

# **Analysis of the Impact of the Promotion of Free Trade Zones on the Construction of Domestic Industrial Chain under the Background of Dual Circulation**

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## **Abstract**

**Under the background of the reconstruction of the global value chain, China has proposed to build a dual circulation pattern after judging the situation and upgrading the domestic industrial structure. Since the 18th National Congress of the Communist Party of China, China has successively set up 21 pilot free trade zones, which are orderly distributed in the eastern, central and western regions of China. As a pilot zone for China's reform and opening up, the pilot free trade zone encourages institutional innovation to achieve free flow of factors and resources on a larger scale, which is conducive to the construction of a unified national market, especially high-end service elements, thereby creating conditions for upgrading the domestic industrial chain. This paper selects the provincial panel data from 2006 to 2020 an.**

## **Keywords**

**Differences-in-Differences; Institutional Innovation; Service Industry Opening; Industrial Structure; Dual Circulation.**

## **1. Research Background**

Today's world coincides with major changes unprecedented in a century, with the collective rise of developing countries and emerging market countries led by China, the global outbreak of the new crown pneumonia epidemic, unilateralism and protectionism, etc., which have seriously hindered the process of economic globalization. In this context, China proposed in the "Suggestions of the CPC Central Committee on the Formulation of the 14th Five-Year Plan for National Economic and Social Development and the Long-Range Objectives for 2035" to optimize the supply structure, smooth the domestic circulation, attract global resource elements with the domestic circulation, make full use of the domestic and international markets, and promote the domestic and international dual circulation. At the same time, the development of the global value chain is undergoing new changes, the development of artificial intelligence, big data, and the Internet of Things and other digital economies have changed the driving mechanism of the global value chain, the division of labor in the global value chain extends from manufacturing to the service field, and the service industry has also been given many new characteristics. In the face of the construction requirements of the domestic value chain in the process of getting rid of the "low-end lock-in" trap, the importance of accelerating the upgrading of the industrial structure has become increasingly prominent, especially the development of the service industry, such as Yao Zhanqi (2019) from the perspective of opening up, expounding the positive impact of the service industry on the upgrading of China's industrial structure. Although the development of China's service industry has achieved obvious results in recent years, and the total import and export volume of service trade has ranked second in the world for five consecutive years, the low level of openness and the lack of resilience of the domestic supporting industry chain are still the pain points of China's service industry development. From the perspective of development quality, the industry is still at the

middle and low end of the value chain on the whole, and the proportion of traditional service fields is still large. It is difficult to meet the real demand of medium and high-end under consumption upgrading and the rigid demand of industrial upgrading and the continuous expansion of the export scale of service trade in China's manufacturing field. Jiang Wang et al. (2020) found that the enhancement of the National Innovation Driving Force (NIDF) can significantly increase the domestic value-added rate of service industry exports and promote the high-quality development of the service industry. Therefore, it is of great practical significance to study the impact of promoting the institutional innovation of the free trade zone under the reconstruction of the global value chain on the upgrading of China's industrial chain structure, which is of great practical significance for China to smooth the domestic and international dual circulation, enhance the status of the global value chain, and achieve high-quality development.

## **2. The Promotion of the Free Trade Zone Throughout the Country Provides Opportunities for the Construction of the Domestic Industrial Chain**

### **2.1. The Degree of Openness of the Free Trade Zone has been Continuously Improved**

Since the 18th National Congress of the Communist Party of China, China has successively established 21 pilot free trade zones, which are orderly distributed in the eastern, central and western regions of China, and have coordinated with major national strategies to form a pilot pattern covering the east, west, south and north. Data from July 2021 shows that China's pilot free trade zones have launched a total of 278 institutional innovations at the national level. As a pilot zone for China's reform and opening up, the pilot free trade zone encourages institutional innovation to enable the free flow of factors on a larger scale, especially high-end service elements, thereby creating conditions for the construction of a gradient industrial chain. As shown in Table 1, the overall plan of each pilot free trade zone is centered on innovation and service industry opening. On this basis, each pilot free trade zone has its own pilot pattern. For example, the Liaoning Free Trade Zone focuses on enhancing the overall competitiveness of the development of the old industrial base in Northeast China, focusing on traditional heavy industry and manufacturing, while the Henan Free Trade Zone focuses on the construction of a modern logistics system based on the construction of the transportation system. The differentiated free trade zone development strategy provides a broad space for the development of a complete industrial chain. For example, Feng Rui et al. (2020), on the basis of examining the promotion of industrial structure upgrading in the first two batches of pilot free trade zones, explored the regional heterogeneity of different provinces through synthetic control methods, and found that compared with the Shanghai free trade zone, the policy effect of the second batch of free trade zones to promote the upgrading of local industrial structure is more significant. Wang Xuyang et al. (2020) comprehensively analyzed the development trend of China's first five batches of free trade zones, affirmed their achievements in institutional innovation in the fields of investment, trade, finance, government management and business environment, and also put forward existing problems and prospects for the future. Cai et al. (2021) empirically analyzed the policy effects after the establishment of the Shanghai FTZ using dynamic panel data model and regression control method, and concluded that it significantly promoted the increase of Shanghai's GDP.

