Empirical Analysis of the Impact of China's Cross-border Electronic Commerce on Foreign Trade Based on VAR Model

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Abstract. In recent years, the volume of CEC transactions continues to rise, with its advantages of small amount, multi batch, flexible and efficient, simple process has become one of the most important factors affecting traditional foreign trade. The empirical analysis method based on VAR model can comprehensively and scientifically understand CEC, which is more conducive to the further development of foreign trade. This paper first analyzes the current situation of China's CEC development, then studies the impact of CEC on foreign trade based on VAR model, and finally gives countermeasures and suggestions to promote the interaction between CEC and foreign trade.

Keywords: Cross-border Electronic Commerce, Foreign Trade, VAR Model

1. Introduction

With the development of economic globalization, there is a trend of industrial hollowing out in capitalist countries[1]. In order to save the economy, some developed capitalist countries have set off a wave of quasi globalization. In this context, the development of global economy and trade in recent years has fallen into a downturn[2]. On the other hand, the volume of Cross-border Electronic Commerce (short for CEC in this paper) transactions in China has been increasing in recent years, and some research and analysis believe that the growth rate of CEC transactions in China will remain above 20% in the next few years[3]. The rapid development and growth of CEC has gradually replaced the traditional container mode of foreign trade with its advantages of small amount, multi batch, flexible and efficient, and simple process, which has become one of the most important factors affecting China's traditional cross-board trade. Based on the empirical analysis method of VAR model, this paper studies the impact of CEC on foreign trade, and analyses the development status and operation mode of CEC from macro and micro perspectives, which can not only comprehensively and scientifically understand CEC, but also further promote the development of foreign trade. Therefore, it is of great value and meaning to research the impact of CEC on foreign trade based on VAR model.

2. Analysis of the current situation of China's CEC development

2.1. Development scale of China's CEC

With the close trade of CEC between China and countries along the line, it has laid a foundation for CEC enterprises to open up the international market[4]. Despite the turbulence of the global economic environment and the rise of the anti globalization wave, the growth of China's foreign trade slowed down, but CEC is still developing vigorously against the trend. In recent years, with the impressive development of
China's information technology, as well as the improvement of market environment and many other favourable factors, China's cross-border export e-commerce has maintained a continuous expansion trend. According to the research data from China’s E-Commerce Research Centre, the current export CEC transaction scale growth is significantly faster than the scale growth of China's e-commerce industry. Figure 1 below shows the transaction scale and growth rate of China's export CEC market.

![Transaction scale and growth rate of export cross-border e-commerce market](image)

**Figure 1.** Transaction scale and growth rate of China's export CEC market

2.2. Market distribution of China’s export CEC
From the perspective of the distribution of export countries of CEC, countries as America and France are still the main destinations for China's export of e-commerce, mainly because these countries have perfect infrastructure and relatively mature online shopping environment[5-6]. In recent years, emerging markets such as Russia, Brazil and India have been booming, which has attracted a large number of Chinese e-commerce enterprises and sellers. Emerging markets have a broad foundation for e-commerce development, with huge potential for e-commerce development. They are the blue ocean of the next wave of market and an important growth point of China's export of CEC. Figure 2 below shows the distribution of China's export of CEC market.

![The distribution of China's export of CEC market](image)

**Figure 2.** The distribution of China's export of CEC market

3. Analysis of the influence of CEC on foreign trade based on VAR model
3.1. Analysis principle of VAR model
As one model that based on the nature of data statistics, each endogenous variable in the VAR model is regarded as an endogenous variable in the system, and the model is built based on the lag value of all endogenous variables. VAR model is composed of multiple time series variables, avoiding the needs of structural model. VAR model takes into account the relationship between various economic variables in the time series, and does not take into account the relevant economic theory. Its form is as follows:
In which, \( Y_t \) is an endogenous variable column vector, the variable selection of VAR model needs to be based on economic and financial theories, and also needs to consider the sample size in hand. When using VAR model to analyze practical problems, using non-stationary sequence variables will bring about difficulties in statistical inference, because standard statistical tests and statistical inference require that all sequences analyzed must be stationary.

