

The Influences of E-Commerce on International Trade

-Evidence from Zhejiang Province of China

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Abstract—With the globalization of world economy and the rapid development of information technology, e-commerce has emerged and played an increasingly important role in international trade. The development of e-commerce in China represents a rapid and robust development trend. Zhejiang province, as the earliest and the fastest place of e-commerce development in China, has a high level of e-commerce development. This research empirically examined the data of 40 counties in Zhejiang province in 2014 to investigate the influences of e-commerce on international trade. The analysis results indicate that e-commerce does have a positive effect on international trade. Moreover, this research proposes suggestions to facilitate the development of e-commerce based on the analysis results, thus improving China's international trade development.

Keywords—E-commerce; International trade; Influences; Zhejiang province

I. INTRODUCTION

With the continuous integration of the world economy, international trade has become one of the most important engines of the economic growth. Since the development of information technology, e-commerce is playing an increasingly crucial role in international trade. China, as one of the largest economies in the world, both its trade and e-commerce has shown a strong growth trend. However, in recent years, because of the lacking of recovery impetus of world economy and rising domestic production costs, international trade growth rate in China has been slowed down. Meanwhile E-commerce in China maintained a rapid growth with the annual growth rate over 30%. How will the rapid growth of e-commerce affect the development of trade? Can we further promote the development of international trade through the development of e-commerce, especially cross-border e-commerce? Based on the above questions, this paper aims to investigate what kind of influences will be imposed on international trade by e-commerce.

Zhejiang Province is one of the earliest, fastest and largest provinces in China's e-commerce development. The largest e-commerce enterprise of China, Alibaba, is located in Zhejiang. This work uses economic data of 40 counties in Zhejiang Province in 2014 to empirically analyze the role of e-commerce played in promoting international trade.

Furthermore, we will provide some suggestions based on the analysis results, in order to exploit the possibility of promoting China's international trade through e-commerce.

II. E-COMMERCE

A. An Overview of E-commerce

E-commerce refers to the process of purchasing or selling products or services nationally or internationally over an electronic network [1]. The most popular medium in which e-commerce is conducted is the internet. The emerging of internet provides the possibility of individualization of trade [2]. It allows the consumers to purchase commodities directly from a foreign seller without traveling to the seller's country. The internet also gives sellers the opportunities to put their storefronts, in the form of Web pages, in front of consumers worldwide.

The emerging of e-commerce has changed the way of doing business and the mode of conducting international trade. The whole process doing business, including product design, production, distribution, marketing, and services support, has been efficiently improved by e-commerce. The cost of trade has been reduced, and the value of trade has been dramatically increased.

Since 1990s, the volume of global e-commerce has shown a strong tendency of growing. In 1999, global e-commerce was worth over \$150 billion only [2]. The global e-commerce has reached \$3,888 billion in 2005, and has rocketed up to \$16,135.7 billion in 2009 [3]. According to UNCTAD, in 2015 the global e-commerce market value has hit \$22.1 trillion.

After years of explosive growth, China has ranked the largest e-commerce market in 2015, followed by United States, South Korea, France, and United Kingdom. China's e-commerce market has increased from RMB 3.5 trillion in 2012 to RMB 26.7 trillion in 2017, accounting for more than 40 percent of the world's total [4]. With the fast development of e-commerce in China, many e-commerce companies have grown up, such as Alibaba and JD.cn. These enterprises provide a convenient online shopping platform, bringing thousands of international enterprises and domestic enterprises conducting transactions together.

B. *E-commerce Impact on International Trade*

Many experts believe that e-commerce has certain kinds of influences on international trade. The impacts of e-commerce on international trade can be classified into two groups: cost and efficiency.

1) *Cost reduction of international trade*: The application of electronic means and the internet makes the process of doing international trade much easier, faster and less expensive [5]. The cost of collecting international information across national borders, searching for the optimal suppliers, negotiating the price, arranging deliveries and marketing the products are all very expensive and costly [2]. Moreover, the companies' labor costs and office rentals can be largely decreased. The emerging of e-commerce reduces both the people and procedures that revolved during a transaction and brings the sellers and buyers close to each other.

