

# A Study on the Impact of China's Comprehensive Cross-border E-commerce Pilot Zones on Regional Export Trade -- An Empirical Analysis Based on A Multi-Period Double-Difference Model

Fangqi Ji

jfq18562195206@163.com

Minzu University of China, Beijing, 100000, China

**Abstract.** Cross border e-commerce has become the main driving force for "activating" economic development and promoting high-quality development of import and export trade. The Chinese government has implemented the pilot policy of cross-border e-commerce comprehensive pilot zone. However, due to its short implementation cycle, can the cross-border e-commerce comprehensive pilot zone promote the development of cross-border e-commerce in China, thus promoting the growth of foreign trade? The multi period DID method was selected as an analytical tool to evaluate the policy effect of the cross-border e-commerce comprehensive pilot zone. The empirical results showed that the establishment of the cross-border e-commerce comprehensive pilot zone had a significant positive impact on the total export volume, and the policy effect of the establishment of the cross-border e-commerce comprehensive pilot zone was significant, which was tested through the parallel trend test and placebo test. The robustness of the conclusions is confirmed.

**Keywords:** cross-border e-commerce pilot zones; export trade; policy effects; multi-period double-difference method

## 1 Introduction

Along with the increasing weakness of traditional foreign trade and the rise of overseas shopping wave, "cross-border electronic business", a new model attracted the great attention of our government. Relying on the construction of comprehensive pilot zones, Chinese cross-border electronic business accumulated a wealth of innovative experience in terms of management, services and systems, and formed many mature practices, laying the foundation the high-quality development of cross-border electronic business[1]. One hundred and thirty-two comprehensive pilot zones have been set up nationwide, covering 30 provinces, autonomous regions and cities, realizing joint domestic and international efforts and two-way economic growth[2]. In order to better promote the emergence of Chinese cross-border electronic business industry, the government formulated the pilot policy of the comprehensive experimental zone for cross-boarder electronic business, but due to the relatively short time of the implementation of this policy, so whether it can really play a role in promoting China's

cross-border electronic business to promote China's foreign trade prosperity and development is an issue that deserves attention and in-depth investigation[3].

## 2 Study design

### 2.1 Modeling

The multi-period DID method is used to examine the impact of establishing Chinese the comprehensive experimental zone for cross-boarder electronic business in Jiangsu, Zhejiang, Shanghai and Guangdong on the regional trade effect. This paper uses the "differences" at the regional and time levels to make multi period double difference estimates[4]. From 2008 to 2019, the comprehensive experimental zone for cross-boarder electronic business will be set up in four batches. Therefore, according to the different time of setting up Chinese the comprehensive experimental zone for cross-boarder electronic business in the selected four provinces and regions, the virtual variable time will be set first. The dummy variable policy should also be set to distinguish the experimental group from the control group[5]. According to above settings, multi phase DID model is built as follows:

$$\text{LnExp}_{it} = \beta_0 + \beta_1 \text{did}_{it} + \beta_2 \text{Controls}_{it} + \gamma_i + \delta_t + \varepsilon_{it} \quad (1)$$

In equation (1),  $\text{LnExp}_{it}$  is the explained variable, which represents the logarithm of the export volume of city  $i$  in year  $t$ . This paper selects the regional export volume to measure the export level;  $\text{did}_{it}$  is a double difference term, indicating whether city  $i$  has set up a cross-border e-commerce comprehensive pilot zone in year  $t$ ;  $\text{Controls}_{it}$  is a set of control variables that affect growth of export trade volume.  $\gamma_i$  for individual fixed effects, the  $\delta_t$  is a time fixed effect, the  $\varepsilon_{it}$  It is a random interference term.  $\beta_1$  is the core estimation parameter, which identifies the net effect of establishing a comprehensive pilot zone for cross-border electronic commerce.

### 2.2 Variable selection and data description

In order to study the impact of establishing a comprehensive pilot zone for cross-border electronic commerce on the trade effect of region and the effectiveness analysis of this policy, the variables and settings involved in the main selected model of this paper are as shown in Table1.

1. Interpreted variable ( $\text{LnExp}_{it}$ ): the explanatory variables for each city's export trade effect, this will be measured by the logarithm of regional exports, the larger the logarithmic value of regional exports means that the higher the level of export trade in the region. All raw data in this thesis come from the statistical yearbook of each prefecture-level city in the past years.

2, the core explanatory variables ( $\text{did}_{it}$ ): The comprehensive experimental zone for cross-boarder electronic business is a dummy variable. The core explanatory variable is whether the city has set up a Chinese the comprehensive experimental zone for cross-boarder electronic business, reflecting whether it is affected by policies. The regression coefficient of the double difference item  $\text{did}$  is the policy effect of cross-border electronic business comprehensive pilot zone on export trade[6].