**Table 1.** Statistics on the overall plan innovation of each pilot FTZ and the relevant provisions of the opening up of the service industry

Year	FTZ	Number of provisions related to innovation and service sector liberalization
2013	Shanghai	8
2015	Tianjin	11
2015	Guangdong	12
2015	Fujian	11
2017	Zhejiang	7
2017	Hubei	11
2017	Shanxi	20
2017	Chongqing	12
2017	Henan	11
2017	Sichuan	19
2017	Liaoning	6
2018	Hainan	11
2019	Hebei	10
2019	Jiangsu	14
2019	Shandong	7
2019	Heilongjiang	4
2019	Yunnan	12
2019	Guangxi	5
2020	Beijing	9
2020	Hunan	12
2020	Anhui	9

Source: Official website of the State Council.

## 2.2. The Opening of the Free Trade Zone System Provides a Guarantee for the Construction of the Industrial Chain - Taking the Gradient Industrial Chain of the Yangtze River Delta as an Example

The "Opinions of the CPC Central Committee and the State Council on Accelerating the Construction of a Unified National Market" issued in April 2022 clearly stated that it is necessary to create a unified factor and resource market, accelerate the optimization of the business environment, and cultivate new advantages in industrial competition. Dual circulation requires the domestic large market to be the key development, and the national unified factor market can form a strong siphon effect, attract global talents, technology, knowledge and other factors, which is conducive to the construction of a complete domestic industrial chain. The construction of the pilot free trade zone is actually a test field for the domestic unified factor market, which is to improve the lessons learned from point-to-point promotion.

The establishment of the Yangtze River Delta Free Trade Zone Alliance is a deepening promotion of the free trade zone, a vigorous promotion of the national unified factor market, and a promotion significance for the Shanghai-Suzhou, Zhejiang-Anhui free trade zone to further break down administrative barriers, save institutional costs, and promote the free flow of factors in the region. Although the factor endowments and industrial structures of different regions are different, the degree of industrial synergy between regions is high, infrastructure is interconnected, and it is easy to form industrial clusters, which can promote industrial structure upgrading through industrial transfer or even relayout.

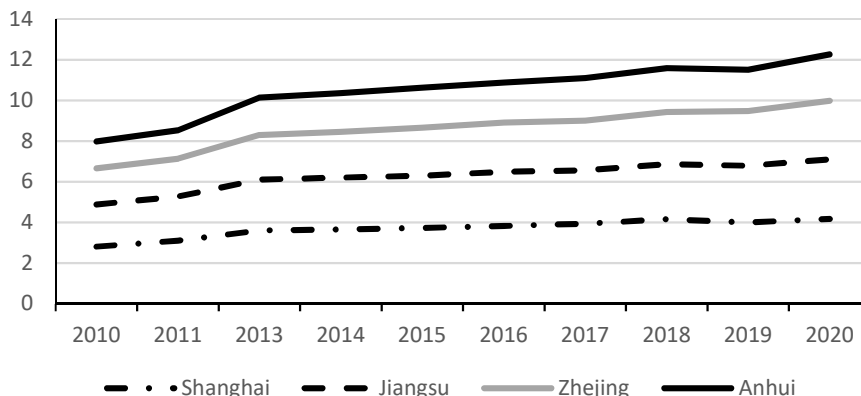


Fig. 1 R&D investment intensity of provinces in the Yangtze River Delta from 2010 to 2020

Table 2. Key industries for development in the Yangtze River Delta Pilot Trade Zone

