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Research on the Optimization of Regional Industrial Structure in the Yangtze River Delta

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Abstract

Optimizing the industrial structure of the Yangtze River Delta is the key to solving the structural contradictions of regional economic development. Based on the dynamic changes of the rationalization and heightening of the industrial structure, this paper selects the Theil index and the proportion of industry added value to quantify the aforementioned concept. According to the relevant data of the Yangtze River Delta industry in recent years, a regression analysis of the factors affecting the optimization of the regional industrial structure is carried out. The results are as follows: GDP per capita, fixed asset investment rate, and the process of urbanization all give impetus to the rationalization of the industrial structure. Emphasizing the role of supply and the balance of investment structure is the focus of policy decisions. The process of urbanization and marketization promotes the development of advanced industrial structure, which require government to promote the development of urban-rural integration and minimize market intervention. Based on the analysis results, the Yangtze River Delta region should actively promote supply-side structural reforms, attach importance to demand income elasticity and productivity enhancement benchmarks, achieve urban and rural integrated development, push forward industrial integration development, and play the decisive role of market allocation of resources to promote the progression of high-quality economic development in the Yangtze River Delta region.

Keywords

Regional Integration of the Yangtze River Delta; Industrial Structure Optimization; Theil Index; Proportion of Industry Added Value.

1. Introduction

As one of the important national strategies, the development strategy of the Yangtze River Delta regional integration is an in-depth exploration of the regional integration development system and model, which is conducive to giving play to the relative advantages of the Yangtze River Delta urban agglomeration. The optimization of the industrial structure is an important force supporting the comprehensive, coordinated and sustainable development of the economy. At the same time, the current economic growth rate of the Yangtze River Delta also provides a suitable material basis for the optimization of the industrial structure, which can realize a virtuous circle of optimization and upgrading of the industrial structure and economic growth. In this context, how to optimize the industrial structure of the Yangtze River Delta region and

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promote the high-quality development of the regional economy is an urgent problem to be solved recently.

Generally speaking, promoting the optimization of industrial structure is conducive to realizing the optimal allocation of resources, improving the ratio of output to input, improving the level of industries, promoting the coordinated development of various industries in the national economy, making the development of various industries adapt to the development of the national economy, and maintaining and promoting economic development.

2. Literature Review

The relationship between industrial structure optimization and economic growth is very close, and the two promote and complement each other, especially in the process of modern economic growth. This also makes the optimization of industrial structure attract the attention of many countries and regions. Developed countries and some new industrialized countries have accumulated a lot of achievements and rich experience in the theoretical research and practical application of industrial structure. The introduction of industrial economics was followed by relevant research on the optimization of industrial structure.

Foreign experts and scholars began to study from the structuralist viewpoint of economic growth, transitioned to industrial structure theory, and then gradually extended to related research on industrial structure optimization. Kuznets studied the changing trend of the industrial structure through the change process of the total amount from the economic point of view. Rostow analyzed the law of the growth of the total economic aggregate through the change process of the department structure from the perspective of the department. In the 1950s, Japanese scholar Shinohara Sandaihei first proposed how to optimize and upgrade the industrial structure in *Theory of Industrial Structure*, and clearly put forward two benchmark conditions: "income elasticity benchmark" and "productivity growth rate and benchmark". Economist Romer (1986) put forward the "endogenous economic growth theory" and made a deep exploration of the influencing factors in the process of industrial structure optimization and upgrading [1]. Legewie (2000) put forward the concept of industrial integration and carried out further research on social and economic issues [2], Almeida (2009) demonstrated the optimization of industrial structure by studying the influencing factors of industries [3].

