

Does the Policy of the Cross-border E-commerce Comprehensive Pilot Zone Promote the Internationalization of the Manufacturing Industry in Foshan?

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Abstract. In the context of China's economy, facing the challenges of slowing foreign trade growth and domestic overcapacity, cross-border e-commerce has emerged as a critical driver of trade expansion, export growth, and economic development. Foshan, a key city in Guangdong Province, has proactively promoted economic development and industrial upgrading, resulting in consistent growth in cross-border e-commerce exports. In response to global economic changes, the Foshan government has implemented strategic policies, including establishing a comprehensive pilot zone for cross-border e-commerce, to enhance the city's competitiveness on the global stage. This study aims to investigate the impact of the cross-border e-commerce comprehensive pilot zone policy on the development of Foshan's cross-border e-commerce industry. To address this research question, we selected Foshan City as the treatment group and focused on the policy intervention period in 2019. Using the synthetic control method, we analyzed the policy's effects on the output level of Foshan's cross-border e-commerce industry. Our robustness checks, including placebo and stability tests, validated the significant positive impact of the policy. Our results suggest that the cross-border e-commerce comprehensive pilot zone policy significantly positively affects Foshan's cross-border e-commerce industry. The output level of this industry increased significantly after the implementation of the policy. The background and significance of this research stem from the rapid growth of the e-commerce sector and Foshan's aspirations to enhance its global competitiveness through policy interventions. By examining the policy's influence on Foshan's cross-border e-commerce industry and its role in creating an enabling policy environment and providing essential resources, this study contributes to understanding the effectiveness of such policies. This study provides valuable insights for policymakers seeking to promote cross-border e-commerce and enhance economic development.

Keywords: Cross-border E-commerce Comprehensive Pilot Zone policy; cross-border e-commerce; synthetic control method.

1 Introduction

In the new normal of China's economy, characterized by a slowdown in overall foreign trade growth and domestic overcapacity, cross-border e-commerce has emerged as a bright spot and a new driver of domestic and international trade expansion, export growth, and economic development. This trend has garnered significant attention and policy support at the national

level. The National Development and Reform Commission has classified e-commerce services as a strategically supported emerging industry in the “Guiding Catalog for Key Products and Services of Strategic Emerging Industries” (2016 edition). This policy measure has yielded significant benefits for cross-border e-commerce, further fostering the industry’s rapid development.

Foshan, an important city in Guangdong Province, has actively promoted economic development and industrial upgrading. Foshan’s cross-border e-commerce exports have witnessed steady growth over the years. In 2022, Foshan recorded a total import and export volume of 663.78 billion RMB, marking a 7.7% increase compared to the previous year. Export value amounted to 556.25 billion RMB, representing an 11.1% increase, while imports stood at 107.53 billion RMB, indicating a 6.8% decrease. Foshan achieved a trade surplus of 448.72 billion RMB. Additionally, in 2022, Foshan’s cross-border e-commerce achieved a transaction volume exceeding 100 billion RMB for the first time. These accomplishments are mainly attributed to the competitiveness of Chinese products in the international market and Foshan’s strong industrial foundation.

In response to rapid global economic changes, particularly the growth of the e-commerce sector, the Foshan government has implemented several policies in recent years, including the establishment of a comprehensive pilot zone for cross-border e-commerce. These policy measures aim to attract a greater number of cross-border e-commerce enterprises to establish themselves in Foshan, thereby enhancing the city’s competitiveness in the global cross-border e-commerce landscape. The policy of the cross-border e-commerce comprehensive pilot zone is designed to promote the rapid development of Foshan’s cross-border e-commerce industry, further enhance the city’s economic vitality, stimulate employment growth, strengthen international cooperation, and achieve a higher level of openness.

Against this backdrop, it is worth investigating the impact of the cross-border e-commerce comprehensive pilot zone policy on the development of Foshan’s cross-border e-commerce industry. Did the pilot zone, through policy support and guidance, create a conducive policy environment and provide necessary resources? These are the questions that warrant further research.

