

# An Empirical Study on the Impact of China's E-commerce Development on Export Trade

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**Keywords:** E-commerce, Cross-border e-commerce, Export trade, Impact

**Abstract:** At home and abroad, this paper will concentrate on the perspective of the development of electronic commerce and the export trade development, draw lessons from advanced literature at home and abroad, and analyzes its limitations, establishing electronic commerce the influence mechanism of our country foreign trade export, and to our country's current e-commerce and the development of our country foreign trade status and the existing problems are studied. Finally, according to China's current policy and e-commerce market environment, put forward the strategy and suggestions to further expand e-commerce activities. China's e-commerce activities do have an important impact on China's export, and with the improvement of China's e-commerce level, the growth of trade volume will play a positive role in promoting China's export. Through the development of e-commerce activities, can significantly improve the export of a country's foreign trade, thus promoting the country's international trade. E-commerce can reduce international trade barriers between suppliers and the national consumers, through the logistics, information flow and cash flow, greatly reduces the country's purchase cost, reduce the cost of international suppliers, simplify the international market, improve the international suppliers and cooperation between countries, to produce more trade opportunities, promote the export of international trade.

## 1. Introduction

Since the sudden outbreak of COVID-19 in 2020, the development of e-commerce in China has encountered severe challenges. However, the development of e-commerce in China has a rapid momentum and has become the core force in building a new development pattern with domestic circulation as the main body and domestic and international double circulation promoting each other. Among them, online service e-commerce innovation is active, live e-commerce provides a new mode of digital retail for agricultural products and more brands, B2B e-commerce accelerates the digital collaboration of upstream and downstream enterprises in the supply chain, and cross-border e-commerce has become an important force to stabilize foreign trade since the outbreak of the epidemic[1]. Rural e-commerce has helped to overcome poverty and successfully completed the "RCEP agreement" signing to promote the new development of "Silk Road e-commerce" cooperation.

The important role of e-commerce in China's economic growth is as follows: first, it is an effective means to increase farmers' income. E-commerce combines manufacturing and sales closely, and it does not need to spend a lot of energy or invest a lot of money, and it can quickly achieve profits. Secondly, e-commerce has become a good entry point, which can transform our agricultural development model. E-commerce gradually turns blind production into relying on the large market, and starts production after receiving orders, so as to avoid sales difficulties. Third, in the consumer market, e-commerce is a new development space. With the continuous improvement of farmers' income, the consumption level of farmers has gradually increased, but the consumption environment of the vast rural areas has not been fully developed. E-commerce has opened a convenient channel for commodity markets below the county level. Fourth, e-commerce has become a huge platform for "mass entrepreneurship and innovation".

This paper will open the thinking of this paper from the relationship between the development of e-commerce and the growth of export trade in China, draw on the experience of excellent documents

and analyze the limitations of these documents, try to build the impact mechanism of e-commerce on China's export trade through theoretical analysis, analyze the current situation and existing problems of China's e-commerce and China's international trade exports, and analyze and test them by using the individual fixed effect multiple regression model, Determine the relationship between e-commerce activities and China's international trade exports[2]. Finally, combined with the current policy background and the market environment of e-commerce activities, this paper puts forward some countermeasures and suggestions on how to expand e-commerce activities to promote China's international trade exports.

## **2. Literature review and review**

### **2.1 Foreign literature review**

Jauhwa Lee (2012) collected the import and export trade data of 23 representative countries, and physically analyzed the construction of a gravity model that the Internet is the main support point of modern international import and export trade. Esmeli Ramazan et al. (2022) have analyzed and studied the impact of early purchase prediction for shoppers in the e-commerce field by using scenario characteristics and loyalty characteristics.

### **2.2 Domestic aspect of the literature review**

Huang Yiting (2021) used industrial products trade export enterprises as a case to analyze and study the problems and strategic countermeasures of cross-border e-commerce transformation and upgrading of established export enterprises. Huang Xuqiang analyzed and studied the influence mechanism of e-commerce development on China's export trade under "Belt and Road". Chen Boetal. (2022) put forward constructive suggestions on the current situation and problems of cross-border e-commerce development in China. Xiong Ying (2022) analyzed and studied the marketing strategy of e-commerce webcast.

### **2.3 Literature review**

The analysis results of various documents at home and abroad can help people to diversify the impact of e-commerce on import and export trade[3]. But I need to point out here is that the foreign and domestic references still exist some problems, the first is some domestic experts and scholars to research selection data is not fine, and because the development time of e-commerce in China is short, so many experts and scholars research data have partial missing, many experts and scholars for the average and approximate mathematical method instead, which makes the empirical research results and the actual results in real life[4].

