# Whether the Establishment of The Shaanxi FTZ Has Boosted the Scale of Local Imports and Exports

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**Abstract.** This paper uses panel data from 19 provinces (municipalities and autonomous regions) from 2000-2019, applies the regression control method (HCW), and selects the optimal control group according to the AICC guidelines to study the impact of the policy of setting up a FTZ in Shaanxi on the scale of local imports and exports. And the endogeneity test is conducted using the exclusion of samples from neighboring provinces in Shaanxi Province; the placebo test is conducted using the method of advancing one period of the policy implementation year. The empirical evidence concludes that the implementation of the FTZ policy in Shaanxi can greatly enhance the scale of import and export trade. Based on the above conclusions relevant insights are obtained. First, to promote the construction of Pilot Free Trade Zone with high standards to help the high quality development of the economy; second, to refine the top-level design to avoid the potential negative impacts of the construction of Pilot Free Trade Zone; and third, to focus on the regional differences and promote the construction and development of the Pilot Free Trade Zone according to the local conditions.

**Keywords:** FTZ; Regression control method; Economic effect assessment

## 1 Introduction

The development process of pilot free trade zones (hereinafter referred to as FTZs) is precisely a microcosm of China's comprehensive improvement of its openness to the outside world and its proactive participation in the reform of the global economic governance system. After the successful "water test" of the Shanghai Pilot Free Trade Zone, the success of the coastal FTZs in terms of replicable and generalizable new explorations and experiences has further accelerated the layout of FTZs. After six rounds of expansion, the number of FTZs has reached 21, basically covering China's major economic sectors, forming a new pattern of FTZ development of "no gap along the coast, focusing on the interior, and blooming in all aspects".

The establishment of the western inland FTZ represented by Shaanxi marks that the construction of China's FTZ has stepped into a new stage of pilot exploration and a new breakthrough in the region, which is of great historical significance and practical role. The establishment of Shaanxi FTZ will help expand regional openness, increase

regional import and export trade, and effectively play its leading role in the development of western China and the Belt and Road. However, compared with the development achievements of the coastal FTZ, the development effectiveness of Shaanxi FTZ deserves further exploration. This paper uses the newly developed regression control method (HCW) to study the impact of the establishment of the Shaanxi Pilot Free Trade Zone on the scale of import and export.

## 2    Review

The literature on the assessment of the impact of FTZ policies is mainly divided into two categories, one based on the establishment of regression models to assess the impact of FTZ policies on regional economic growth, such as Ren Zeping et al. (2016)[1] based on the feasible generalized least squares estimation of the D-S model, empirically demonstrated that the establishment of the FTZ has enhanced the location advantages of the region, and strengthened synergistic and complementary relationships between the regional economy. Another type of non-experimental methods based on micro-econometrics to construct "counterfactuals" to assess the impact of FTZ policies on regional economic growth, which are currently more widely used in this area, are mainly the double-difference-in-differences (DID) method, synthetic control method (SCM) and regression control method (HCW). Regarding the literature on the application of the double difference method for effect assessment, for example, Liu Bingkan et al. (2019) [2]analyzed the mechanism of the establishment of the FTZ to promote the synergistic opening up of the region based on the double difference method, taking the factor flow as the entry point, and introducing the boundary variables to simulate the constraints of the factor flow such as the local administrative management and the institutional and institutional barriers. Regarding the literature on the application of synthetic control method for effect assessment, for example, Ren Zeping et al. (2020)[3] empirically verified the contribution of Shanghai FTZ's financial innovation and openness policy to Shanghai's economic growth based on synthetic control method and multiple regression. Based on the synthetic control method, Wang Aijian et al. (2020) [4] empirically concluded that there is a huge gap in the policy effects brought by the establishment of FTZs in different regions, i.e., coastal FTZs are superior to inland-type FTZs. Regarding the literature on the application of regression control method for effect assessment, for example, Wu Jian et al. (2019) [5]assessed the economic effects of the policies of Shanghai, Guangdong, Fujian, and Tianjin FTZs based on the regression synthetic control method from a multi-indicator perspective. Yang Dongxu et al.(2022) [6]empirically demonstrated that the construction of Pilot Self-Trade Zones promotes the quality of regional economic growth.