Since the establishment of the China (Hangzhou) Cross-border E-commerce Comprehensive Pilot Zone approved by the State Council in 2015, Chinese scholars have conducted research on various aspects related to cross-border e-commerce comprehensive pilot zones. Previous studies have primarily focused on the following areas:

Macro-level analysis: Scholars such as Zhao Hui (2021)^[1] have utilized difference-in-differences models to explore the policy impact and effects of cross-border e-commerce comprehensive pilot zones on overall economic growth. Wang Rui (2020)^[2] conducted empirical analysis on data from 35 cities within China’s cross-border e-commerce pilot zones, uncovering the positive impact of trade facilitation on cross-border e-commerce trade. These studies highlight the influence of factors like infrastructure, service capacity, and development potential on cross-border e-commerce trade. Another study by Yang Yiweng (2023)^[3] delved into the underlying mechanism of pilot zone policies on the e-commerce industry’s development, employing a conceptual model based on knowledge spiral evolution and conducting empirical tests.

Micro-level analysis: Examining the impact of cross-border e-commerce comprehensive pilot zone policies on firm-level outcomes, Song Yanqun (2022) ^[4] employed a multi-period difference-in-differences approach and discovered that China's cross-border e-commerce reforms have significantly enhanced the export business of firms in the pilot zones. The study emphasizes the positive effect of these policies on international trade. In a similar vein, Shi Yaru (2023) ^[5] examined the impact of cross-border e-commerce reforms on patent applications by firms in the pilot zones, utilizing a multi-period difference-in-differences model with data from Chinese listed companies. The study highlighted the positive effect of the policies on firm innovation capacity.

Another noteworthy study by Hu Haoran (2022) ^[6], combining data from listed companies on the Shanghai and Shenzhen stock exchanges, found that the establishment of cross-border e-commerce pilot zones significantly increased the risk-taking level of firms in those zones, encouraging them to engage in more innovative activities.

Additionally, research has been conducted on the operational performance and evaluation of cross-border e-commerce comprehensive pilot zones. Liao Aihong (2020) ^[7], based on the industrial ecosystem theory, analyzed the development environment of the cross-border e-commerce industry and constructed a comprehensive evaluation index system. This system assessed the development environment of the first and second batches of 13 pilot zones in China, considering factors such as the market, application, support, and innovation environment. Pei Dongxia (2020) ^[8] evaluated the comprehensive operational performance index of cross-border e-commerce in 35 pilot cities, focusing on efficiency, service, and growth dimensions.

The aforementioned literature provides empirical evidence demonstrating the positive impact of policies on macroeconomic levels. It refines the policy effects at the city level and considers multiple factors. A deeper understanding of the mechanisms and driving forces behind the policies helps guide policy-making processes. This literature offers valuable insights into the impact of China's cross-border e-commerce comprehensive pilot zones, providing valuable information for policymakers and researchers.

In contrast to the aforementioned research findings, this paper adopts the synthetic control model, which is a quasi-natural experiment method. This method allows for a more accurate assessment of policy causal effects as it closely resembles the actual policy implementation scenario. By treating the establishment of cross-border e-commerce comprehensive pilot zones as a natural experiment, researchers can better control for other variables, enhancing the reliability and persuasiveness of the study. The adoption of this method provides an important tool for a deeper understanding of the policy's impact on the regional cross-border e-commerce industry.

2 Research Hypotheses

2.1 Research Hypothesis 1 The enhancing effect of the cross-border e-commerce comprehensive pilot zones on Foshan's cross-border e-commerce industry

The Impact of the Cross-border E-commerce Comprehensive Pilot Zones on Foshan's Cross-border E-commerce Industry The establishment of the cross-border e-commerce comprehensive pilot zone in Foshan has led to a reduction in trade barriers, improved trade facilitation, attracted

international enterprises, expanded product categories and supply chains, enhanced corporate competitiveness, promoted the construction of digital trade infrastructure, strengthened international cooperation and exchanges, and intensified regulation and market order maintenance. These series of policies have collectively facilitated the rapid development of the regional cross-border e-commerce industry, increased regional international competitiveness, and created opportunities for economic growth and employment. Based on these observations, the following research hypothesis is proposed:

H1: The cross-border e-commerce comprehensive pilot zone promotes the output level of Foshan's cross-border e-commerce industry.