Since Professor Zhou Zhenhua in China took the lead in researching the upgrading of industrial structure, many domestic experts and scholars have carried out relevant research on industrial structure optimization through qualitative and quantitative analysis methods, and the research interest has remained high. In recent years, the research tends to be multi-disciplinary, such as industrial economics and regional economics. Therefore, the research on industrial structure optimization has developed a situation based on basic theories based on multiple perspectives and multiple aspects. He Dexu and Yao Zhanqi (2008) studied how to maintain the coordination and interaction of industrial structure adjustment and upgrading and various effects of industrial structure change from the perspective of China's industrial structure change effect [4]. Shen Kunrong and Xu Libo (2014) emphasized the change of thinking in the optimization process by analyzing the bottlenecks, breakthrough methods and development trends encountered in the optimization of my country's industrial structure [5,6]. Zhang Xiusheng and Wang Peng (2015) put forward the necessity and effective measures to optimize the industrial structure in my country by interpreting the connotation mechanism of the new normal [7].

Based on the above literatures, in the process of considering the optimization of the industrial structure in the Yangtze River Delta region, this paper organically combines the rationalization and heightening of the industrial structure to achieve the optimal allocation and reallocation of regional resources, and ultimately achieve sustained and rapid economic growth.

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3. Measurement Methods of Industrial Structure

The industrial structure is an important part of the social and economic system, which refers to the five-dimensional spatial relationship between the various production factors within the industry and the time, space and levels between industries. In the process of economic development, the social division of labor has become more and more refined, and more and more production departments have emerged as the times require. Due to the influence of various factors, these production sectors play different roles in promoting social and economic development. Economist Chen Shiqing mentioned in the *Glossary of Symmetrical Economics* that the symmetrical relationship between economic subjects and economic objects is the most basic industrial structure and the most fundamental driving force for the upgrading of the industrial structure. The upgrading of industrial structure is the result of industrial upgrading from quantitative change to qualitative change, and it is the process or trend of the transformation of industrial structure from low-level form to high-level form.

The optimization and upgrading of the industrial structure is the organic unity of the rationalization and advancement of the industrial structure. The rationalization of industrial structure mainly refers to the strengthening of the coordination ability between industries and the improvement of the level of association, which is a dynamic process. The high-level industrial structure mainly refers to the development of the industrial structure from a low-level state to a high-level state, which is also a dynamic process. Through the improvement of the technical level, the labor-intensive industries will be promoted to high-level development with the advantages of capital-intensive industries and technical knowledge-intensive industries. Each production sector maintains a certain proportional relationship. The rationalization of the industrial structure is the basis for the advanced industrial structure, and the advanced industrial structure is the inevitable result of the rationalization of the industrial structure.

In order to measure the evolution degree of rationalization and high-level industrial structure in the process of industrial structure optimization and upgrading, this paper selects Theil index as the measure of industrial structure rationalization [8, 9], is referred to as the industrial structure rationalization index here.

$$\mathrm{TI} = \sum_{i=1}^{n} (Y_i/Y) \ln\left(\frac{Y_i}{L_i} / \frac{Y}{L}\right) \quad (1)$$

Where, TI represents the Theil index, that is, the rationalization index of industrial structure; Y represents gross domestic product (GDP), L represents total social employment; i represents industrial sector, i=1, 2, 3. The larger the value of TI is, the more unreasonable the industrial structure is. The smaller the value of TI is, the more reasonable the industrial structure is.

Due to the phenomenon of servitization in the economic field, this paper, based on the research of Ma Jun (2018) adopts the ratio of industrial added value as a measure of the heightened industrial structure [10], that is, the ratio of the added value of the tertiary industry to the added value of the secondary industry as the measurement standard for measuring the industrial structure sophistication is referred to here as the industrial structure sophistication index.

$$\mathrm{U} = \mathrm{Y}_3/\mathrm{Y}_2 \quad (2)$$

Among them, U represents the ratio of the added value of the tertiary industry to the added value of the secondary industry, that is, the industrial structure advanced index; Y2 represents the added value of the secondary industry; Y3 represents the added value of the tertiary

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industry. The larger the value of U, the larger the added value of the tertiary industry, and the optimization and upgrading of the industrial structure; the smaller the value of U, the smaller the added value of the secondary industry, and the lag in the optimization of the industrial structure.