   The difficulties in assessing policy effects lie in the endogeneity problem of economic events and economic policies and the unobservability of virtual implementation. Traditional regression model estimation has been criticized for not being able to solve the endogeneity problem well, and thus non-experimental methods have begun to be widely used by researchers in recent years. Compared with the double-difference method (DID) and the synthetic control method (SCM), which have been widely used

in recent years, the regression control method (HCW), which evaluates the policy effects by constructing a counterfactual with time-varying potential, has attracted attention as a non-experimental method.

In summary, the existing literature has conducted multi-angle theoretical and empirical research on the development of FTZs, and put forward relatively informative research results, but the vast majority of the above research focuses on the FTZs set up in developed regions and coastal port areas, and the literature on the empirical evidence centered on the Shaanxi FTZs is still rare. In view of this, this paper will utilize the panel data of 19 provinces (municipalities and autonomous regions) from 2000-2019, and apply the regression control method (HCW) to select the total amount of imports and exports to assess and analyze the policy effect of the establishment of FTZ in Shaanxi.

# 3      Research Design

## 3.1      Theoretical Model

Hsiao, Ching, and Wan (a.k.a. HCW) (2012) [7] proposed a more flexible method than DID and the synthetic control methods proposed by Abadie and Gardeazabal (2003) [8] and Abadie, Dimond, and Hainmueller (2010) [9]. In this paper, we adopt the newly developed "HCW" analysis, a new method proposed by Hsiao, Ching and Wan to estimate the average treatment effect using panel data. The basic idea of this method is to construct counterfactuals by utilizing the correlation between cross-sectional units (Hsiao et al., 2012)[6].

## 3.2      Variables and Data Description

In this paper, the annual total import and export amount is selected to represent the scale of foreign trade, to test whether the establishment of FTZ promotes the growth of regional total import and export amount.

Shaanxi Pilot Free Trade Zone was approved and established on August 31, 2016, which is the treatment group studied in this paper. The control group is selected from other provinces in China, in which the establishment of Shanghai, Guangdong, Tianjin, Fujian, Liaoning, Zhejiang, Henan, Hubei, Chongqing, Sichuan Pilot Free Trade Zone is earlier than Shaanxi Pilot Free Trade Zone or approved to be established at the same time as Shaanxi Pilot Free Trade Zone, so the control group excludes the above 10 provinces and municipalities, and in addition, taking into account the specificity of the political system in the three regions of China, Hong Kong, Macao and Taiwan, excluded from the control group excludes the above 10 provinces and cities, and in addition, considering the special political system of Hong Kong, Macao and Taiwan, they are excluded from the control group, and at the same time exclude Tibet, which has more missing data, and finally determine 18 provinces (municipalities and autonomous regions) as the control group area, including Beijing, Hebei, Shanxi, Inner Mongolia, Jilin, Heilongjiang, Jiangsu, Anhui, Jiangxi, Shandong, Hunan, Guangxi, Guizhou, Yunnan, Gansu, Qinghai, Ningxia and Xinjiang.

Restricted by data availability, this paper selects the annual data of each province and city from 2000-2019, of which most of the data come from China Statistical Yearbook, and individual data come from local statistical bulletins.

# 4          Counterfactual Analysis

In this paper, the total import and export amount of Shaanxi and other control groups are regressed to obtain the optimal combination of control provinces and cities in Shaanxi according to the AICC criterion. The optimal control group of Shaanxi's total import and export includes Guizhou, Ningxia, Jiangxi, Xinjiang and Guangxi, and the corresponding regression coefficients are -0.4393, 3.4740, -0.0128, -0.1448, 0.5098, and basically all of them pass the significance test at 1% statistical level, and the $R^2$ of the estimated equation is 0.9982, which indicates that the fitting effect is very good. The above results show that the total import and export amount of the optimal control group of province and city combinations selected in this paper is a good approximation of the import and export trade amount of the provinces and cities in the Pilot Free Trade Zone.