2.2 Research Hypothesis 2 The improving effect of the comprehensive pilot zone policies gradually increases

The Increasing Impact of Comprehensive Pilot Zone Policies Over Time The enhancing effects of the cross-border e-commerce comprehensive pilot zone policies on the regional cross-border e-commerce industry are expected to gradually increase over time. Factors such as continuous policy optimization, an increasing number of enterprises, expanding influence, local talent cultivation, and international market expansion will interact with each other, driving the rapid development of the cross-border e-commerce industry in the region. This, in turn, creates more opportunities for economic growth, employment, and promotes the competitiveness of the region and the country in the global cross-border e-commerce field.

H2: The impact of the cross-border e-commerce comprehensive pilot zone increases year by year.

3 Empirical Research Design

3.1 Model Specification

The Synthetic Control Method (SCM) is an approach commonly used in the fields of economics and statistics to evaluate the impact of policies or interventions on specific entities, such as countries, regions, or organizations. This method is particularly useful for studying the effects of policy changes on economic, social, or health indicators of entities^[9].

The core idea of the SCM is to construct a synthetic "control group" that comprises multiple entities similar to the treated unit but has not been subject to the policy intervention. By comparing the changes between the treated entity and the synthetic control group, we can estimate the effects of the policy or intervention^[10].

In our research, we assume the existence of a treated unit that has undergone policy intervention, and our objective is to evaluate the impact of the policy on this unit. To construct the synthetic control group, we select a group of potential control group members denoted as $j \in 1, \dots, J+1$. Entity 1 represents the city under the policy influence (i.e., the treated group), while entities 2 to $J+1$ belong to a potential control group known as the "donor pool." These members are selected based on their similarity to the treated unit in key characteristics.

The study time span includes the pre-policy implementation period denoted as $t = 1, \dots, T_0$, and the post-policy implementation period denoted as $t = T_0+1, \dots, T$. Our objective is to

estimate the policy effect on the affected unit after policy implementation, denoted as τ_{1t} . This effect refers to the difference between the observed outcome Y_{1t}^I under policy intervention and the counterfactual potential outcome Y_{1t}^N assuming no intervention. We are particularly interested in how to estimate Y_{1t}^N . As shown in equation (1):

$$\tau_{1t} = Y_{1t}^I + Y_{1t}^N . \quad (1)$$

As we cannot observe Y_{1t}^N directly, Abadie & Gardeazabal (2003) proposed a factor model to estimate it. The model is as follows:

$$Y_{1t}^N = \delta_t + \theta_t Z_t + \varphi_t \mu_i + \varepsilon_{it} . \quad (2)$$

In this model, δ_t represents time-fixed effects, reflecting differences in policy implementation time across different cities. θ_t is a parameter vector, Z_t represents control group variables, φ_t represents unobserved factors, μ_i represents fixed effects of different cities, and ε_{it} is the error term. To construct the synthetic control group, we need to estimate the expected value of the synthetic control group Y_{1t}^N through weighted least squares regression.

Assuming the first entity ($i=1$) is the unit affected by the policy, while the remaining M cities ($i=2, \dots, M+1$) have not implemented the policy. We assume a $(K*1)$ dimensional weight vector $W = (\omega_2, \dots, \omega_{H+1})$. Where W_m represents the weight of the m -th city in the control group, and the weights sum up to 1. The resulting synthetic control group can be expressed as:

$$\sum_{m=2}^{M+1} W_m Y_{mt} = \delta_t + \theta_t \sum_{m=2}^{M+1} W_m Z_{mt} + \varphi_t \sum_{m=2}^{M+1} W_m \mu_m + \sum_{m=2}^{M+1} W_m \varepsilon_{mt} \quad (3)$$

Furthermore, let the weight vector $W^* = (\omega_2^*, \dots, \omega_{H+1}^*)$ satisfy the following conditions (3).