2) *Improve the efficiency of international trade*: The e-commerce allows for gains in productivity due to improved efficiency from the automation of transactions [6]. The seller and buyer can be easily matched through e-commerce applications, which improve the communication efficiency. The use of EDI technology, which means the traders exchange standards, standardized file format using electronic means, can improve the transaction efficiency obviously. Moreover, e-commerce enables SMEs to enter into the world market and compete with larger cooperations easily, which makes the whole market compete efficiently.

III. E-COMMERCE DEVELOPMENT IN ZHEJIANG PROVINCE

A. *E-commerce Development Environment of Zhejiang Province*

1) *The trade situations*: In recent years, the global economy is still in a difficult recovery stage. Refer to China, the appreciation pressure of RMB, arising prices of raw materials and labour, and frequent trade frictions all contribute to a downward pressure to Chinese trade volume. From the perspective of Zhejiang province, the import and export volume and growth rate is basically consistent with the overall environment of China's import and export development. From 2010 to 2015, the total amount of foreign trade in Zhejiang province continued to increase slightly and steadily. The exports show a better situation than imports, but with a decreasing growth rate. According to Zhejiang Statistical Information Network Statistics, despite the year-on-year decline in the trade volume, cross-border e-commerce of Zhejiang province has reached RMB 27 billion, with a year-on-year growth more than 30%.

2) *Political environment*: By the end of the 20th century, the e-commerce shows strong vitality since its birth [7]. With its potential of promoting the national economic development and upgrading economic structure, the national policy of China has shifted from regulating and guiding development of e-commerce to promoting development of e-commerce. Between 2012 and 2015, the state council, the ministry of commerce, the general administration of customs and other relevant departments have issued many policies to perfect the law and regulation systems of e-commerce and support its development, including "Several Opinions about Utilising E-Commerce Platform to Conducting International Trade", "Opinions on Supporting Cross-Border E-Commerce Retailing Sales," "Announcement on Further Promoting Healthy and Rapid Development of Electronic Commerce", etc.. In recent years, "Internet plus foreign trade", "One Belt, One Road" Initiatives, "overseas warehouse" and other issues have brought new opportunities for the development of cross-border e-commerce.

In addition to the favorable policy of China, Zhejiang province has also continuously issued relevant policies and measures to promote the development of e-commerce. Since 2008, Zhejiang province has taken the lead in implementing the "10,000 E-commerce Enterprises Project", guiding the enterprise to conduct e-commerce. In early 2015, the state council approved the establishment of the first cross-border e-commerce comprehensive reform pilot zone in Hangzhou, Zhejiang province. In 2016, the department of commerce of Zhejiang and other relevant departments issued "Guidance and Advices about Vigorously Promote Cross-Border E-Commerce Industrial Clusters in Zhejiang Province".

B. *Characteristics of E-commerce Development in Zhejiang Province*

1) *The number of e-commerce enterprises is increasing*: According to the data of China E-commerce Research Center, by the end of 2014, more than 30,000 companies have engaged in cross-border e-commerce, and more than 300,000 online stores operated on the major cross-border e-commerce platform. In the transaction records of the largest B2B trading platform in China, Zhejiang Province has accounted for approximately 50 percent of the orders with sales more than RMB 10 million.

2) *The depth and breadth of e-commerce business is expanding*: In 2014, the total cross-border e-commerce exports of Zhejiang Province reached RMB 39 billion. E-commerce has been widely applied in various fields, such as retail, finance, tourism, etc..

3) *The supporting system of e-commerce has been improved*: According to data released by China E-Commerce Research Centre, by the end of 2014, there are 30 county-level e-commerce service centers, 4,491 village-level e-commerce service points and 114 e-commerce pioneer parks in Zhejiang province. Furthermore, with the rapid increasing of e-commerce, the supporting system, such as payment system and logistics system, also entered into a fast development

period, promoting the e-commerce trade development of Zhejiang Province, and even China.

