Statistical Analysis on the Differences of Provincial Economic Development between East and West China

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Abstract: In view of the comprehensive evaluation of the difference of provincial economic development in China, through the evaluation and statistical analysis of the economic development environment of the eastern and western provinces, the main weight values that affect the difference of provincial economic development in the eastern and western regions are obtained. These weights include seven items (employment volume, comprehensive economic strength, enterprise development level, people's living standard, economic development potential, public support and service capabilities, policies and laws). The comprehensive evaluation results of the economic development differences between the eastern and western provinces are obtained through comparative analysis, and the strategies and suggestions for narrowing the differences are made according to the regional differences of economic development between the eastern and western provinces.

1. Introduction

Provincial economy is an important subject and component of China's economy, and the eastern and western provincial economies are representative, reflecting the comprehensive evaluation of economic competitiveness between eastern and western provinces[1]. At present, the main research achievements in this area are as follows. First, it has theoretical basis and significance of provincial economic competitiveness prediction research. This paper analyzes the necessity of forecasting provincial economic competitiveness from both theoretical and practical aspects, and further analyzes the theoretical basis and practical significance of the feasibility of provincial economic competitiveness prediction from the perspectives of Marxist theory, Marxist economics, statistics, macroeconomics and neural network theory. Second, it has research on the evaluation and prediction methods of provincial economic competitiveness. Combined with the actual situation of provincial economic competitiveness prediction, through the analysis of a variety of statistical prediction models, the selection method of prediction models for provincial economic competitiveness is obtained. The evaluation model of provincial economic competitiveness is given, and the weight of each provincial economic competitiveness evaluation index is determined through the analytic hierarchy process (AHP)[2], thus obtaining the final evaluation result.

There are still many problems worthy of further discussion and solution in the study of the economic differences between eastern and western provinces. This paper mainly aims at two problems. First, the determination of the evaluation index weight of provincial economic differences is analyzed from seven options, and six options are selected for comparison. Second, at present, the evaluation method of competitiveness involved in the economic differences between eastern and western provinces is usually based on the direction of national economic strategic development to determine the weight of different evaluation indicators.

2. Evaluation on the Economic Development Environment of Eastern and Western Provinces in China

The economic development environment refers to the external factors and objective conditions related to the market subject and the market content involved in the process of production and operation and withdrawal according to the market norms, which can meet the access requirements. According to the 2021 Report on the Global Economic Development Environment, the current economic development environment in China has been continuously improved, rising from the 46th place in the earliest international ranking to the 31st place. It can be seen that our government attaches great importance to the economic development environment. However, the unbalanced development of the eastern and western regions is an objective problem. Through the assessment of the economic development environment of the eastern and western regions, the gap can be found out, which plays a positive role in improving the overall economic development level and business environment of China. In January 2020, the State Council issued the Regulation on Optimizing the Environment for Economic Development for the first time in response to the current market economy environment and the objective needs of the business place, and it has become an important part of the modernization of the national governance system and governance capacity.

From the current situation of major eastern and western provinces, since 2019, many western provinces have successively issued a series of policies to stimulate economic development, such as the Implementation Opinions on Promoting the High-Quality Development of Innovation and Entrepreneurship and Creating an Upgraded Version of Mass Entrepreneurship and Innovation further attracts investment and entrepreneurship by actively and continuously optimizing the business environment. By relying on the platform and entrepreneurial resources of local governments and optimizing supporting policies, the soft and hard environment of the economic development environment can be further improved, such as free handling of various certificates and licenses through convenient services, provide some idle plants or office space, enjoy tax relief benefits. In addition, policy measures such as providing loan guarantees to college students and technicians returning from developed eastern regions to ease the difficulty of loans have greatly promoted the return of the tide of returning to their hometown to start businesses. At the same time, with the optimization of the economic environment, the return of the tide of migrant workers is also quite obvious, and more migrant workers choose places close to home for employment. This has also resulted in many enterprises and factories in the eastern region being unable to recruit workers and the emergence of "labor shortage", which indicates that changes are taking place in the eastern and western regions. Therefore, further management of the economic development environment will help balance the development of the eastern and western regions and share resources.

