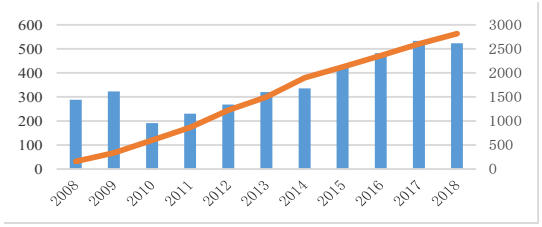

Fig2. Number of Chinese websites and webpages in 2008-2018
Data source: "The 43rd Statistical Report on Internet Development in China"

In 2018, China's IPv6 addresses were 41,079 blocks/32, with an annual growth rate of 75.3%. There were 21,243,478 CN domain names with an annual growth rate of 1.9%. International export broadband was 8,946,570 Mbps, with an annual growth rate of 22.2%. It shows that China's network resources are growing rapidly, and the infrastructure of China's e-commerce industry is improving day by day, and the entire industry continues to develop[2].The number of Chinese websites and webpages increased rapidly from 2010 to 2017. As of the end of 2018, the number of Chinese websites was 5.23 million (the blue bar in Figure 2 with 10,000 units), and the number of webpages was 281.6 billion (Figure 2 Histogram in middle orange color, 100 million units), as shown in the data in Figure 2.

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1.3 China's e-commerce industry human capital investment status

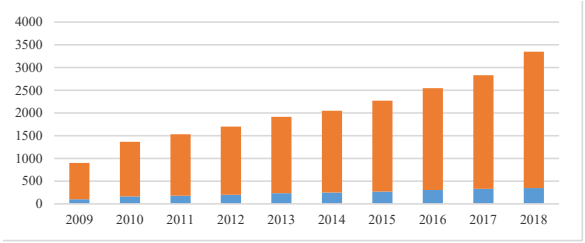

Fig3. Number of employees in e-commerce in 2009-2018
Data source: China Business Research Institute

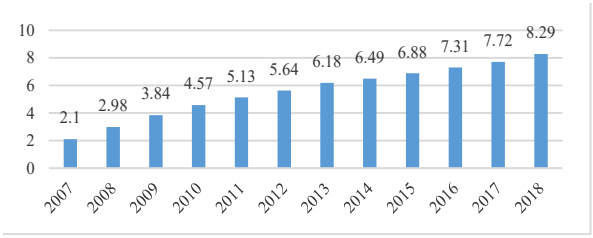

Fig4. Total number of Chinese Internet users from 2007 to 2018
Data source: China Internet Network Information Center

The accelerating integration of China's e-commerce industry and the real economy has driven more people to engage in e-commerce related work. As shown in the data in Figure 3: Not only are direct employees growing (blue histogram in Figure 3, 10,000 people), but indirect employees are also increasing (orange histogram in Figure 3, 10,000 people). According to estimates by the China Internet Economics Research Institute of Central University of Finance and Economics, China's e-commerce industry employed 47 million people in 2018, an increase of 10.6% year-on-year. The number of Chinese netizens has been rising as shown in Figure 4, increasing from 210 million in 2007 to 821 million in 2018 (blue bar in Figure 4, 100 million people). The ratio increased from 24% in 2007 to 99.1% in June 2019, indicating that mobile payment penetrates all areas of life, and people only need to carry a mobile phone to meet their needs when they go out. Therefore, the increase in the number of Internet users has promoted the development of e-commerce in Lao to a certain extent.

1.4 China's e-commerce industry development potential

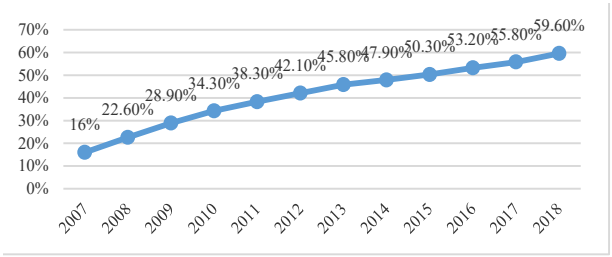

Fig5. China's Internet penetration rate from 2007 to 2018
Data source: "The 44th Statistical Report on Internet Development in China"

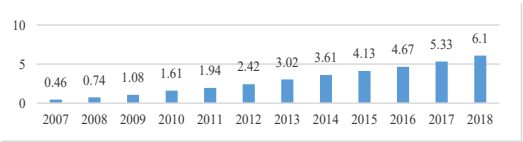

Fig6. Scale of online shopping users in China from 2007 to 2018
Data source: "Statistical Report on China Internet Development"

The popularity of the Internet is a necessary condition for the rapid development of e-commerce. "Internet +" has become the mainstream trend of economic development in the future. Artificial intelligence, big data, 5G and other cutting-edge science and technology are highly integrated with the real economy, and will surely produce economic development. New kinetic energy. As can be seen from Figure 5, China's Internet penetration rate has been increasing, and it has reached 59.6% by 2018, an increase of 3.8% from 2017.