## **3. Current analysis of E-commerce development and export trade in China**

In order to empirically analyze the impact of China's e-commerce development on the development of export trade, this chapter analyzes the current situation of the whole country and the provinces and municipalities[5].

### **3.1 Current analysis of E-commerce development in China**

Since the outbreak of COVID-19 in 2020, China's e-commerce has gradually become the main force in the fight against COVID-19, ensuring the epidemic and living supplies for residents, and has played a positive role in helping the resumption of production, stabilizing employment, and solving the sales problems of agricultural products (see Figure 1).

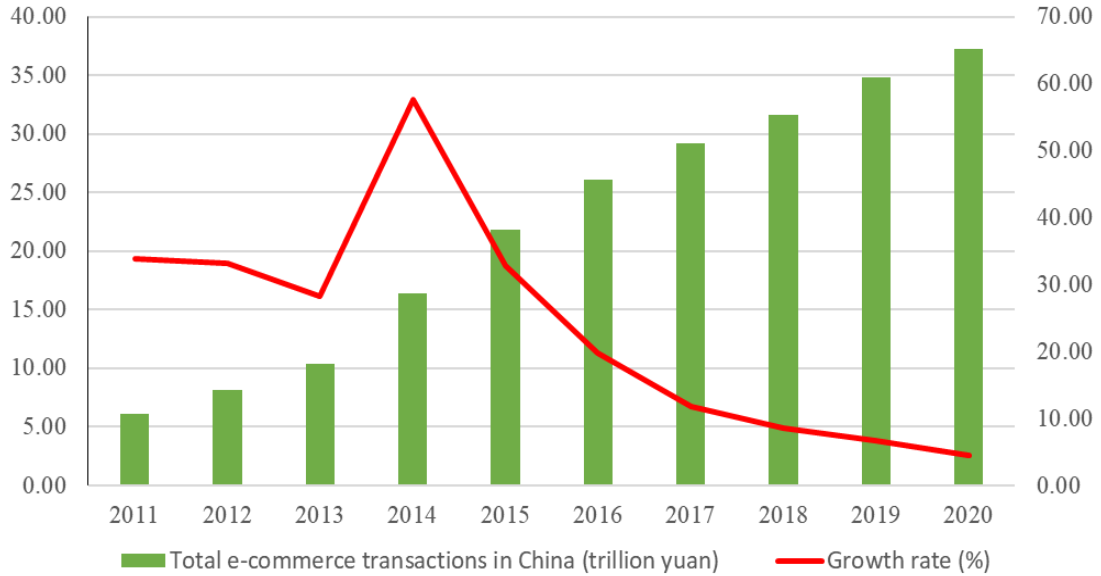


Figure 1 Total volume and growth rate of E-commerce transactions in China in 2011-2020

Data source: China E-commerce Report 2020

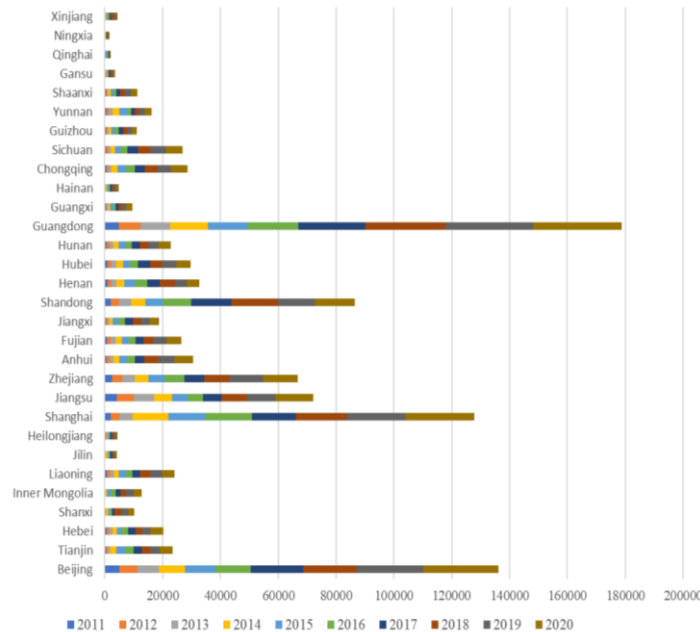


Figure 2 E-commerce transaction volume of Chinese provinces from 2011 to 2020

Data source: National Bureau of Statistics

The development of e-commerce in China is unbalanced, the east is strong and the west is weak, the regional imbalance, and the gap of e-commerce transaction volume is large in the east, central and western regions[6]. From the analysis of the e-commerce transaction volume in the eastern, central and western regions of China from 2011 to 2020(see Figure 2), we can know that the eastern region is far ahead, followed by the central region. Although the total volume in the western region is relatively low, the growth rate is fast and the development momentum is good.

