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The Driving Effect of Pilot Free Trade Zones on High-quality Economic Development

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Abstract

Promoting the upgrading of industrial structure is an important measure to realize the high-quality development of Chinese economy. Therefore, it can be inferred that the "pilot free trade zone driving" of regional industrial structure upgrading will have a leading effect on the high-quality development of economy.In this paper, the entropy weight TOPSIS method is used to integrate the indicators based on the "five development concepts" of innovation, coordination, green, open and sharing into the"economic high quality indicators" to build a model. By analyzing the interaction terms between pilot free trade zones and industrial structure upgrading, the conclusion can be drawn that pilot free trade zones effectively promote the high-quality economic development of pilot provinces by influencing industrial structure upgrading.

Keywords

Pilot Free Trade Zone; Economic High Quality Development; Induced Effect.

1. Introduction

China is in a critical period of transforming the development model, optimizing the economic structure and shifting growth drivers.To promote the high-quality development of the economy, we must focus on promoting the transformation and upgrading of the industrial structure, and how to promote the new breakthrough of industrial structure upgrading awaits the academic circle to focus on the research.

On the other hand, pilot free trade zones have made bold innovations in areas such as investment and trade facilitation, financial opening and innovation, in-process and postoperation supervision and services, and national strategies, and achieved a series of breakthroughs, which have played an important leading and demonstration role in building an open economic system for China, and effectively promoted the transformation and upgrading of industrial structure.At present, a large number of pilot reform experience has been replicated across the country, which requires to find out the specific mechanism of pilot free trade zones to drive economic development, and provide suggestions for economic development in various regions.

2. Literature Review

2.1. Concepts

Pilot free trade zones: The pilot free trade zones referred to in this article are not only different from special administrative areas such as special economic zones, development zones, high-tech zones and state-level new zones, but also different from special customs supervision areas such as bonded port areas, comprehensive bonded areas, bonded areas, export processing zones, bonded logistics parks and cross-border industrial zones. The most significant difference between the pilot free trade Zone and them is that it belongs to the "inside and outside the

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customs" zone in the true sense, and the construction goal is to gradually form a liberalizing environment in line with international practices and adapted to the new generation of economic and trade rules.

Since the first pilot free trade zone was set up in Shanghai in September 2013, a total of 21 pilot free trade zones have been set up in various provinces and cities in China. The following table shows the current distribution of pilot free trade zones in 21 provinces and cities in China. The construction of pilot free trade zones is entering a new stage of comprehensive exploration. The construction of pilot free trade zones is still an important front for China to comprehensively deepen reform at present and in the future.

High-quality development: High-quality development is to improve the effectiveness of supply and achieve a dynamic balance between supply and demand at a new level. High-quality economic development is a major strategic judgment China has made as it enters the new era after more than four decades of reform and opening up. It has a distinctive feature of The Times and policy. It requires the speed of development, the optimization of the economic structure and the transformation of economic momentum. There are also many different opinions in the academic circle on the construction of high-quality economic development indicators. Ma Rueal. (2019) 1constructed an evaluation index system of China's high-quality economic development, which includes 5 first-level indicators, 15 second-level indicators and 28 third-level indicators. After dimensionless processing of the original index data, this paper adopts linear weighting method to obtain the overall index of regional economic high-quality development and subindexes at all levels. Wei Min and Li Shuhao (2018) integrated the indicators based on the "five development concepts" of innovation, coordination, green, openness and sharing into the "economic high quality index" through the entropy weight TOPSIS method, which is the index adopted in this paper.