TZ	Area	Focus on the development of industries
Anhui	Hefei Area	High-end manufacturing, Integrated Circuits, Artificial Intelligence, New Displays, Quantum Information, Science and Technology Finance, Cross-border e-commerce
	Wuhu Area	Intelligent Connected Cars, Smart Home Appliances, Aviation, Robots, Shipping Services, Cross-border e-commerce
	Bengbu area	Silicon-based New Materials, Bio-based New Materials, New Energy
Jiangsu	Nanjing Area	Integrated Circuits, Life and Health, Biomedicine, Artificial Intelligence, Internet of Things and Modern Finance
	Lianyungang Area	Biomedicine, New materials, New Energy, High-end Equipment Manufacturing, Modern Logistics, Port and Shipping Logistics, Health Care and Leisure Tourism, Business Support, Big Data, Cross-border e-commerce, Scientific and Technological Services, Financial Services
	Suzhou Area	Biomedicine, Nanotechnology Application, Artificial Intelligence, High-end Equipment Manufacturing, Modern Service Industry
Shanghai	Jinqiao Development Area	Intelligent Manufacturing, Big Video, 5G New Communication, Tax Declaration Maintenance and Remanufacturing, Future Vehicles
	Lingang New Area	Biomedicine, Integrated Circuits, Artificial Intelligence, Digital Economy Industry, New Energy Vehicles, Aerospace, High-end Shipping Services, Bulk Commodities, Fresh Cold Chain, Cross-border e-commerce, Financial Leasing, Financial Services
Zhejiang	Zhoushan Area	Aviation Manufacturing, Port Equipment Manufacturing, Shipbuilding, Marine engineering, Oil and Gas Industry Chain
	Ningbo Area	New Materials, Intelligent Manufacturing, Oil and Gas Resource Allocation, Shipping
	Hangzhou Area	Artificial Intelligence, High-end Equipment Manufacturing, Life and Health, Information Technology, Cross-border e-commerce
	Jinyi Area	Modern Logistics, Information Technology, New Materials, Small Commodity Trade, Cross-border e-commerce

As a leader in the Yangtze River Delta region, Shanghai has outstanding advantages in many fields. From the perspective of innovation, Shanghai's R&D investment intensity reached 3% as early as 2013, significantly higher than the other three provinces, as shown in Figure 1. Secondly, from the perspective of the financial sector, Shanghai, as the most open region of the country's financial industry, rose to the third place in the world as early as 2020 in the global financial center index; By the end of 2020, a total of 771 regional headquarters of multinational companies had been introduced, leading the rest of the country. On this basis, other provinces are also constantly copying and learning from Shanghai's institutional innovation achievements in various fields, such as "license separation", which has produced significant spillover effects; Zhejiang and Jiangsu have outstanding advantages in modern and high-end industries, especially Zhejiang's digital economy and Jiangsu's high-end manufacturing. As can be seen from Table 2, there are many similarities between the two provinces and Shanghai's key development industries, such as artificial intelligence, integrated circuits and other high-end industries; As a node connecting Shanghai, Jiangsu and Zhejiang, Anhui's natural geographical advantages are conducive to its joint development with Suzhou, Zhejiang and Shanghai, coupled with its certain labor cost advantages, it can undertake the spillover of some industries, especially labor-intensive industries. Therefore, weakening institutional barriers and reconfiguring factors in the entire Yangtze River Delta region at a lower cost are of promoting the industrial advantages of each region, building a more reasonable industrial chain, and enhancing the industrial competitiveness of the entire region.

### **3. Model Building**

#### **3.1. Variable Selection**

##### **3.1.1. Explanatory Variables**

According to the above analysis, the ratio of tertiary industry output value to GDP (INSTRU) is selected to represent the current situation of industrial structure.

##### **3.1.2. Core Explanatory Variables**

FTZ represents the regional dummy variable, and regions that have established inland free trade zones will take the value of this variable as 1, otherwise 0; YEAR is a dummy variable of time, and the value of the year before the establishment of the free trade zone is 0, and the value of the year before the establishment and subsequent years is 1. The interactive term FTZYEAR is the core explanatory variable in this article, which means that the region has been set as a free trade zone this year.

##### **3.1.3. Control Variables**

In order to improve the accuracy of the estimation results, other control variables need to be added to the model. According to existing research, GDP is used to measure the level of regional development (GDP); The level of government intervention (LE) is measured by local government budget expenditure; Labor costs (AW) are measured in terms of average wages.

In order to avoid being affected by the epidemic, this paper uses the data released by the National Bureau of Statistics and local statistical bureaus from 2006 to 2020 to conduct an empirical analysis of 30 provinces, autonomous regions and municipalities directly under the central government in China except Tibet, Hong Kong, Macao and Taiwan, among which due to the short time of the free trade zones established in 2018, 2019 and 2020, there is no guarantee that the policy has played a stable role, so this paper excludes the relevant years of this batch of free trade zones.

### 3.2. Model Settings

This paper uses the double difference method to evaluate the policy effect on the optimization and upgrading of the industrial structure of the inland free trade zone after its establishment. In order to reduce the influence of heteroscedasticity on the model, the variable data in the form of non-ratios are logarithmic. According to the basic principle of this method, the provinces and cities that have established inland free trade zones are used as the experimental group, and other provinces and cities are used as the control groups, and the model is constructed as follows:

$$INSTRU = \alpha + \beta_0 FTZ * YEAR + \beta_1 LNGDP_{ij} + \beta_2 LNAW_{ij} + \beta_3 LNTRADE_{ij} + \beta_4 LNLE_{ij} + u_i + v_j + \varepsilon_{ij}$$

where  $i$  represents the province,  $j$  represents the time,  $\alpha$  represents the constant term,  $\beta$  represents the coefficient,  $u_i$  and  $v_j$  represents the individual effect and time effect, respectively,  $\varepsilon_{it}$  representing the random perturbation term.