If the matrix $\sum_{t=1}^{T_0} \varphi_t \varphi_t'$ is non-singular, then it satisfies the following condition:

$$Y_{1t}^N - \sum_{m=2}^{M+1} W_m^* Y_{mt} = \sum_{m=2}^{M+1} W_m^* \sum_{t=1}^{T_0} \varphi_t (\sum_{t=1}^{T_0} \varphi_t \varphi_t')^{-1} \varphi_t' (\varepsilon_{mt} - \varepsilon_{1t}) - \sum_{m=2}^{M+1} W_m^* (\varepsilon_{mt} - \varepsilon_{1t}) \quad (4)$$

Equation (4) allows for treatment effects to vary over time. The ‘‘synthetic control’’ represents the weighted average of control group entities, as shown in equation (5):

$$\hat{Y}_{1t}^N = \sum_{j=2}^{J+1} W_m Y_{mt} . \quad (5)$$

In this case, the treatment effect is given by equation (6):

$$\hat{\tau}_{1t} = Y_{1t} - \hat{Y}_{1t}^N . \quad (6)$$

Regarding the choice of weights, it is important to select appropriate weights among different control group entities. Abadie & Gardeazabal (2003) and Abadie, Diamond & Hainmueller (2010) suggest that the chosen weights should be such that the synthetic control group’s predicted values of pre-treatment outcome variables are closest to those of the treated group. In

other words, the weights should be chosen to minimize the discrepancy between the synthetic control group and the treated group in terms of their pre-treatment outcome values. Given a set of non-negative constants V_1, \dots, V_k , the construction of the synthetic control group can be expressed as:

$$W^* = (\omega_2^*, \dots, \omega_{H+1}^*) . \quad (7)$$

minimizing the equation (8):

$$\|X_1 - X_0 W\| = (\sum_{h=1}^k v_h (X_{h1} - w_2 X_{h2} - \dots - w_{m+1} X_{hm+1})^2)^{1/2} \quad (8)$$

3.2 Variable Description

3.2.1 Cross-border e-commerce industry output level variable

Considering the challenges in obtaining direct data on cross-border e-commerce industry output, this study uses the indicator of international/Hong Kong/Macao/Taiwan express delivery volume as a proxy variable. This proxy variable is employed to assess the effects of the comprehensive pilot zone policy on the output level of the cross-border e-commerce industry in Foshan's cities. Table 1 provides a summary of the indicators used in the study and their respective sources.

3.2.2 Predictive covariates

To accurately synthesize the observed values of the treated cities using the Synthetic Control Method while considering data availability, this study selects several predictive covariates from various aspects. These covariates include disposable income, consumption expenditure, economic openness, infrastructure, industrial structure, marketization level, economic development level, financial support, urbanization level, innovation level, and investment level. By incorporating these covariates, we aim to capture relevant factors that may influence the outcomes and create a more accurate synthetic control group.

Table 1. Measurement of Variables and Data Sources.

	Indicator Level	Specific Indicator Measurement Method	Description Source
Outcome Variable	Cross-border e-commerce industry output level	International/Hong Kong/Macao/Taiwan express delivery volume per total population	Postal Administration Annual Report
Covariates	Disposable income	Per capita disposable income of all residents in each city/Per capita GDP	Foshan Statistical Yearbook
	Consumption expenditure	Per capita consumption expenditure of all residents in each city/Per capita GDP	Foshan Statistical Yearbook
	Economic openness	Import and export trade value/GDP	Foshan Statistical Yearbook
	Infrastructure	Port cargo throughput per total population	Calculated
	Industrial structure	(Secondary industry value-added + Tertiary industry value-added)/Primary industry value-added	Foshan Statistical Yearbook

Covariates	Marketization level	Fan Gang's marketization index	Calculated	
	Economic development level	Real per capita GDP	Foshan Statistical Yearbook	
	Financial support	Total credit of various financial institutions/GDP	Foshan Statistical Yearbook	
	Urbanization level	Urban permanent residents/Total permanent residents	Foshan Statistical Yearbook	
	Innovation level	R&D expenditure internal funding/GDP	Foshan Statistical Yearbook	
	Investment level	Fixed asset investment/GDP	Foshan Statistical Yearbook	

3.2.3 Experimental Group and Control Group

This study utilizes data from the Foshan Statistical Yearbooks spanning from 2014 to 2021 as the sample data. Due to significant differences in various indicators between Guangzhou and Shenzhen and their unique economic characteristics, it is challenging to fit and compare their data with other cities using weighted averages. Therefore, when analyzing the experimental group, the indicator values of Guangzhou and Shenzhen are excluded to ensure a more accurate comparison.