2.2. Research Status

The research on pilot free trade zones has increasingly become an academic hot spot. Scholars have conducted researches from multiple perspectives, mainly focusing on macro policies, economic and social impacts, etc. (Huang Qicai, 2018).In terms of the policies of pilot free trade zones, Chen Zongsheng and Wu Zhiqiang (2016) analyzed the background, significance, main contents and reform difficulties of the construction of China's pilot free trade zones, and argued that the zones were set up at a time when challenges and advantages coexist. It plays an important strategic role and significance in promoting China's economic transformation and upgrading, promoting a new round of reform and opening up, and building a new engine of economic growth. Reform and opening up are still the main theme of pilot free trade zones, but there will be some reform difficulties in the transformation of government functions, expansion of opening up in the investment field, transformation and upgrading of trade functions, and opening up and innovation in the financial field.In terms of the economic and social impact of the pilot Free trade Zone, Yao and Whalley (2015) studied the impact of the establishment of the Shanghai Pilot Free Trade Zone on China's economy, especially on the opening up of capital account, financial liberalization and the development of offshore finance.Huang Qicai (2017) analyzed the opening-up and innovation measures in the Fujian Pilot Free Trade Zone in the fields of health care, tourism, education, culture and other fields, as well as the impact on the development of regional social undertakings.Jin Zehu and Li Qingqing (2016), Teng Yongle and Shen Kunrong (2014), Ye Hongyu (2014), Jiang Ruochen et al. (2014) analyzed the impact of the Shanghai Pilot Free Trade Zone on the Yangtze River Economic Belt, the economy of Jiangsu Province, the economy of the Yangtze River Delta region, and the economy of Shanghai headquarters, respectively.In terms of quantitative evaluation, Tan Na et al. (2015), based on the regression synthetic counterfactual method proposed by Hsiao et al. (2012), evaluated the economic growth effect of Shanghai Pilot Free Trade Zone by using two monthly data indicators,

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namely the growth rate of industrial added value and the growth rate of total import and export volume, and found that it had a significant positive effect.

In general, most of the existing targeted studies believe that the pilot free trade zone has a positive effect on the upgrading of industrial structure, especially the more persuasive quantitative studies. Although some studies have pointed out that the driving force of the pilot free trade zone is different or even insignificant, it still affirms the positive driving effect on the whole.For example, the empirical studies of Li Shijie and Zhao Tingru (2019), Li Shaokai and Li Luyi (2019) show that the Shanghai Pilot Free Trade Zone has a significant positive effect on promoting the upgrading of industrial structure, although its positive effect on the rationalization of industrial structure and the upgrading of processing degree is generally weak.Nie Fei (2019) concluded that pilot free trade zones can effectively optimize the rationalization of manufacturing structure on the whole, but the four pilot free trade zones in Shanghai, Tianjin, Fujian and Guangdong have different impacts on the rationalization of manufacturing structure in terms of duration and lag period.

At present, the research on the free trade zone is mainly at the macro level, and for empirical evidence, most scholars are studying the development of a pilot free trade zone with a pilot free trade zone as the research object, and there are few articles that study the development of all pilot free trade zones, and this article just makes up for this deficiency.

3. Theoretical Framework

This paper takes Zhao Liang's (2021) econometric model setting form as reference. Promoting industrial structure upgrading is an important measure to achieve high-quality economic development in China, from which it is inferred that the "pilot free trade zone drive" of regional industrial structure upgrading has a high impact on the economy quality development has an induced effect. It can be verified by empirical analysis, the basic idea of which is as follows:

$$Economy_{it} = h_0 + h_1 PFTZ_{it} + h_2 Structure_{it} + h_3 PFTZ_{it} \times PFTZ_{it} h' \ln K_{IT} + \tau_{it} \quad (1)$$

Economy stands for the quality of economic development, measured by five specific indicators representing the "five development concepts". Represents the set of control variables that affect high-quality economic development; PFTZ*Structure is the interaction term, which represents the net effect of the pilot free trade zone in promoting the upgrading of industrial structure; K represents the set of control variables affecting the high-quality economic development; tauitIs the random error term; h0, h1, h2, h3 and h'are all parameters to be estimated, but h3 core estimation parameters, their positivity and significance are the basis for judging the economic consequences of the impact of the pilot free trade zone on industrial structure upgrading. If h3 If the value is significantly positive, it means that the pilot free trade zone effectively promotes the high-quality economic development of the pilot cities by influencing the upgrading of industrial structure.