4. The Industrial Composition and Spatial Distribution of the Yangtze River Delta Region

4.1. Industrial Composition of the Yangtze River Delta Region

According to the *Outline of the Yangtze River Delta Regional Integrated Development Plan* issued by the State Council in 2019, the planning scope of the Yangtze River Delta urban agglomeration was officially designated as the entire area of the three provinces and one city in Jiangsu, Zhejiang, Anhui and Shanghai, with Shanghai, Nanjing, Jiangsu, Hangzhou, Zhejiang, 27 cities including Hefei City in Anhui Province are the central areas, which radiate and drive the high-quality development of the Yangtze River Delta region.

Table 1. Industrial added value in the Yangtze River Delta region in the past five years

Unit: 100 million yuan

		2014	2015	2016	2017	2018
The added value of the primary industry	Shanghai	124.26	109.82	109.47	110.78	104.78
	Jiangsu	3634.33	3986.05	4077.18	4045.16	4141.71
	Zhejiang	1777.18	1832.91	1965.18	1933.92	1975.89
	Anhui	2392.39	2456.69	2567.72	2582.27	2638.00
	Yangtze River Delta	7928.16	8385.47	8719.55	8672.13	8860.38
The added value of the secondary industry	Shanghai	8167.71	7991.00	8406.28	9330.67	10360.78
	Jiangsu	30854.50	32044.45	34619.50	38654.87	42129.37
	Zhejiang	19175.06	19711.67	21194.61	22232.08	25308.13
	Anhui	11077.67	10946.83	11821.58	12838.28	14094.44
	Yangtze River Delta	69274.94	70693.95	76041.97	83055.90	91892.72
The added value of the tertiary industry	Shanghai	15275.72	17022.63	19662.90	21191.54	25546.26
	Jiangsu	30599.49	34085.88	38691.60	43169.73	46936.47
	Zhejiang	19220.79	21341.91	24091.57	27602.26	30718.83
	Anhui	7378.68	8602.11	10018.32	11597.45	17278.47
	Yangtze River Delta	72474.68	81052.53	92464.39	103560.98	120480.03
Regional industrial structure	Shanghai	0.53:34.66:64.81	0.43:31.81:67.76	0.39:29.83:69.78	0.36:30.46:69.18	0.29:28.77:70.94
	Jiangsu	5.58:47.41:47.01	5.69:45.70:48.61	5.27:44.73:50.00	4.71:45.02:50.27	4.44:45.20:50.36
	Zhejiang	4.42:47.73:47.85	4.28:45.96:49.76	4.16:44.85:50.99	3.74:42.94:53.32	3.41:43.63:52.96
	Anhui	11.47:53.13:35.40	11.16:49.75:39.09	10.52:48.43:41.05	9.56:47.52:42.92	7.76:41.44:50.80
	Yangtze River Delta	5.30:46.28:48.42	5.24:44.15:50.61	4.92:42.91:52.17	4.44:42.53:53.03	4.00:41.54:54.46

Source: Compiled from relevant data on the website of the National Bureau of Statistics

In 2018, the added value of the primary industry in the Yangtze River Delta was 886.038 billion yuan, a year-on-year increase of 2.17%; the added value of the secondary industry was 9,189.272 billion yuan, a year-on-year increase of 10.64%; the added value of the tertiary industry was 12048.003 billion yuan, a year-on-year increase of 16.34%. It can be seen from