**Table 1.** Main variables and their data sources.

variable type	The name of the variable	variable meanings	Data sources
the explanatory variables	$\text{LnExp}_{it}$	regional export trade effects	Urban Statistical Yearbook
explanatory variables	did	comprehensive cross-border e-commerce pilot zone policy	The official website of the State Council
	lnfdi	Level of foreign direct investment	Urban Statistical Yearbook
	lnpeo	Population size	Urban Statistical Yearbook
control variables	wage	labor costs	Urban Statistical Yearbook
	lnpgdp	level of economic development	Urban Statistical Yearbook
	gov	Government intervention	Urban Statistical Yearbook

Since most of the cities that set up the comprehensive experimental zone for cross-boarder electronic business before 2020 are concentrated in the regions of Jiangsu, Zhejiang, Shanghai and Guangdong[7], the samples selected in this paper are prefecture-level cities in Jiangsu, Zhejiang, Shanghai and Guangdong that set up Chinese the comprehensive experimental zone for cross-boarder electronic business, and some of those that have not been set up, and the data selected are the panel data of the indicators related to the regional export trade in the 12 consecutive years from 2008 to 2019. In order to guarantee the continuity of the data, the sample excludes Yiwu City due to the serious lack of various data in Yiwu City. Therefore, there are 16 cities in the experimental group. The control group, on the other hand, is selected from the cities in Jiangsu, Zhejiang and Guangdong that have not set up the comprehensive experimental zone for cross-boarder electronic business before 2019. Some of the cities in the control group include Zhenjiang City and Taizhou City, etc. in Jiangsu Province, Jinhua City and Zhoushan City, etc. in Zhejiang Province, and Shanwei City and Qingyuan City, etc. in Guangdong Province, for a total of 15 cities in the control group. Table 2 shows the descriptive statistics of each variable by Stata.

**Table 2.** Descriptive Statistics for Key Variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
lny	372	4.814	1.601	1.792	8.025
did	372	0.105	0.307	0	1
lnpeo	372	3.743	0.588	2.27	4.988
lnpgdp	372	1.823	0.684	0.193	3.845
gov	372	0.148	0.257	0.055	4.97
wage	372	6.473	12.052	1.725	233.775
Variable	Obs	Mean	Std. Dev.	Min	Max
lnfdi	372	4.406	1.671	0.477	7.524

### 3 Empirical results and analysis

#### 3.1 Benchmark regressions

Table 3 shows the regression results of the fixed effect of double difference. According to the stata benchmark regression results, establishing a comprehensive pilot zone for cross-border electronic business has significantly promoted the development of local export trade. After adding the control variables, the regression coefficient of the double difference sub item did is also significantly positive. The results further prove that establishing a comprehensive pilot zone for cross-border electronic business has significantly promoted the development of local export trade.

**Table 3.** Baseline regression results.

VARIABLES	(1) lny	(2) lny
did	2.468*** (13.382)	0.502*** (3.173)
lnpeo		0.428*** (4.215)
lnpgdp		1.492*** (11.858)
gov		0.254*** (5.076)
wage		0.001** (-5.201)
lnfdi		0.246*** (3.923)
Constant	-0.194 (-0.640)	-3.292*** (-15.269)
Observations	372	372
Number of id	31	31
R-squared	0.183	0.795

#### 3.2 Parallel trends and dynamic effects tests

In this thesis, before establishing a comprehensive pilot zone for cross-border electronic business, there is no significant difference between the cities implementing the comprehensive experimental zone for cross-boarder electronic business and the cities not implementing the comprehensive experimental zone for cross-boarder electronic business, that is, there is a parallel trend[8]. Therefore, parallel trend test is required, and the following model is built for this purpose:

$$\ln EXP_{i,t} = \varphi_0 + \sum_{t=2}^4 \alpha_t \times pre + \varphi_1 \times current_{i,t} + \sum_{t=1}^4 \beta_t \times post + \varphi_2 \times Controls_{it} + \gamma_i + \delta_t + \varepsilon_{it} \quad (2)$$

Since the first year to set up the comprehensive pilot zone in the selected cities is 2015, in order to prevent the occurrence of co-linear problems, 2014 is selected as the benchmark year in the parallel trend test, and the definition of pre 'i'='i' for the year i before the implementation of the policy is defined, and post 'i'='i' for the year i after the implementation of the policy is defined[9]. The reason why 2015 is not selected as the base period is that the policy

implementation period has actually been affected by the policy, so the policy implementation period cannot be used as the base year. The assignment of pre 'i' means:  $pre\ i = treat \times Distance$ , where distance refers to the difference between the year and the year when the comprehensive pilot zone policy is implemented, that is, the year policy year. If the city has set up a comprehensive pilot zone and the distance is negative, then pre 'i' is defined as 1; Otherwise, pre 'i' is 0. Post 'i' assignment means:  $post\ i = treat \times Distance$ , if the city has set up a comprehensive pilot area and the distance is positive, then post 'i' is defined as 1; Otherwise, post 'i' is 0. According to the above variable settings, the sample is tested. This paper uses graphical method to test the parallel trend and dynamic effect of policies.

Figure 1 shows the parallel trend test chart, where the covered short straight line perpendicular to the horizontal axis is the 95% confidence interval of the regression coefficient of the multipliers of the number of policy periods and the dummy variables of the treatment group. It can be seen that before the number of periods is 0, it represents the number of periods before the implementation of the policy. They are not significant (95% confidence interval crosses the horizontal dotted line with coefficient=0), indicating that there is no significant difference between the treatment group and the control group before the implementation of policy, which meets basic assumption of a parallel trend.