4. Data and Sample

(1) Quality of economic development (Economyit). First, an evaluation index of highquality economic development should be constructed based on the "five development concepts" of innovation, coordination, green development, opening up and sharing. Among them, "innovation" is measured by the level of R&D investment (the ratio of R&D expenditure to GDP), "coordination" is measured by the ratio of urban and rural per capita income, "green" is measured by the level of energy consumption (energy consumption per ten thousand yuan of GDP), and "open" is measured by the dependence on foreign trade (the ratio of total foreign

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trade to GDP). And "sharing" is measured by indicators such as the registered urban unemployment rate. Then through the entropy weight TOPSIS method to integrate all indicators into "economic high quality indicators".

(2) Whether to establish pilot free trade zones (PFTZit).Dummy variable, if a province establishes a pilot free trade zone in the first half of the year, the value is 1 from that year; If the province established the pilot free trade zone in the second half of the year, then the value is 1 from the next year.

(3) The industrial Structure upgrading index($Structure_{it}$).According to the study of Dong Danfeng (2022), the establishment of pilot free trade zones can promote urban economic growth mainly in the tertiary industry, but not in the secondary industry. Therefore, the ratio of the gross domestic product of the tertiary industry to the gross regional product is used to measure the upgrading of the industrial structure.

(4) Interaction terms between pilot free trade zones and industrial structure upgrading (PFTZit* Structureit). The core explanatory variable of this model is obtained by multiplying the establishment of free trade zones and industrial structure upgrading index.

(5) Other control variables (lnKit). Since high-quality regional development cannot be separated from government assistance and human capital, this paper selects local general public budget expenditure (lnGovernit) and the average number of college and university students per 100,000 population (lnTalentit) as a control variable and logarithmically treated.

The data required in the construction of dependent variable index are mainly from the statistical yearbook of each province, while the data of explanatory variable are mainly from China Statistical Yearbook.For the time of establishing pilot free trade zones, refer to the relevant document.Based on the availability of the data, the time dimension of the original data used in this article is 2010-2020.Considering that the pilot free trade zones set up after 2019 failed to show good development results due to the epidemic, the research objects of this paper are 18 provinces that set up pilot free trade zones from 2013 to 2019.

5. Empirical Results

5.1. Descriptive Analysis

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Economy	180	.347	.18	.091	.925
PFTZ	180	.372	.485	0	1
Structure	180	.472	.083	.297	.732
PFTZ*Structure	180	.199	.262	0	.732
lnGovern	180	8.546	.552	6.658	9.766
lnTalent	180	7.891	.222	7.326	8.396

The sample size of this paper is 180, which is relatively small.The quality of economic development in the provinces varies greatly. The maximum value is more than ten times the minimum value, and the average value is 0.347, which is closer to the minimum value, indicating that the quality of development in most provinces is low. As for the variable PFTZ, the average value was only 0.372, indicating that most provinces set up pilot free trade zones late. The standard deviation of industrial structure upgrading index is only 0.083, indicating that the upgrading state of industrial structure in each province is relatively stable over the years.In addition, it can be seen that the control variables are also relatively stable.

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5.2. Analysis of Benchmark Results

Firstly, the index of industrial structure upgrading is used to regression the index of highquality economic development, and it is found that the coefficient is significantly positive, indicating that there is a positive correlation between the two, industrial structure upgrading can promote high-quality economic development. Then, pilot free trade zones and the interaction term with industrial structure upgrading are added. The coefficients of explanatory variables are significant at least at the 95% confidence level. The coefficients of industrial structure upgrading index and interaction term are positive, indicating that pilot free trade zones effectively promote the high-quality economic development of pilot provinces by influencing industrial structure upgrading. In order to make the results more accurate, we added the two control variables of government support and human capital for the third time, and found that all the other variables except human capital passed the significance test, and the coefficients of industrial structure upgrading index and interaction term were still significantly positive, indicating that the pilot free trade zone effectively promoted the high-quality economic development of the pilot provinces by affecting industrial structure upgrading.