## 4. Empirical Analysis

### 4.1. Descriptive Statistics

Table 2 lists the results of the statistical description of the variables and reports the data characteristics of the explanatory variables and the explanatory variables of the regression model. The table shows that the maximum and minimum values between the groups of variables differ greatly, and the standard deviation also indicates that there is a large difference in the data between the groups. It can be seen that the inter-provincial differences among the explanatory variables are very obvious.

**Table 3.** Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
FTZYEAR	294	.1836735	.3878779	0	1
INSTRU	294	46.12412	7.450388	30.71003	73.39496
LnGDP	294	9.385802	1.007831	6.371954	11.61865
LnLE	294	7.927513	.8279245	5.263778	9.765993
LnAW	294	10.74579	.5028119	9.640173	12.05458

### 4.2. Analysis of Regression Results

In this paper, a double-difference model is used for empirical testing, and according to the results of Hausman's test, a fixed-effect model should be used in regression. When there are no control variables, the establishment of the free trade zone has a significant impact on the industrial structure. In order to exclude the influence of other factors, regression was carried out after adding control variables, and the results are shown in Table 2. The results show that the coefficient of the FTZYEAR variable is significantly positive regardless of whether the control variable is added or not. The results show that the regression coefficient of the free trade zone establishment variable to the industrial structure (INSTRU) is 1.2114, which is significant at the level of 1%, which indicates that the establishment of the free trade pilot zone is directly proportional to the industrial structure. The impact of labor cost (AW) on the industrial structure is not significant; The negative impact of GDP on industrial structure may be due to the relatively large proportion of primary and secondary industries in some regions, which hinders the current industrial structure upgrading in order to stabilize economic growth;

Local fiscal expenditure LE has a promoting effect on the industrial structure, because higher LE expenditure generally means that the infrastructure of the region is more complete and the supporting facilities required for industrial structure upgrading are more complete.

**Table 4.** regression results

INSTRU	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
FTZYEAR	1.211359	.4565805	2.65	0.008	.3122265	2.110491
LnGDP	-16.51815	2.168428	-7.62	0.000	-20.78838	-12.24792
LnLE	3.23818	1.595729	2.03	0.043	.0957526	6.380606
LnAW	1.546789	3.453286	0.45	0.655	-5.253676	8.347255
_cons	158.6455	28.81227	5.51	0.000	101.9063	215.3848

## 5. Policy Recommendations

Under the impact of various external adverse factors such as the Russia-Ukraine conflict and the epidemic, China should accelerate the construction of a dual circulation pattern, especially the development of the domestic market, and improve and upgrade the industrial chain as the focus of supply-side reform. At the same time, we should continue to accelerate the opening up of China's system, integrate with the international level as soon as possible, actively participate in the reconstruction of the global value chain under the premise that our own development is basically guaranteed, and enhance China's position in the value chain.

Give full play to the industrial advantages of various regions, identify the positioning, build a more reasonable gradient industrial chain, and promote the optimization and upgrading of the industrial structure. Each free trade zone has its own different target positioning based on its own resource endowments, geographical differences, etc., and each region should not ignore the actual pursuit of comprehensive development or the development of advanced industries that do not currently match the industrial chain, but should make full use of its strengths and avoid its weaknesses, and position its current role in the industrial chain.

Accelerate the formation of a unified national market and promote the optimal allocation of factors and resources. The establishment of the free trade zone provides the possibility for the formation of a large market for unified factors in the country. Unifying the large market can save system costs and information costs for enterprises, optimize the allocation of factors, and avoid unnecessary losses caused by administrative barriers, information asymmetry and other obstacles.

Accelerate the promotion of institutional innovation achievements in the free trade zone and enhance the degree of openness of various regions. As a test field for China's new round of reform and opening up, the free trade zone has achieved initial results in its institutional innovation, and accelerating the promotion of relevant achievements in other parts of the country can save the cost of trial and error and accelerate the speed of opening up. It can attract more factors from other parts of the world to flow into the country, especially high-end service elements, providing opportunities for China's industrial structure upgrading.

## Acknowledgments

Anhui University of Finance and Economics Postgraduate Research and Innovation Fund Project "Research on the impact of global value chain reconstruction on the high-quality development of China's service industry Research-based on a dual-loop perspective"(Project Approval Number:ACYC2021175).

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