### 3.2 Analysis of export trade

From 2011 to 2020, China's export trade was generally in a stable state, with a brief negative growth in 2015 to 2016, and reaching the previous stable state in 2017 (see Figure 3).

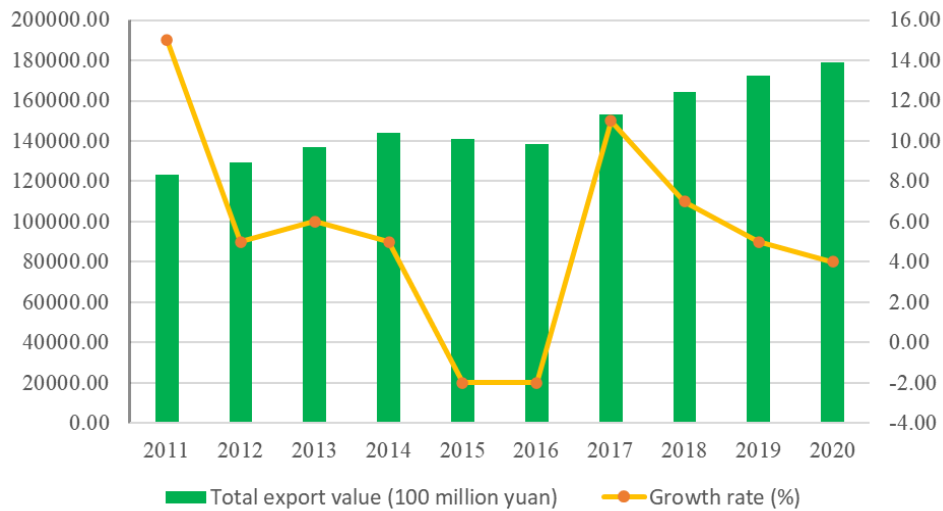


Figure 3 China's total export trade from 2011 to 2020

Data source: National Bureau of Statistics

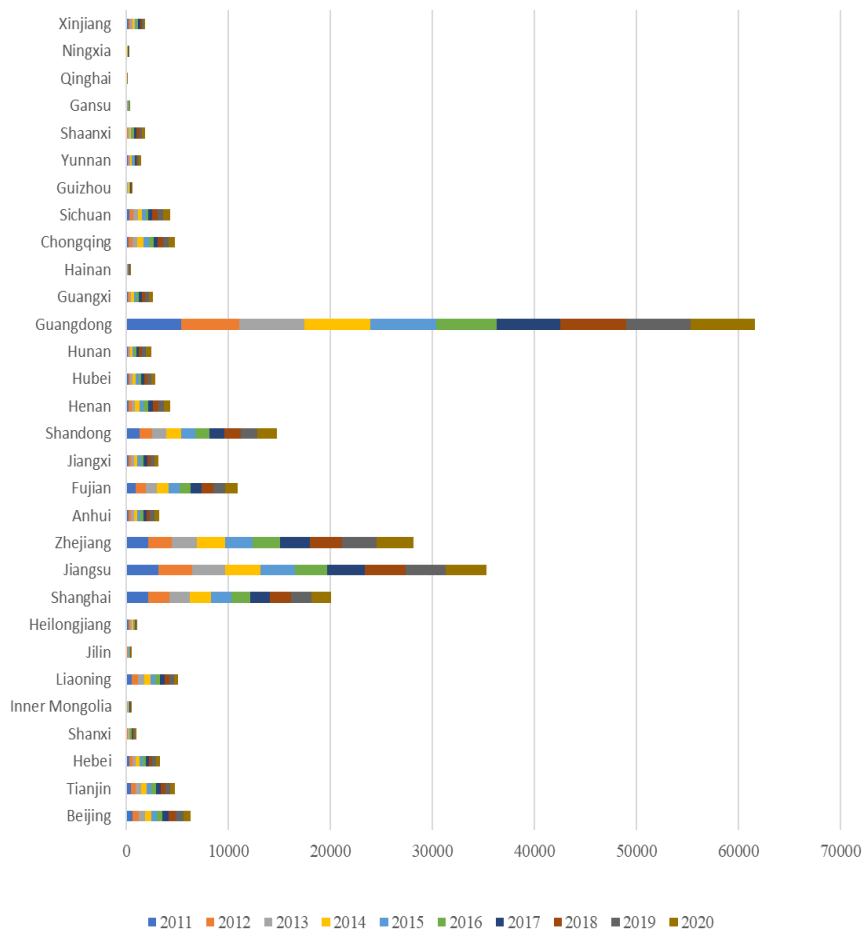


Figure 4 Export Trade volume of Chinese provinces from 2011-2020

Data source: National Bureau of Statistics

China's export trade development is uneven, the east is strong, the central and western regions are weak, various regions are unbalanced(see Figure 4), the east, central and western regions of the export trade development level gap is large[7]. From the analysis of the export trade volume of China's eastern, central and western regions from 2011 to 2020, we can know that the eastern region leads the lead, followed by the central regio[8]n. Although the total volume in the western region is low, the growth rate is fast and the development potential is huge.

## 4. The impact of the development of E-commerce on export trade in China

### 4.1 Empirical model construction

Based on the above theoretical basis and the constructed impact mechanism model, due to the late start of e-commerce, due to the lack of available data, the number of samples is limited, and it is difficult to use the traditional multiple regression method to fit and further hypothesis test. In order to more accurately study the impact of e-commerce activities on China's exports, taking into account the integrity and availability of sample data, we can construct the total annual export volume of 30 provinces and cities in Chinese mainland as an explanatory variable, its annual e-commerce transactions ( e-commerce ), the provinces and cities within the enterprise e-commerce transaction area ( enterprise proportion ), and the provinces and cities under the number of enterprise e-commerce transactions ( number ). Based on the multiple regression analysis of the panel model with annual gross domestic product ( GDP ) and exchange rate ( exchange rate ) as explanatory variables, this paper further studies the role of e-commerce activities in China's exports from 2011 to 2020.

The initial time series cross section model for the influence of e-commerce activities on export in China is studied(1):