As shown in Fig. 1, the solid line represents the actual value of total import and export, and the dashed line represents the predicted value of total import and export. In the period before the establishment of the Pilot Free Trade Zone, the actual value and the predicted value basically overlap, and the important inflection points have been well fitted, i.e., the total import and export of Shaanxi before the establishment of the FTZ can be more accurately fitted by Guizhou, Ningxia, Jiangxi, Xinjiang, and Guangxi, which suggests that the assessment of policy effects of the establishment of the Pilot Free Trade Zone based on the regression control method (This indicates that the assessment of the policy effect of the establishment of the Pilot Free Trade Zone based on the counterfactual value obtained by the regression control method (HCW) can obtain more reliable results. After the establishment of the Pilot Free Trade Zone, the actual value and the predicted value show different states, showing that the actual value is higher than the predicted value, indicating that the establishment of the Pilot Free Trade Zone has a significant promotion effect on the total amount of import and export in Shaanxi.

# 5          Robustness

First, the endogeneity test. In order to satisfy the exogeneity assumption of the control group, the control group provinces adjacent to the Shaanxi FTZ are excluded to reduce the potential endogeneity problem. As shown in Fig. 2, the difference between the actual and predicted values of total imports and exports is significant after the implementation of the FTZ policy, i.e., the actual values are significantly larger than the predicted values, which is consistent with the previous benchmark results.

Second, the placebo test. Changing the time of policy implementation, advance the establishment of the FTZ by one year, and then conduct the "counterfactual" analysis. As shown in Fig. 2, the difference between the actual and predicted values of total imports and exports after the implementation of the FTZ policy is significant, i.e., the

actual value is significantly larger than the predicted value, which is consistent with the previous benchmark results.
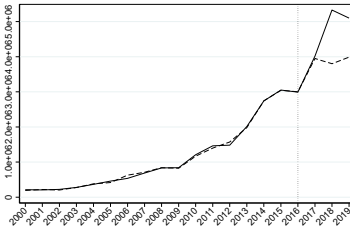


**Fig. 1.** Actual and Predicted Import and Export Trade Volume
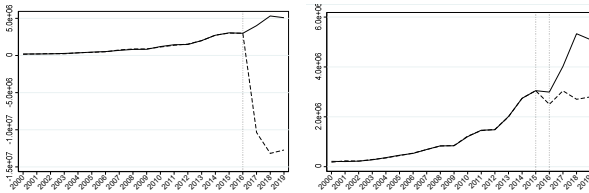


**Fig. 2.** Endogeneity Test (left) and Placebo Test (right)

## 6      Conclusions and Implications

### 6.1      Conclusion

This study finds that the implementation of the FTZ policy in Shaanxi can greatly promote the import and export trade of the region, both the benchmark results and the robustness test are well verified that the implementation of the FTZ policy on the total amount of import and export of a significant positive promotional effect, based on the above conclusions can be obtained from the following revelations.

### 6.2      Suggestion

First, promoting the construction of pilot free trade zones at a high standard to facilitate high-quality economic development. In line with the world's high-level FTZs, we will further improve the customs clearance integration system and other measures to promote the liberalization and facilitation of trade and investment, which will in turn drive the steady growth of import and export trade, and promote high-quality economic development with the help of various positive spillover effects of trade and investment.

Second, the top-level design should be refined to avoid the potential negative impact of the construction of the Pilot Free Trade Zone. We should make a good top-level design, build a perfect institutional system, and replicate and extend the reform pilot experience to the whole country while continuously optimizing the institutional system of the zone.

Third, pay attention to regional differences and promote the construction and development of the Pilot FTZ according to local conditions. Shaanxi Pilot Free Trade Zone, as an important part of the western inland FTZ and an important junction of the "Belt and Road", should continue to promote the autonomous reform of the Pilot Free Trade Zone system, based on its own location advantages and resource endowments, establish its own comparative advantages, and explore the Pilot Free Trade Zone construction programs and development paths with local characteristics and differentiation.

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