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the data that in 2018, the added value of the primary industry in the Yangtze River Delta region increased the least, while the added value of the tertiary industry increased the most. The added value of the primary industry in the Yangtze River Delta accounted for 4% of the regional GDP, a year-on-year decrease of 0.44%; the added value of the secondary industry accounted for 41.54% of the GDP, a year-on-year decrease of 0.99%; the added value of the tertiary industry accounted for 54.46%, an increase of 1.43 percentage points over the previous year. According to the data of industrial added value in the Yangtze River Delta region in the past five years (see Table 1), the proportion of the primary industry and the secondary industry has continued to decline, while the proportion of the tertiary industry has continued to rise, and the proportion of the tertiary industry has already More than the sum of the proportion of the primary and secondary industries, the industrial structure has been further optimized, breaking the characteristics of "primary, secondary, tertiary " and " secondary, tertiary, primary". The law of economic development is inevitable [11]. The steady growth of the tertiary industry has become the primary driving force for the economic development of the Yangtze River Delta region.

Table 2. Industrial Composition of the Yangtze River Delta Region in 2018

		The added value of the primary industry (886.038 billion yuan)	The added value of the secondary industry (9189.272 billion yuan)	The added value of the tertiary industry (12,048.003 billion yuan)
Composition of industrial added value (%)	Shanghai	1.18	11.27	21.20
	Jiangsu	46.74	45.85	38.96
	Zhejiang	22.30	27.54	25.50
	Anhui	29.78	15.34	14.34

Source: Compiled from relevant data on the website of the National Bureau of Statistics

The survey results show that the economic development level of the Yangtze River Delta region is relatively high, but the internal development level is not balanced. From the perspective of the composition of industrial added value, Jiangsu has the highest proportion of the added value of the primary, secondary and tertiary industries, Shanghai has the lowest proportion of the added value of the primary and secondary industries, and Anhui has the lowest proportion of the added value of the tertiary industry. From a regional perspective, Shanghai has the highest proportion of the added value of the tertiary industry, and its contribution has increased. Its regional economic development level is ahead of Jiangsu, Zhejiang, and Anhui. Anhui has the highest proportion of the added value of the primary industry, and its development level is relatively backward.

4.2. Industrial Distribution in the Yangtze River Delta Region

According to the survey statistics, from the perspective of the distribution of industrial added value, the value added of the Yangtze River Delta region in 2017 was the largest, while the added value of the accommodation and catering industry was the smallest. From the perspective of regional distribution, among the industries listed in industry, construction, agriculture, forestry, animal husbandry and fishery, wholesale and retail, the industrial added value of Jiangsu ranks first; Anhui only ranks first in the added value of agriculture, forestry, animal husbandry and fishery. It surpassed Zhejiang in Shanghai, and the added value of the other listed industries contributed less. Except for Jiangsu, Shanghai accounted for a large proportion of the added value of the financial industry in the Yangtze River Delta region. Shanghai, as the vanguard of national reform and opening up and the pioneer of innovation and

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development, is the only super-larger in the Yangtze River Delta region. The city and the first-tier cities are built around the "five centers" of international economy, finance, trade, shipping and technological innovation, and strive to improve the comprehensive economic strength of the Shanghai metropolis, the function of financial resource allocation, the function of trade hub, the function of high-end shipping services and technological innovation.

Table 3. Distribution of industrial added value in the Yangtze River Delta region in 2017

Unit: 100 million yuan

Industry category	Shanghai	Jiangsu	Zhejiang	Anhui	Yangtze River Delta
Industry	8392.84	34013.60	19474.48	10916.31	72797.23
Construction industry	970.79	4651.75	2845.48	1943.56	10411.58
Agriculture, forestry, animal husbandry and fishery	115.10	4314.53	1972.84	2706.74	9109.21
Wholesale and retail trade	4393.36	8070.23	6217.29	1910.47	20591.35
Transportation, Warehousing and Postal Industry	1344.54	3097.67	1938.17	875.38	7255.76
Accommodation and Catering	412.33	1406.82	1218.51	500.57	3538.23
Financial industry	5330.54	6783.87	3533.05	1663.59	17311.05
Real estate	1873.05	5016.54	3222.54	1390.48	11502.61
Other industry	7800.44	18514.75	11345.90	5110.90	42771.99