IV. EMPIRICAL ANALYSIS OF THE EFFECT OF E-COMMERCE ON THE TRADE OF ZHEJIANG PROVINCE

A. Regression Models

Gravity model theory originated from Newton’s law of universal gravitation. Tinbergen (1962) first introduced the gravity model into international trade analysis [8]. He concluded that trade between two countries is determined by the economic size of each country and distances between these two countries. This research will use expanded gravity model to investigate how e-commerce influences international trade.

We use the cross section statistics of 40 counties in Zhejiang Province to analyze the influences posed on international trade by e-commerce. The exports of each county, imports of each country, and total trade volume of each county are used as dependent variable respectively. The Alibaba e-commerce development index (AEDI) of each country is used as explanatory variables. Other variables, including each

county’s FDI, population (POP), GDP, per capita income (PCDI), whether landlocked (DSS), are used as the control variables. Thus, we can set up three multiple regression models:

$$\ln EXP = \alpha_0 + \alpha_1 \ln AEDI + \alpha_2 \ln GDP + \alpha_3 \ln POP + \alpha_4 \ln PCDI + \alpha_5 \ln FDI + DSS + \mu_1 \tag{1}$$

$$\ln IMP = \beta_0 + \beta_1 \ln AEDI + \beta_2 \ln GDP + \beta_3 \ln POP + \beta_4 \ln PCDI + \beta_5 \ln FDI + DSS + \mu_2 \tag{2}$$

$$\ln T = \gamma_0 + \gamma_1 \ln AEDI + \gamma_2 \ln GDP + \gamma_3 \ln POP + \gamma_4 \ln PCDI + \gamma_5 \ln FDI + DSS + \mu_3 \tag{3}$$

The Alibaba e-commerce development index is obtained from Ali research Centre [9]; all other data are acquired from 2015 Zhejiang Statistical Yearbook [10]. Whether a county is landlocked or coastal are set as dummy variable, indicated by DSS. If a county is in a coastal location, DSS equals 1; when the county is not in a coastal location, DSS is 0.

B. Description of The Figure

The following table presents the description of the variables.

TABLE I. DESCRIPTION OF THE VARIABLES

Variable	Average Value	Standard Deviation	Minimum	Maximum
EXP	275187.2	393959.7	6368	2370934
IMP	42374.9	77621.55	1	413963
T	317562.1	426376.4	8125	2419063
AEDI	10.74132	4.761428	7.204	34.516
GDP	402.7182	268.5584	50.78	1109.41
POP	62.45025	33.34458	11.36	133.18
PCDI	37328.32	6402.915	26224	51899
FDI	10527.6	13970.42	10	45098

C. Tests and Modification of the Model

In order to make the gravity model closer to the reality, the multi-correlation test will be conducted, and further corresponding modification of the model will be made.

TABLE II. MULTI-CORRELATION TEST OF VARIABLES

Correlation	lnAEDI	lnGDP	lnPOP	lnPCDI	lnFDI
lnAEDI	1.0000				
lnGDP	0.4696	1.0000			
lnPOP	0.3572	0.8456	1.0000		
lnPCDI	0.4322	0.8689	0.5548	1.0000	
lnFDI	0.2826	0.6779	0.4530	0.5817	1.0000

As indicated in Table 2, GDP, population and income per capita of each county shows relatively high relations, indicated that there may have kind of multi-correlation effects on the results. Therefore, the model has been modified as follow:

$$\ln EXP = \alpha_0 + \alpha_1 \ln aEDI + \alpha_2 \ln GDP + \alpha_3 \ln PCDI + \alpha_4 \ln FDI + DSS + \mu_1 \tag{1}$$

$$\ln IMP = \beta_0 + \beta_1 \ln aEDI + \beta_2 \ln GDP + \beta_3 \ln PCDI + \beta_4 \ln FDI + DSS + \mu_2 \tag{2}$$

$$\ln T = \gamma_0 + \gamma_1 \ln aEDI + \gamma_2 \ln GDP + \gamma_3 \ln PCDI + \gamma_4 \ln FDI + DSS + \mu_3 \tag{3}$$

D. Analysis Results

OLS regression has been conducted by robust test under fixed effects, the results are as follow:

TABLE III. OLS REGRESSION RESULTS

Model	Exports Model	Imports Model	Trade Model
Variables	lnEXP	lnIMP	lnT
DSS	-0.255 (0.164)	0.356 (0.547)	-0.094 (0.164)
lnAEDI	0.546* (0.281)	0.292 (0.912)	0.597*** (0.219)
lnGDP	1.040*** (0.238)	1.205* (0.704)	0.834*** (0.242)
lnPCDI	0.999** (1.308)	5.549* (2.910)	2.048* (1.191)
lnFDI	0.050** (0.051)	-0.018 (0.176)	0.031 (0.043)
_cons	-6.251* (12.300)	-56.779** (27.521)	-15.917 (11.239)
Adjusted R ²	0.8677	0.5979	0.8727
F Value	59.52	12.60	64.43
Prob > F	0.000	0.0000	0.0000

Note: * indicates significant at 10% level, ** indicates significant at 5% level, *** indicates significant at 1% level.

From Table 3, we can find that e-commerce development index positively influences exports and total trade at the significant level of 10% and 1 % respectively. GDP has positive effects on exports, imports and total trade at 1%, 10% and 1% significant level respectively. Per capita income promoted export, imports and trade at the significant level of 5%, 10% and 10% respectively. FDI has positive effects on the exports at 5% significant level, while whether the county is a coastal county has no significant influences on trade.

V. CONCLUSIONS AND SUGGESTIONS

Based on previous analysis, we can draw following conclusions. First, e-commerce has a positive significant influence on the exports and overall trade of Zhejiang Province. For every 1% improvement of e-commerce development index (AEDI), the exports value will increase by 0.546%, the total trade value will increase by 0.597%. E-commerce can help the companies to introduce their products to foreign customers and build up their brand, facilitating the outflows of trade and exports.

Second, e-commerce shows a positive effects on the imports of Zhejiang Province, but not significant. This result may be because of the fast development of manufacturing industry in Zhejiang. Most enterprises in Zhejiang are utilizing e-commerce to promote the sales of their products, rather than import something from overseas.

The above results give us the implication that we can facilitate international trade, especially the exports, by improving e-commerce development. So suggestions are brought forward:

First, carry out favorable and supportive policies of the development of e-commerce, mainly focusing on cross-border e-commerce. Cross-border e-commerce provides a convenient platform to match the supply and demand information in the international market, across there striction of time and spaces.

Second, enterprises should be encouraged to engage in import business through cross-border e-commerce, to promote the common development of cross-border e-commerce in both import and export. The government can adopt relevant tax preferential policies and corresponding measures to optimize and simplify the supervision mode of customs operation procedures. Furthermore, enterprises should strengthen its overseas stability of supply chain system and logistic system, promoting both exports and imports by utilizing the advantages of cross-border e-commerce.

Third, focus on optimizing the development conditions of e-commerce. Speed up the development of local e-commerce service industry chain, to provide integrated services for e-commerce development, including inventory, warehousing, payment clearing, logistics, customs clearance, investment and financing. Moreover, strength the international corporations, build up bilateral or multilateral cross-border e-commerce platform, to constantly improve the internal and external development environment of e-commerce.

Fourth, support the small and medium-sized enterprises to accumulate e-commerce experiences in the continuous application and practice. Nowadays, the small and medium-sized enterprises have become one of the main powers of economic development as the main body of the microscopical economic activities. Most business e-commerce in Zhejiang

province is conducted by small and medium-sized enterprises, thus it is extraordinarily crucial to encourage small and medium-sized enterprises to participate and develop e-commerce. Cross-border e-commerce platform enables more and more small and medium-sized enterprises to display their products to overseas buyers, and brings more opportunities to small and medium-sized enterprises, as well as an increased competition between them. This will help to realize the supply side economic structure reform, promote the small and medium-sized enterprises productivity, a dupgrade the transformation of economic structure.

Overall, development of e-commerce, on the one hand, can help the international trade to maintain stable growth; on the other hand, development of e-commerce helps small and medium-sized enterprises to upgrade their transformation, improve the quality of products, and create their own brands, thus promoting the healthy development of international trade.

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