The control group in this study comprises all cities that did not implement the cross-border e-commerce comprehensive pilot zone policy during the observation period. These cities serve as an appropriate control group for evaluating the effects of the policy.

4 Empirical Results Analysis

4.1 Synthetic Control Method Evaluation Results for Foshan City

Using the variable settings of outcome variables and covariates as described in Table 1, this study employs the Synthetic Control Method to evaluate the effects of the comprehensive pilot zone policy on the optimization of the cross-border e-commerce industry output level in Foshan's cities. The policy intervention year is set as 2019, and the synthetic control group demonstrates a good fit with Foshan.

Figure 1 presents the overall effect estimation of the cross-border e-commerce comprehensive pilot zone policy in Foshan:

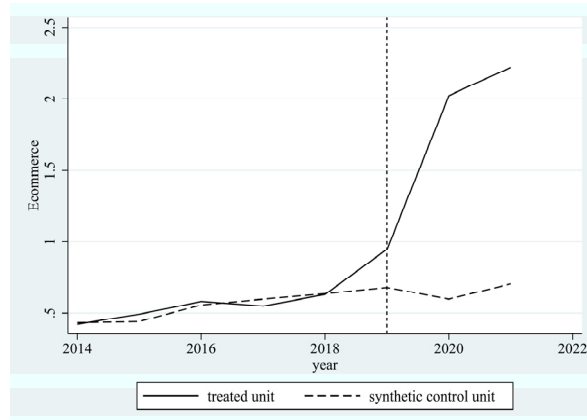


Fig. 1. Actual and Fitted Values of Cross-border E-commerce Level in Foshan.

In Figure 1, the solid line represents the trajectory of the actual values of the cross-border e-commerce level in Foshan, while the dashed line represents the trajectory of the fitted values from the synthetic control group. Throughout the observation period, particularly before 2019, the actual values in Foshan closely align with the fitted values from the synthetic control group, indicating a good fit of the synthetic group to Foshan’s cross-border e-commerce output level prior to the policy intervention.

However, after the policy intervention in 2019, the actual values of Foshan clearly surpassed the fitted values from the synthetic control group. The vertical distance between the two trajectories reflects the policy intervention effect generated by the implementation of the cross-border e-commerce comprehensive pilot zone policy.

Furthermore, the difference between the solid line and the dashed line exhibits an increasing trend after 2019, indicating a year-by-year escalation in the promoting effect of Foshan’s cross-border e-commerce comprehensive pilot zone.

4.2 Placebo Test

Based on the synthetic evaluation results, it appears that the implementation of the cross-border e-commerce comprehensive pilot zone policy in Foshan has a significant positive impact on industry output. To ensure the statistical significance of this conclusion, we conducted a placebo test using the placebo test method proposed by Abadie (2003). This method allows us to construct a synthetic control group and validate the validity of our research conclusions.

In conducting the placebo test, we initially select certain cities from the control group that exhibits similar characteristics and trends to the actual cross-border e-commerce comprehensive pilot zone cities. These selected cities serve as candidate cities. Using the synthetic control method and historical data from these candidate cities, along with other relevant factors, we create a “hypothetical control group.” Under this assumption, we estimate the effect of the policy by assuming that these candidate cities also implemented the cross-border e-commerce comprehensive pilot zone policy in 2019.

Next, we compare the actual effect with the hypothetical effect of the synthetic control group to determine if the impact of the cross-border e-commerce comprehensive pilot zone policy on the output level is statistically significant. If the actual effect is significantly greater than the hypothetical effect, we can conclude that the impact of the policy on the output level is statistically significant. Conversely, if the difference between the two is not significant, it may indicate that the impact of the policy on the output level could be coincidental.