Source: Compiled from relevant data on the website of the National Bureau of Statistics

In the process of accelerating the optimization of the regional industrial structure under the background of the integration of the Yangtze River Delta, Shanghai should play its leading role, and the three provinces of Jiangsu, Zhejiang and Anhui should jointly play their respective resource advantages and develop in a coordinated manner. According to the *Outline of the Yangtze River Delta Regional Integration Development Plan*, Shanghai should form the influential "four major brands" of Shanghai service, Shanghai manufacturing, Shanghai shopping, and Shanghai culture to provide a strong guarantee for the high-quality development of the Yangtze River Delta. In recent years, Zhejiang has focused on the development of the digital economy. It not only made the development of the digital economy a *No. 1 project* in 2017, but also formulated a five-year doubling plan for the digital economy in 2018. According to data, from 2014 to 2018, the digital economy in Hangzhou, Zhejiang, the added value of core industries has an average annual growth rate of 22%. As a major province of higher education, Jiangsu has 53 institutions of higher learning, with abundant educational resources and obvious advantages. As a major agricultural province, Anhui, centered on Hefei, the provincial capital, has attached great importance to scientific and technological innovation in recent years, and has become a gathering place for emerging industries.

5. Empirical Analysis of Industrial Structure Optimization in the Yangtze River Delta Region

5.1. Variable Selection and Data Sources

In this paper, the above-mentioned variables Industrial Structure Rationalization Index (TI) and Industrial Structure Advanced Index (U) are regarded as explained variables. Before processing the independent variables, we preprocessed the explained variables, that is, the quantitative indicators of the advanced and rationalized industrial structure. We found that its trend does not have periodic characteristics, and it can be considered that it does not need to consider its independent variables in the time series.

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On this basis, we combined the correlation of influencing factors and the convenience of data collection. Based on the research of Xu Jinjing (2017), we selected the following seven indicators that affect the advanced and rationalization of industrial structure, namely: per capita GDP, fixed asset investment rate, proportion of education investment, weight of employees, urbanization process, marketization process, etc. are used as explanatory variables [12]. The measurement indicators of each explanatory variable are shown in Table 4. This article selects the annual data from 2009 to 2018. The data are authentic and valid, and they are all selected from the relevant data published on the website of the National Bureau of Statistics and the summary of the statistical yearbooks of provinces and cities.

Table 4. Explanatory variables and their metrics

Explanatory variables	Metrics	Variable shorthand notation
GDP per capita	The ratio of GDP to the total population (unit: 100,000 yuan)	G
Fixed asset investment rate	Fixed asset investment as a share of GDP	FI
The proportion of investment in education	Fiscal education expenditure as a percentage of GDP	EI
Government involvement	Government consumption as a share of GDP	GI
Practitioner's weight	The proportion of employees in the primary industry to the total employees	PW
Urbanization	Proportion of urban population to resident population at the end of the year	QP
Marketization process	The added value of the tertiary industry as a proportion of GDP	MP

Next, we calculated the correlation between the explanatory variable and the dependent variable, and selected the Pearson correlation coefficient as the reference coefficient for correlation judgment. The closer the absolute value is to 1, the greater the linear correlation between variables. The calculation results of the Pearson correlation coefficient are shown in Table 5:

Table 5. Pearson Index Calculation Results

Explanatory variables	U	TI
GDP per capita	0.9686	-0.9112
Fixed asset investment rate	0.9013	-0.9106
The proportion of investment in education	0.4597	-0.7639
Government involvement	0.2672	-0.0114
Practitioner's weight	-0.8558	0.9818
Urbanization	0.9265	-0.9543
Marketization process	0.9994	-0.9028

Obviously, "government participation" has a low correlation with the two quantitative indicators of industrial structure. Therefore, we select six variables that have passed the Pearson test as explanatory variables, namely: GDP per capita, investment rate of fixed assets, proportion of investment in education, weight of employees, urbanization process, and marketization process.