3.2. Data selection and processing
In order to verify the interaction between the development of CEC and foreign trade, it should to eliminate the impact of exchange rate fluctuation, price level and changes in macro policy environment. Generally speaking, the total amount of import and export trade is usually used as an indicator to measure the development level of foreign trade and as an explanatory variable. Choose CEC transaction volume to measure the development level of CEC, as an explanatory variable. The premise of building VAR model is stationary series. Unit root test is carried out on three groups of time series data to check whether there is unit root, and the stationarity of time series is judged according to whether there is unit root.

3.3. Empirical analysis data test results
Firstly, based on the impulse response analysis, the dynamic influence of a certain impact in the system is judged. Impulse response analysis is made on the natural logarithm of total Import and Export (short for I&E) of foreign trade goods, e-commerce transaction amount and number of online shoppers. The results are shown in Figure 3 below. It can be seen from the data in the figure that the positive impact of CEC transaction volume will have a positive impact on the total I&E volume of goods trade and this impact will last for a long time. In addition, after a positive impact on the volume of e-commerce transactions in this period, the total I&E volume of foreign trade goods will fluctuate up and down. The results of impulse response analysis show that after the impact of external conditions, the volume of e-commerce transactions will be transferred to foreign trade through the market, which will bring a driving effect on foreign trade in goods, and this effect will last for a certain period of time.

![Figure 3. Results of impulse response analysis](image)

Secondly, based on variance decomposition, it could measure the contribution of the impact of endogenous variables in each VAR model to the change of endogenous variables, and further evaluate the importance of different structural impact. Based on variance decomposition, we can analyze the mutual influence and function among the three indexes of total import and export of foreign trade goods, e-commerce transaction amount and online shopping number, and make clear the mutual influence degree among total import and export of foreign trade goods, e-commerce transaction amount and online shopping number.

From the results of variance decomposition, it can see that increasing the volume of e-commerce transactions can play a positive role in the total import and export of foreign trade goods, but it cannot exceed its own positive role in the total import and export of foreign trade goods. At the same time, it should...
also see that the number of online shoppers has little contribution to the total import and export of foreign trade goods.

4. Suggestions on promoting the interactive development of CEC and foreign trade
First of all, make full use of modern artificial intelligence, information technology and other advanced technologies and means to build an intelligent logistics warehouse and artificial intelligence customer service platform. Secondly, actively integrate cloud computing technology into CEC industry, strengthen the integration of resources at home and abroad, speed up the flow of information, and reduce transaction losses caused by information asymmetry. In addition, it should also give full play to the role of big data analysis, so as to achieve personalized advertising push and marketing services, so that CEC transactions can be further increased. New technology means are conducive to reducing the process cost of CEC enterprises and improving trade efficiency.

Secondly, it should strengthen the standardized development of CEC industry, improve the supervision system of CEC, standardize the responsibilities that CEC operators need to bear, and improve the overall quality of the market. In addition, it should also be active in the field of CEC talents, and provide more CEC application talents with skilled trade operation ability and network marketing ability for the society. And further encourage small and medium-sized enterprises to expand the international market through CEC, promote small and medium-sized enterprises to adjust their business philosophy, strengthen their innovation ability, and further expand the international market through CEC.

5. Conclusions
In summary, with the rapid development and growth of CEC, it has become one of the most important factors affecting China's traditional foreign trade. Based on the empirical analysis method of VAR model, this paper studies the impact of CEC on foreign trade, analyzes the development status and operation mode of CEC, and develops the role of CEC in promoting the development of foreign trade. In addition, in order to fully promote the development of CEC, it is necessary to make full use of information technology means, vigorously cultivate CEC application talents, and small and medium-sized enterprises expand the international market through CEC, so as to promote the healthy and sustainable development of CEC and make it a new economic growth point.

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