$$Lnexp_{it} = c + \beta_1 Lnecom_{it} + \beta_2 Lnper_{it} + \beta_3 Lnnum_{it} + \beta_4 Lngdp_{it} + \beta_5 Lnex_t + \mu_{it} \quad (1)$$

### 4.2 Variable description and data source

#### 4.2.1 Variable declaration

Interpreted variable: the annual export of 30 provinces and municipalities.

Core explanatory variables: the annual e-commerce transaction volume in each province and municipality, the proportion of enterprises with e-commerce transaction activities in all provinces and municipalities, and the number of enterprises with e-commerce transaction activities in all provinces and municipalities.

Control variables: annual GDP and average US dollar / RMB exchange rate of all provinces and municipalities.

#### 4.2.2 Data sources and descriptive statistics

All the data in this article are derived from the National Bureau of Statistics. In data processing, very few missing values are eliminated. Secondly, the measurement software used in this article is Eviews, which measurement and analyzes the collated data.

#### 4.2.3 Geographic division

China is divided into three eastern, central, and western regions.

### 4.3 Empirical results analysis

#### 4.3.1 National overall analysis

Table 1 Descriptive Statistics of Variables (Nationwide)

Variable name	Variable meaning	sample number	mean value	standard deviation	minimum value	maximal value
lnexpt	Exports of all provinces and municipalities	300	5.512	1.590	0.576	8.774
lnecom	E-commerce transaction volume of all provinces and municipalities	300	7.272	1.459	3.091	10.327
per	The proportion of enterprises with e-commerce transaction activities	300	0.073	0.043	0.004	0.228
lnnum	Number of enterprises with e-commerce transaction activities	300	7.051	1.450	2.402	9.737
lngdp	Gross domestic product of all provinces and municipalities	300	9.784	0.884	7.223	11.615
ex	The average exchange rate of the US dollar against the Chinese yuan	300	6.514	0.273	6.143	6.899

Source: the author statistics collation, National Bureau of Statistics.

China's e-commerce activities do have a significant impact on China's exports, and with the continuous development of China's e-commerce degree, the continuous increase of e-commerce transaction volume, will have a positive role in promoting China's exports (see Table 1).