With the popularization of Internet shopping online, the scale of online shopping users in China has been continuously increasing from 2007 to 2018, with an average annual compound growth rate of 17%, which is a very rapid growth. In 2018, China's online users reached 610 million (the blue bar chart in Figure 6, Unit 100 million people), as shown in the data in Figure 6 below. The scale of online shopping users is one of the important factors to measure the potential of e-commerce development. Therefore, it can be said that the development potential of China's e-commerce industry is great, and the level of transactions is also gradually improving.

2 Impact of e-commerce industry on export trade

2.1 Impact of e-commerce transaction level

The participation of e-commerce in international trade can reduce transaction costs, increase the types of traded goods, and give play to the competitive advantages of SMEs, thereby increasing the transaction volume of e-commerce enterprises and increasing the number of online shoppers, further promoting the level of e-commerce transactions and ultimately affecting China's export trade amount.

2.2 Impact of e-commerce infrastructure

Electronic data exchange is a data exchange tool widely used in the world. It can standardize the company's daily economic information data according to the agreement and transmit it back and forth. Only standardized and standardized logistics services can improve the efficiency of e-commerce transactions, increase consumer satisfaction, and help increase the sales profits of e-commerce companies, thereby promoting the growth of export trade.

2.3 E-commerce Human Resources Impact

The vigorous development of e-commerce will inevitably increase the market's demand for high-end talents such as e-commerce and international trade. International trade competition will force companies to improve the overall level of human resources and optimize local talent resources through corporate training and other means.The goverment effectively improve the level of human capital, promote the improvement of labor efficiency, and finally optimize the operating environment of e-commerce companies, enhance their international competitiveness, and ultimately expand export trade.

2.4 Impact of e-commerce development potential

E-commerce has promoted the formation of a virtual trading market, allowing commodity transaction information to fully flow around the world, transaction information is more open, transparent, and time-sensitive, thereby reducing the asymmetry of transaction information between buyers and sellers, and avoiding the incomplete impact of transaction information on transactions the interests of both parties.

3 An Empirical Analysis of the Development Level of Electronic Commerce Industry on China's Export Trade

3.1 Model building and data description

Table1. Variable interpretation

Variable	Meaning
EX	China's export trade scale
ECDI	e-commerce industry development level
REER	Renminbi effective real exchange rate

Table2. Variable description statistics

	EX	ECDI	REER
Mean	12.91000	1.000000	111.3373
Median	13.71000	0.925625	114.2200
Maximum	16.42000	1.816027	125.0500
Minimum	8.200000	0.368428	97.87000
Std. Dev.	2.428786	0.508686	9.029611
Skewness	-0.551808	0.325418	-0.095532
Kurtosis	2.459758	1.694318	1.692184
Jarque-Bera	0.692004	0.975513	0.800657
Probability	0.707511	0.614002	0.670100
Observations	11	11	11

During 2008 and 2018, the unit root test, cointegration test, Granger causality test and other methods were used to study the impact of the e-commerce industry development level and the effective exchange rate of RMB on total export trade.Based on the above variables, this article establishes the following multiple regression model:

$$LNEX=\beta 0+\beta 1\ LNECDI+\beta 2LNREER+u$$

In the above formula, EX is the total export trade, ECDI indicates the development level of the e-commerce industry, and REER indicates the actual effective exchange rate of RMB. β0 represents the constant term, β1 and β2 are the regression coefficients of two variables[3]. In order to eliminate the influence of heteroscedasticity and dimension, each variable is analyzed after natural logarithm processing. The original data description statistics of each variable are as follows. According to the statistical description of the data in Table 2, the minimum value of the total export trade is 8.2, the maximum value is 16.42, and the average value is 12.91, indicating that the changes in total export trade over the years vary greatly; the minimum value of the e-commerce industry development level is 0.368, the maximum value It is 1.816, with an average value of 1, indicating that the development level of the e-commerce industry has varied greatly over the years; the minimum effective exchange rate of the RMB is 97.87 and the maximum is 125.05, indicating that the actual effective exchange rate of the RMB varies greatly over the years. And the statistical significance of each variable Jarque-Bera P value is greater than 0.05, indicating that the total export trade, the level of e-commerce industry development, and the actual effective exchange rate of RMB all follow a normal distribution.

3.2 Related analysis

This article first analyzes each factor and total export trade, and the relevant analysis results are shown in Table 3.

Table3. related analysis

	LNEX	LNECDI	LNREER
LNEX	1.0000		
LNECDI	0.8898***	1.0000	
LNREER	0.8504***	0.8547***	1.0000

Note: ***, **, and * represent 1%, 5%, and 10% significance levels, respectively

According to the relevant test results, the correlation coefficient between the development level of the e-commerce industry and the total export trade is 0.8898, which has passed the significance test at the 1% significance level, indicating that there is a positive correlation between the development level of the e-commerce industry and the total export trade.