The advantage of this placebo test method is that it helps eliminate other possible confounding factors. By comparing the difference between the actual effect and the hypothetical effect of the synthetic control group, we can more accurately assess the true effect of the policy. The test results are as follows:

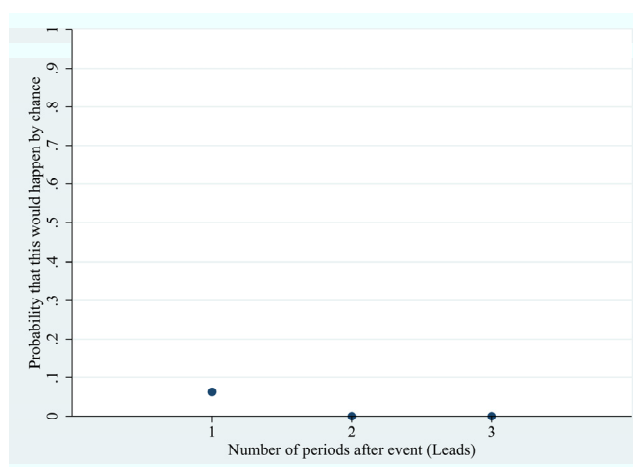


Fig. 2. P-value of the Policy Effect in Foshan Cross-border E-commerce Comprehensive Pilot Zone.

In Figure 2, the horizontal axis represents the forecast period after 2019, while the vertical axis represents the p-values obtained from the placebo test. A p-value closer to 0 indicates a higher level of statistical significance in the optimization effect of the region.

From Figure 2, it is evident that the p-values associated with the policy effect in Foshan's Cross-border E-commerce Comprehensive Pilot Zone are all below 0.1. This implies that, at a significance level of 10%, the policy effect of the Cross-border E-commerce Comprehensive Pilot Zone in Foshan has undergone a significant test and demonstrates statistical significance in terms of its enhancement effect on the output of the cross-border e-commerce industry in Foshan.

4.3 Robustness Test

To ensure the robustness of the analysis results and minimize biases arising from differences in the control group, this study employed an iterative method to conduct a robustness test of the empirical findings. The iterative method is a sensitivity analysis approach used to assess the impact of weights in the synthetic control group on the policy effect by gradually excluding samples that contribute positively to the policy effect.

In the robustness test using the iterative method, the first step involves identifying the samples that positively contribute to the policy effect during the construction of the synthetic control group. These samples play a crucial role in the allocation of weights within the synthetic control group. Subsequently, these positively contributing samples are systematically removed, and the policy effect is recalculated. The results of this robustness test are presented in Table 2:

Table 2. Robustness Test Results.

Robustness Test	Base Model	Iteration 1	Iteration 2	Iteration 3
Policy Effect Fit	Passed	Passed	Passed	Passed
RMSPE	0.04	0.04	0.04	0.04
The results of the prediction period 1 P-value	0.07	0.00	0.07	0.08
The results of the prediction period 2 P-value	0.00	0.00	0.00	0.00
The results of the prediction period 3 P-value	0.00	0.00	0.00	0.00

The results of the robustness test demonstrate that even after excluding samples from the synthetic control group that positively contribute to the policy effect and recalculating the policy impact, there are no significant changes in the final fit results of the control group. This suggests that variations in the weights assigned to the synthetic control group do not affect the presentation of the policy effect. Consequently, this further confirms the robustness of the observed policy effect.

The primary purpose of conducting the robustness test using the iterative method is to validate the credibility and robustness of the research findings. Through this robustness test, we conclude that the impact of the cross-border e-commerce comprehensive pilot zone policy on the output level of the cross-border e-commerce industry in Foshan is indeed robust. This result enhances our confidence in estimating the policy effect and provides policy-makers with a more solid scientific basis for decision-making.

In conclusion, the empirical conclusions of this study, regarding the two research hypotheses, are summarized in Table 3:

Table 3. Summary of Research Conclusions.

processing method	result
Policy Effect	Pass
Placebo Test	Pass
Robustness Test	Pass

From Table 3, it is evident that the policy effect in Foshan has successfully passed the significance test, thereby validating hypothesis 1. Furthermore, during the same period of policy implementation, there is an increasing trend in the difference between the experimental group and the control group. This trend indicates a year-by-year rise in the promoting effect of the cross-border e-commerce comprehensive pilot zone, thereby validating hypothesis 2.