Table 2. Analysis of benchmark results

	(1)	(2)	(3)
	economy	economy	economy
Structure	1.19***	0.98***	0.95***
	(8.141)	(4.377)	(4.378)
PFTZ		-0.45**	-0.49***
		(-3.015)	(-3.359)
Structure*PFTZ		0.84**	0.81**
		(2.583)	(2.628)
lnGovern			0.10***
			(4.120)
lnTalent			0.05
			(1.015)
_cons	-0.22***	-0.11	-1.31**
	(-3.368)	(-1.248)	(-3.124)
N	180	180	180
r2_a	0.3	0.32	0.39
F	66.27	30.38	24.83

t statistics in parentheses; * p<0.1, ** p<0.05, *** p<0.001.

Source: Author's calculations.

5.3. Heterogeneity Analysis

We divided the samples into three groups according to the quality of economic development, and then carried out regression respectively. We found that most of the coefficients of the first group were significant and only the coefficient of the interaction term in the model of the first group was positive. This indicated that the pilot free trade zone had a more obvious role in promoting the high-quality economic development of the pilot provinces by influencing the upgrading of industrial structure in the regions with lower economic development quality. The regions with medium economic development quality are the least significant, indicating that the establishment of pilot free trade zones has no significant effect on improving the industrial structure and thus the quality of regional economic development.

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Table 3. Heterogeneity analysis

	(1)	(2)	(3)
	economy	economy	economy
Structure	-0.230***	0.086	1.915***
	(0.067)	(0.075)	(0.292)
PFTZ	-0.171**	-0.036	-0.192
	(0.072)	(0.060)	(0.150)
Structure*PFTZ	0.385**	0.056	0.18
	(0.146)	(0.120)	(0.297)
lnGovern	-0.004	-0.011	0.084***
	(0.015)	(0.007)	(0.018)
lnTalent	0.130***	-0.003	-0.381***
	(0.020)	(0.019)	(0.076)
_cons	-0.687***	0.373*	1.889***
	(0.214)	(0.207)	(0.521)
N	60	60	60
r2_a	0.558	0.084	0.699

t statistics in parentheses; * p<0.1, ** p<0.05, *** p<0.001.

Source: Author's calculations.

6. Discussion and Conclusion

The empirical analysis shows that pilot free trade zones can effectively promote the highquality economic development of pilot provinces by influencing the upgrading of industrial structure, and this effect is most obvious in areas with low economic development quality.

The first is to strengthen the scale of the pilot free trade zone drive. That is to promote the establishment of pilot free trade zones, strengthen the construction of pilot free trade zones from the dual dimension of moderately accelerating the number of new areas and the development of existing expanded areas, and continue to realize the coverage of pilot free trade zones from points to lines, connecting woven surface, and surface movement, trying to build a new three-in-one opening pattern of "pilot free trade zones + linked innovation zones + radiation-driven zones". More regions will directly benefit from the "pilot free trade zone drive" to upgrade their industrial structure.

Second, we will do a good job in demonstration promotion and differentiated development. We will speed up "pilot free trade zones" demonstration and summing up experience in building them, improve the efficiency of replication and promotion, and spread the benefits of pilot free trade zones to more regions. Strengthen differentiation, dislocation and interdependent development among coastal, riverside, border and inland pilot free trade zones in terms of functional positioning to prevent disorderly competition.

Third, coordinate the economic development of the East, Central and western pilot free trade zones to narrow the gap and promote market integration. The eastern, central and western regions of China not only have obvious differences in economic development stage and resource endowment, but also have different influences on the degree of market segmentation caused by the level of opening-up of the three regions. In order to promote the formation of the domestic unified market, it is necessary to coordinate the regional economic development and promote the balanced economic development among the eastern, central and western regions.

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