3.3 Unit root test

Table4. Unit root test

Variable	ADF Statistics	Critical value			Prob.	In conclusion
		1%	5%	10%		

LNEX	-0.814997	-4.297073	-3.212696	-2.747676	0.7695	Non-stationary
D(LNEX)	-5.161069	-4.420595	-3.259808	-2.771129	0.0039	Smooth
LNECDI	-1.756745	-4.297073	-3.212696	-2.747676	0.3773	Non-stationary
D(LNECDI)	-2.947260	-4.420595	-3.259808	-2.771129	0.0778	Smooth
LNREER	-0.901685	-4.297073	-3.212696	-2.747676	0.7424	Non-stationary
D(LNREER)	-2.336729	-2.847250	-1.988198	-1.600140	0.0260	smooth

The author further tests the stability of each variable. This article will use the more common ADF test method to test the stability of each variable. The test results are shown in Table 4below.

3.4 Cointegration test

It can be seen from the unit root test results that each variable is a stationary sequence of the same order. For this reason, the author further carries out the co-integration test and uses the Johansen co-integration test. The results of the cointegration test are shown in Table 5.

From the trace test and the maximum eigenvalue test results as shown in Table 6, the significance level of the total export trade and the e-commerce industry development level[4], the actual effective exchange rate of RMB in "None" is less than 0.05, and the co-integration test is passed, indicating that the total export trade. There is a co-integration relationship with the development level of the e-commerce industry and the real effective exchange rate of RMB. To this end, OLS regression is further performed and the regression equation is obtained as follows. The regression equation can be obtained from the regression coefficient results in Table 7.

ΛNEΞ=0.2085ΛNEXΔI+0.8243ΛNPEEP−1.3045

Among them, the model fitting degree is 0.989582, and the adjusted fitting degree is 0.986978, indicating that the model fitting degree is high, and the development level of e-commerce industry and the actual effective exchange rate of RMB have a high degree of explanation for the total export trade. The significance of F test is 0. Passing the F test shows that the regression results of the model are reliable.

The regression coefficient of the e-commerce industry development level at the 1% significance level is 0.208505, indicating that there is a significant positive correlation between the e-commerce industry development level and the total export trade. That is, for every positive percentage change in the development level of the e-commerce industry, the total export trade also changes positively by 0.208505 percentage points. The improvement of the development level of the e-commerce industry has played a positive role in promoting the total export trade.

The regression coefficient of the actual effective exchange rate of RMB at the 1% significance level is 0.824311, indicating that the effective exchange rate of RMB is significantly positively related to the total export trade. That is, for every positive change in the real effective exchange rate of RMB, the total export trade also changes positively by 0.824311 percentage points. The real effective exchange rate of RMB has a positive effect on the total export trade.

Table5. Trace inspection results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.993250	75.98640	35.19275	0.0000
At most 1 *	0.877920	26.00417	20.26184	0.0072
At most 2	0.391852	4.973374	9.164546	0.2863

Table6. Maximum eigenvalue test result

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.993250	49.98224	22.29962	0.0000
At most 1 *	0.877920	21.03079	15.89210	0.0071
At most 2	0.391852	4.973374	9.164546	0.2863

Table7. Regression result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNECDI	0.208505***	0.013384	15.57892	0.0000
LNREER	0.824311***	0.154951	5.319807	0.0007
C	-1.303474	0.733453	-1.777174	0.1134
R-squared	0.989582	F-statistic		379.9530
Adjusted R-squared	0.986978	Prob(F-statistic)		0.000000

Note: ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

4 Conclusions

This article measures the development level of China's e-commerce industry from 2008 to 2018 by establishing a comprehensive and scientific e-commerce index system[5]. The measurement results show that the development level of China's e-commerce industry from 2008 to 2018 has increased year by year and developed at a faster rate. However, the development of China's e-commerce industry is still not perfect, facing various problems, there is still much room for improvement. The empirical results also show that increasing the level of e-commerce industry will have a positive impact on China's export trade. When regressing on the overall e-commerce index, it was found to be significant at a 1% significance level, indicating that the e-commerce industry development level has a positive impact on China's export

trade. It can be seen from the empirical regression results of the extended model in this paper that e-commerce has become an important factor affecting China's export trade, and the improvement of its development level is conducive to increasing China's total export trade, thereby driving China's economic growth. However, due to the current limitations of China's capital and technology, the focus of different reforms on e-commerce is also different. As can be seen from the regression results of e-commerce sub-indicators, different first-level indicators have different impacts on China's export trade[6]. Therefore, we should first reform the indicators with greater impact, increase capital investment, and better promote the development of China's import and export trade.

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