#### 4.3.2 Regional heterogeneity of the influence of e-commerce development on China's export trade

In order to investigate whether there are differences in the impact of e-commerce development on export trade between different regions of China, this paper is analyzed in this section. In order to more highlight the role of economic development, according to the three economic regions under the new situation of China's accelerated economic and social development: the eastern, central and western regions (see Table 2\3\4). The eastern region includes 11 provinces and cities including Beijing, the central region includes eight provinces including Shanxi, and the western region includes 11 provinces or autonomous regions including Chongqing.

Table 2 Descriptive Statistics of Variables (Eastern Region)

Variable name	Variable meaning	sample number	mean value	standard deviation	minimum value	maximal value
Inxpt	Exports of all provinces and municipalities	110	6.806	1.360	3.057	8.774
Inecom	E-commerce transaction volume of all provinces and municipalities	110	8.264	1.229	4.441	10.327
per	The proportion of enterprises with e-commerce transaction activities	110	0.088	0.047	0.009	0.228
Innum	Number of enterprises with e-commerce transaction activities	110	7.887	1.273	3.046	9.737
lngdp	Gross domestic product of all provinces and municipalities	110	10.234	0.864	7.809	11.615
ex	The average exchange rate of the US dollar against the Chinese yuan	110	6.514	0.274	6.143	6.899

Source: the author statistics collation, National Bureau of Statistics.

Table 3 Descriptive statistics of Variables (Central Region)

Variable name	Variable meaning	sample number	mean value	standard deviation	minimum value	maximal value
Inxpt	Exports of all provinces and municipalities	80	5.164	0.797	3.738	6.385
Inecom	E-commerce transaction volume of all provinces and municipalities	80	7.103	1.076	4.316	8.745
per	The proportion of enterprises with e-commerce transaction activities	80	0.059	0.036	0.004	0.144
Innum	Number of enterprises with e-commerce transaction activities	80	6.952	1.222	3.779	8.671
lngdp	Gross domestic product of all provinces and municipalities	80	9.909	0.522	8.953	10.915
ex	The average exchange rate of the US dollar against the Chinese yuan	80	6.514	0.275	6.143	6.899

Source: the author statistics collation, National Bureau of Statistics.

Table 4 Descriptive Statistics of Variables (Western Region)

Variable name	Variable meaning	sample number	mean value	standard deviation	minimum value	maximal value
expt	Exports of all provinces and municipalities	110	4.472	1.326	0.576	6.511
lnecom	E-commerce transaction volume of all provinces and municipalities	110	6.405	1.309	3.091	8.683
per	The proportion of enterprises with e-commerce transaction activities	110	0.068	0.039	0.007	0.139
lnnum	Number of enterprises with e-commerce transaction activities	110	6.288	1.329	2.402	8.679
lngdp	Gross domestic product of all provinces and municipalities	110	9.244	0.830	7.223	10.791
ex	The average exchange rate of the US dollar against the Chinese yuan	110	6.514	0.274	6.143	6.899

Source: the author statistics collation, National Bureau of Statistics.

#### 4.4 Brief summary

This chapter is the focus of this paper, using the panel regression theory to effectively analyze the influence of Chinese e-commerce development and export trade. This chapter first introduces the metric model to be established in this paper, and describes the variables and specific sources needed in detail, and discusses the estimation method in this paper, and selects the model suitable for this paper according to the experimental results.

#### 5. Conclusions

According to the statistics of the Ministry of Commerce, under the rapid development of the Internet, the total amount of e-commerce in China reached 37.21 trillion yuan in 2020, an increase of 6.9% over the same period last year. China's e-commerce has gradually become the main force in the fight against the epidemic and ensuring the supply of materials for residents[9]. The regional development mode of cross-border e-commerce shows the strength of the eastern region and the weakness of the west. In terms of scale, the eastern coast is still the best. From 2011 to 2020, the linear regression models in 30 provinces in China showed good statistical characteristics. China's e-commerce activities do have an important impact on China's export, and with the growth of the e-commerce level and trade scale of Chinese enterprises and companies, it will play a positive role in promoting China's export. From 2011 to 2020, the results of the regression analysis in the eastern and central provinces showed good statistical characteristics. The e-commerce activities in the eastern and central provinces do have an important impact on the exports of the central and eastern regions, and with the improvement of the e-commerce level in the province, its trade volume will play a positive role in promoting the exports of the central and eastern regions. The level of economic development in the western region is relatively low, therefore, the development of e-commerce in the major provinces does not play a positive role in promoting the growth of China's foreign trade.

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