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5.2. Measurement Model Setting

This paper builds the following design model:

$$\mathrm{TI} = \alpha_0 + \alpha_1 G + \alpha_2 FI + \alpha_3 EI + \alpha_4 PW + \alpha_5 QP + \alpha_6 MP + \mu \quad (3)$$

$$\mathrm{U} = \beta_0 + \beta_1 G + \beta_2 FI + \beta_3 EI + \beta_4 PW + \beta_5 QP + \beta_6 MP + \mu \quad (4)$$

In the above equation, μ represents the error term, a factor that cannot be observed in this paper.

5.3. Empirical Results and Analysis

This paper collects relevant data on the Yangtze River Delta region from 2009 to 2018, and this data comes from the China Statistical Yearbook from 2009 to 2018. Regression analysis was performed on the relevant data, and the results were as follows:

Table 6. Regression Results of Rationalization and Sophistication of Industrial Structure

Rationalization of industrial structure (TI)			Advanced industrial structure (U)		
	Coefficients	Standard Error		Coefficients	Standard Error
Intercept	0.4255	0.5163	Intercept	-1.2896	0.1649
G	-0.1426	0.3038	G	-0.1107	0.0970
FI	-0.26272	0.2719	FI	-0.1127	0.0868
EI	-2.9373	2.3340	EI	1.8154	0.7457
PW	4.6620	6.7383	PW	5.1040	2.1529
QP	-0.0570	0.7563	QP	0.2063	0.2416
MP	0.2739	0.8739	MP	4.7179	0.2792
Multiple R	0.9965		Multiple R	0.9999	
R Square	0.9930		R Square	0.9999	
Adjusted R Square	0.9721		Adjusted R Square	0.9997	

According to Table 5, the adjusted R^2 of the industrial structure rationalization and advanced models are 0.9722 and 0.9997, respectively, and the overall regression is more significant, indicating that the model has a good goodness of fit. From the regression significance, it can be judged that the four factors of per capita GDP (G), fixed asset investment rate (FI), urbanization process (QP), and marketization process (MP) are the main factors influencing the rationalization of the industrial structure in the Yangtze River Delta region. .

The per capita GDP (G) and the fixed asset investment rate (FI) have a positive effect on the rationalization of the industrial structure in the Yangtze River Delta region, but have a negative impact on the sophistication, indicating that these two factors are not conducive to the development of the region's sophistication. . The specific value of per capita GDP (G) reflects the economic development level of the Yangtze River Delta region and the economic level difference between different regions. This requires that each region should start from the actual level of the region when optimizing the industrial structure, but its impact on the industrial structure. Advancedization has a negative effect, which may be because supply has not yet fully stimulated domestic demand, and supply-side structural reform still needs to be advanced. The fixed asset investment rate FI is negatively correlated with TI, indicating that the increase in the proportion of fixed asset investment is conducive to the rationalization of the industrial

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structure in the Yangtze River Delta region. The proportion of investment in fixed assets is different, which affects the direction of the evolution of the industrial structure to a certain extent. The evolution process requires a certain amount of investment as a guarantee. The fixed asset investment rate FI has a small effect on U, indicating that the investment structure in the Yangtze River Delta region is unreasonable, and the policy effect of solving economic problems may have a certain lag, causing subsequent problems such as overcapacity.