4.4 Analysis of the Promotion Mechanism of the Cross-border E-commerce Comprehensive Pilot Zone Policy in Foshan

The implementation of the cross-border e-commerce comprehensive pilot zone policy in Foshan has led to a remarkable surge in the volume of cross-border e-commerce trade. This, in turn, has significantly contributed to the region's economic growth by driving up the value of import and export trade. The policy's primary objective is to establish Foshan as a pivotal hub for cross-border e-commerce development, enhance its competitiveness in international trade, attract both domestic and foreign e-commerce enterprises, and stimulate industrial upgrading and economic expansion. The promotion mechanism of the policy in Foshan is depicted in the figure 3 below.

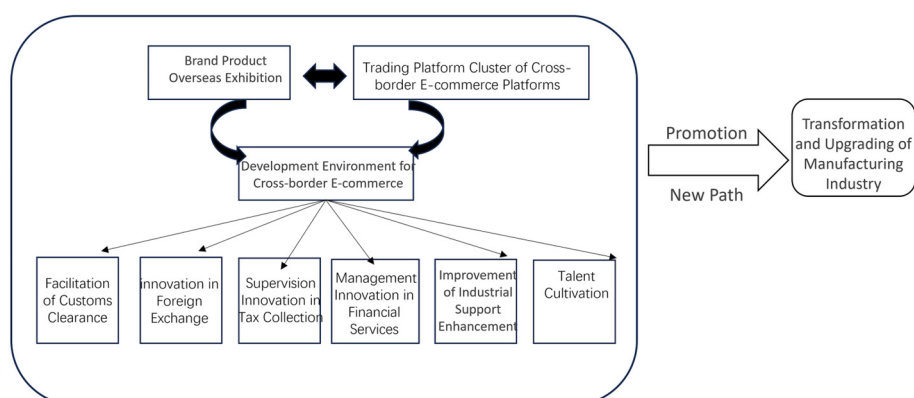


Fig. 3. The promotion mechanism of the policy in Foshan.

4.4.1 Exploring a New Path for the Transformation and Upgrading of Manufacturing Industry through the Promotion of Cross-border E-commerce:

The Foshan government is dedicated to integrating traditional manufacturing industries with cross-border e-commerce through the comprehensive pilot zone policy. This strategic approach aims to facilitate the transformation and upgrading of the manufacturing sector. To support this endeavor, fiscal and tax incentives are provided to manufacturing enterprises, encouraging them to expand their reach in international markets and sell products through cross-border e-commerce platforms. Consequently, this initiative helps to enhance the value-added of Foshan's manufacturing industry, promote technological advancements, improve product quality, and solidify Foshan's competitive position in the global market.

4.4.2 Establishing an Online and Offline Combined Brand Product Overseas Exhibition and Trading Platform:

The policy proposes investing in the construction of an integrated online and offline exhibition and trading platform, which provides local brands in Foshan with opportunities to showcase and sell their products. This platform not only enhances brand visibility but also offers consumers a global shopping experience. By combining online and offline channels, brands can better engage with the international market, understand market demands, adjust product strategies, and achieve faster internationalization.

4.4.3 Establishing a Cluster of Online Cross-border E-commerce Platforms:

The government encourages the clustering of cross-border e-commerce enterprises in designated areas to form a platform cluster. This cluster promotes cooperation and resource sharing among enterprises, thereby enhancing overall competitiveness. Moreover, the government may offer special policies, such as rental reductions or infrastructure support, to attract more e-commerce businesses, creating a virtuous cycle of growth.

4.4.4 Optimizing the Development Environment for Cross-border E-commerce:

Customs Clearance Facilitation: The Foshan Cross-border E-commerce Comprehensive Pilot Zone policy has implemented effective measures to streamline customs clearance. It has introduced a single window and expedited clearance services, thereby accelerating the import and export processes, reducing waiting time, and minimizing operational costs for enterprises.

Tax Incentive Policies: The policy has successfully reduced the tax burden on enterprises by providing exemptions for customs duties and other fees, thereby enhancing enterprise profitability. As a result, enterprises have enjoyed practical tax incentives.

Financial Support: The Foshan government has collaborated with banks to provide financing support for cross-border e-commerce enterprises, reducing the challenges associated with financing and fostering business development.

Digital Trade Infrastructure Construction: The government has invested in the construction of digital payment systems, logistics centers, and other infrastructure, improving the efficiency of digital trade and reducing logistics costs. These efforts make Foshan more attractive as a hub for cross-border e-commerce.