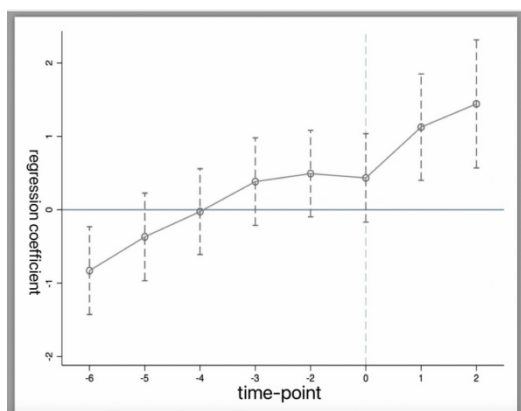


Fig. 1. Parallel Trend Test: Graphical Approach.

### 3.3 Robustness tests

This section focuses on the Placebo test of the empirical results above to ensure the credibility of the research findings.

Randomly select some cities from the 31 cities included in the sample as treatment groups, and estimate the benchmark model (1). Figure 2 of the placebo test nuclear density estimation is the nuclear density estimation chart of the regression coefficients for core explanatory variables did term after 500 randomized treatment groups and policy time. The vertical dotted line is the true coefficient estimated by the benchmark regression, the horizontal dotted line is  $P=0.1$ , and the scattered points below the dotted line indicate that the coefficient is significant at least at the level of 10%, otherwise it is not significant [10]. The placebo test chart illustrates the basic fact that most of the coefficients are concentrated around 0, and most of the

estimated coefficients are not significant, which means that the policy effect of Chinese Comprehensive Pilot Zone for Cross-Border Trade electronic commerce is not affected by other unobserved factors.

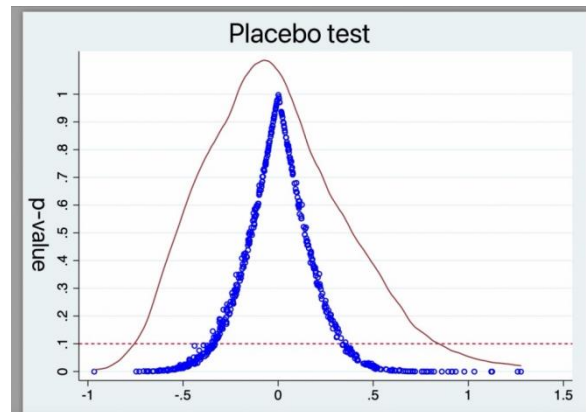


Fig. 2. Plot of placebo test kernel density estimates.

#### 4 Conclusions of the study

Establishing a comprehensive pilot zone for cross-border electronic business has had a significant positive impact on the total export volume. After adding many control variables, the regression coefficient of the policy interaction term remains significantly positive, indicating that the policies formulated by the comprehensive experimental zone for cross-border electronic business have a significant impact. Parallel trend test and placebo test results confirmed stability of conclusions. This shows that policy support needs to be further strengthened to create a great policy environment for further development of cross-border e-commerce industry.

#### References

- [1] Deng Xinjie, Marshal Niu Exploring the way to facilitate the development of cross-border e-commerce export trade in Hangzhou [J] *Foreign Economic and Trade Practice*, 2018 (11): 21-24
- [2] Hu Guoliang, Lu Shou'an Research on the Impact of Cross border E-commerce Comprehensive Pilot Zone on China's Export Trade Growth [J] *China Arab Science and Technology Forum (Chinese and English)*, 2023 (1): 5
- [3] Li Bing, Li Rou. Internet and enterprise exports: micro empirical evidence from Chinese industrial enterprises [J]. *World Economy*, 2017,40 (07): 102-125
- [4] Lin Shiyu, Yin Lijun, Sun Xuyang Research on cross-border e-commerce tax policy based on consumer online shopping behavior [J] *Foreign Trade and Economic Cooperation*, 2022 (4): 43-46
- [5] Liu Lin Research on the impact of port efficiency on the export of countries along the "The Belt and Road Initiative" [J] *Price Theory and Practice*, 2021 (12): 5
- [6] Wang Lirong, Rui Lili. Impact of cross-border e-commerce comprehensive pilot zone on regional

- economy and difference analysis based on the "counterfactual" perspective [J]. Southern Economy, 2022 (03): 53-73
- [7] Wei Dayu Research on the Development of Industrial Clusters in China's Cross border E-commerce Comprehensive Pilot Zone [J] Foreign Trade and Economic Cooperation, 2018 (6): 71-74
- [8] Weekly clearance Research on the impact of China's cross-border e-commerce policies [D]. University of International Business and Economics, 2020
- [9] Dong J . Analysis of the Impact of Cross-border E-commerce on Transformation Mechanism of Foreign Trade in China under the New Normal of Society[J]. 2019, 4(4).
- [10] Jiang Y. The impact of cross border e-commerce on foreign trade[J]. The Frontiers of Society, Science and Technology, 2021, 3(5).