Both the urbanization process (QP) and the marketization process (MP) have a positive effect on U, but the former is positively correlated with TI, and the latter is negatively correlated with TI. It can be seen from the previous analysis that the smaller the TI value, the more conducive to promoting the rationalization of the industrial structure in the Yangtze River Delta region, indicating that while the development of the marketization process promotes the rationalization of the industrial structure in the Yangtze River Delta region, the promotion of the urbanization process is not conducive to the rationalization of the regional industrial structure. The overall economy of the Yangtze River Delta region is developed, and the urbanization process has greatly increased the urban population, but the urban infrastructure and welfare guarantees have not been improved simultaneously. In particular, Shanghai, as my country's financial center, has expanded its trading partners from more than 20 countries in the early days of reform and opening up to more than 200 countries and regions today, and its port import and export ranks first among cities in the world, and Anhui, a major agricultural province , Anhui Free Trade Pilot Zone has been established in Hefei, Wuhu and Bengbu to support the development of high-end manufacturing, encourage the deep integration of advanced manufacturing and modern service industries, and cultivate and deploy future industries. The economic growth rate is as high as 347.61%, attracting a large influx of knowledge-intensive talents. The marketization process (MP) promotes rationalization mainly because the government intervenes appropriately, respects the objective laws of the market economy, and plays a decisive role in the allocation of resources by the market.

5.4. Error Analysis

Due to regional differences between different provinces and regions, including objective physical environment differences, including infrastructure construction conditions, commodity supply conditions, logistics conditions affected by topography, etc., and some subjective environmental factors, such as legal environment, political environment, cultural environment, etc. Such differences will lead to subtle distinctions between the consumption concept of local residents and the development tendency of the government. However, due to the high mobility of the current social population, and the intensive interaction of talents and technology sharing in the Yangtze River Delta region, such indicators have little impact and are difficult to achieve. Therefore, this paper lists it as a difficult-to-observe factor.

6. Conclusions and Suggestions

By arranging the relevant data of four regions in Shanghai, Zhejiang, Jiangsu and Anhui from 2009 to 2018, this research first uses the Theil index and the industrial added value ratio to quantify the rationalization and advancement of the industrial structure, and then combines the industries in the Yangtze River Delta in recent years. Regression analysis and error analysis are carried out on the influencing factors of regional industrial structure optimization based on relevant data. Through regression significance, it can be found that per capita GDP, fixed asset investment rate, urbanization process, and marketization process are the main factors influencing the rationalization of the industrial structure in the Yangtze River Delta region. The specific impact of each factor on the optimization of the industrial structure is as follows:

Per capita GDP (G) and fixed asset investment rate (FI) play a role in promoting the rationalization of the industrial structure in the Yangtze River Delta region, but have a negative

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effect on the heightening of the industrial structure. From the above regression analysis, it can be seen that the calculation coefficients of per capita GDP, fixed asset investment rate, and the heightened and rationalized industrial structure are all negative. It shows that there is an imbalance in the investment structure. In this regard, when formulating policies, we should actively promote the supply-side structural reform, and gradually shift the focus of work from the benchmark of industry relevance to the benchmark of demand income elasticity and productivity growth, so as to maintain the balanced development of the investment structure.

The urbanization process (QP) is conducive to promoting the rationalization of the industrial structure and the development of high-level urbanization in the Yangtze River Delta region. The results of regression analysis show that the regression coefficient between the factor of urbanization process and the index of industrial structure heightening is 0.2063. The development of urbanization process promotes the heightening of industrial structure, and the optimization of industrial structure is also driving the improvement of urbanization level. Under the interaction, the income gap between urban and rural areas has been continuously reduced. The development of urbanization makes various factors of production from the countryside to the city, from decentralization to concentration, and the marketization of products also enables the expansion of urbanization in a wider area, and promotes the gradual transformation of the industrial structure to the advanced industrial structure, which is beneficial to the region.

The process of marketization (MP) is conducive to promoting the heightening of the industrial structure in the Yangtze River Delta region, but it has a negative impact on the rationalization of the industrial structure. The empirical analysis results show that the marketization process MP is positively correlated with TI, and the smaller the TI value, the more conducive to the rationalization of the industrial structure. If the government intervenes too much, it violates the law of social and economic development to a certain extent. The government should minimize its intervention in the market, give play to the decisive role of the market in allocating resources, and ensure the sustainable development of the economy in the Yangtze River Delta region.

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