Talent Training and Innovation Support: The government actively promotes talent training and innovation support programs, cultivating a pool of professionals in cross-border e-commerce and facilitating innovative development.

In conclusion, the implementation of the Foshan Cross-border E-commerce Comprehensive Pilot Zone policy has yielded significant results. The policy measures have stimulated trade, employment, and industrial upgrading in the region, enhancing Foshan's competitiveness in the cross-border e-commerce sector, and making positive contributions to local economic growth and social development. With the passage of time, it is expected that these effects will further strengthen, solidifying Foshan as one of the important hubs for cross-border e-commerce in China.

5 Conclusions

Compared to general Difference-in-Differences (DID) and fixed effects models, the Synthetic Control Method offers looser assumptions and can reduce extrapolation bias. In this empirical analysis, we have employed various methods to mitigate extrapolation bias and address endogeneity issues. These methods include careful selection of a similar control group, estimation of observation time, ensuring a good fit of the synthetic group before policy implementation, and conducting placebo tests. By combining the evaluation conclusions of the

Synthetic Control Method with the results of significance tests, we can draw the final conclusion of this study as follows:

From the perspective of the policy effect of the Cross-border E-commerce Comprehensive Pilot Zone, it is evident that Foshan's policy has significantly improved the output level of the cross-border e-commerce industry. The policy effect has passed placebo tests and robustness tests, with an increasing trend observed over the years. However, further research and analysis are necessary to summarize Foshan's successful experience and provide valuable references for other cities.

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References

- [1] Zhao Hui, Ge Chunrui, Ma Ting. E-commerce Environment and Economic Growth: A Quasi-Natural Experiment Based on the Establishment of Cross-Border E-commerce Comprehensive Experimental Zones [J]. Journal of Gansu Administrative College, 2021, (05): 114-124+128.
- [2] Wang Rui, Gu Qiuyang, Zhong Bingping. What Trade Facilitation Does Cross-Border E-commerce Need? Evidence from China's 35 Cities with Cross-Border E-commerce Comprehensive Experimental Zones [J]. Zhejiang Academic Journal, 2020, (04): 100-110.
- [3] Yang Yiwen, Liang Qiye, Li Chenhua. How Do Pilot Policies of Cross-Border E-commerce Comprehensive Experimental Zones Affect the Development of the E-commerce Industry? [J]. Audit and Economic Research, 2023, 38(01): 107-115.
- [4] Song Yanqun, Hu Haoran. Research on the Impact and Mechanism of Cross-Border E-commerce Reform on the Export of Enterprises in Experimental Zones [J]. Modern Finance and Economics (Journal of Tianjin University of Finance & Economics), 2022, 42(04): 20-35.
- [5] Shi Yaru, Yu Jinping. Cross-Border E-commerce Reform and Enterprise Innovation: A Quasi-Natural Experiment Based on the Establishment of Cross-Border E-commerce Comprehensive Experimental Zones [J]. International Trade Issues, 2023, (04): 37-55.
- [6] Hu Haoran, Song Yanqun. Establishment of Cross-Border E-commerce Experimental Zones and Enterprise Risk Bearing [J]. Journal of Zhongnan University of Economics and Law, 2022, (04): 16-28+53.
- [7] Liao Aihong, Wang Erwei, Qi Yanxin. Research on the Development Environment Evaluation of Cross-Border E-commerce Comprehensive Experimental Zones Based on Entropy Weight-AHP Fusion: A Perspective of Industrial Ecosystems [J]. Mathematics in Practice and Theory, 2020, 50(15): 81-88.
- [8] Pei Dongxia. Evaluation and Improvement Strategies for the Operational Performance of China's Cross-Border E-commerce: An Analysis Based on Sample Data from Cross-Border E-commerce Comprehensive Experimental Zones [J]. Business and Economic Research, 2020, (06): 145-148.
- [9] Abadie, A., Gardeazabal, J.:The economic costs of conflict: A case study of the Basque Country. American Economic Review. 93(1). pp. 113-132 (2003)

[10]Abadie, A., Diamond, A., Hainmueller, J.:Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program. *Journal of the American Statistical Association*. 105(490). pp. 493-505 (2010)