3. Modeling and Data Analysis

3.1 Build Index System

To sum up, there are many factors that affect the economic development environment. Comprehensively considering the scientific guidance, typical research and the availability of research results among relevant indicators, based on the previous research literature, this paper optimizes the indicators through several aspects, researches on the comprehensive economic strength, economic development potential, people's living standard, public service ability and other aspects, and uses them as the landing indicators to build the economic development environment of eastern and western provinces.

This indicator system is a systematic retrospective analysis indicator with the characteristics of comprehensive evaluation indicators. This paper uses the relevant data of 31 provinces in China from January to December 2021 and analyzes it through SPSS, and all data are from the East and West Provincial Bureau of Statistics and the National Bureau of Statistics.

The basic setting of this indicator system analysis: the number of entrepreneurs in eastern and western provinces (Y) is the dependent variable, and the per-capita GDP (X1), enterprise development level (X2, X3), people's living standard (X4), economic development potential (X5),

public supporting services (X6), and policies and laws (X7) in eastern and western provinces are independent variables. The indicator system construction is shown in Table 1:

Table 1 Economic Development Environment Index System of Eastern and Western Provinces

Indicator level	Indicator name	Indicator description
Employment volume	New employment (10000 persons) Y	Data from the website of the National Bureau of Statistics
Comprehensive economic strength	GDP per capita (yuan) X1	Data source: *Statistical Yearbook of Eastern and Western Provinces*
Enterprise development level	Enterprise output value (trillion) X2	From the industrial added value of eastern and western provinces minus the added value of industrial enterprises above designated size, the data source is the *Statistical Yearbook of Eastern and Western Provinces*
	Number of new enterprises X3	Data source: *Statistical Yearbook of Eastern and Western Provinces*
People's living standard	Urban-rural income ratio X4	Per capita disposable income of rural residents/per capita disposable income of urban residents, the higher the value, the smaller the gap between urban and rural residents' disposable income
Economic development potential	Total retail sales of consumer goods (trillion) X5	The total retail sales of consumer goods can reflect the development potential and trend of residents' living standards, purchasing power, social production, etc
Public supporting and service capacity	Average mileage of expressway (km/county) X6	The mileage of expressway=the mileage of expressway/the number of counties and districts, and the data source is the *Statistical Yearbook of Eastern and Western Provinces*
Policy and law	Legal equity index X7	Indicator source Score of China's "Legal Rights and Interests Index" in the *Global Economic Development Environment Report*

3.2 Measurement Method

After the indicator system is determined, because the indicators need to be classified and analyzed, the main variables in this study are economic variables, and their data are meaningful only if they pass the stability test. Through the stationarity test and root difference analysis among the variables, it is found that X1 (GDP per capita), X2 (enterprise output value), X5 (total retail sales of social consumer goods) do not pass the stationarity test. They are still unstable series and need to be eliminated. After removing the above variables, continue to conduct time series analysis. This paper believes that there is a long-term equilibrium relationship between the number of entrepreneurs and their respective variables, and the time series model is established as follows:

$$Y_t = \alpha_0 + \alpha_1 X_{1t} + \alpha_2 X_{2t} + \ldots + u_t \qquad (1)$$

The long-term equilibrium formula is obtained:

$$Y_t = -24.62^{***} + 0.00052X_{3t}^{*} + 0.00634X_{4t}^{*} + 0.01X_{6t} + 4.29X_{7t}^{**} \quad (2)$$

T=(-4.70)(2.19)(2.15)(0.10)(3.38)

R2=0.9884 Adjusted R2=0.9817

"***" represents P<1%, "**" represents P<5%, "*" represents P<10%.

For the cointegration relationship between sequences, it is necessary to establish a relative relationship to meet its needs for establishing error correction terms, then interpret the error correction terms obtained, and reflect the overall situation of the explanatory variables generated by all short-term fluctuations according to the comprehensive variables, so as to better establish the ECM model and examine the relatively complete relationship between the sequences embodied in the short term.

$$\Delta Y_t = -4.92^{*} + 0.002\Delta X_{3t}^{***} + 0.0037\Delta X_{4t} + 0.05\Delta X_{6t} + 3.36\Delta X_{7t}^{***} + 1.56ECM_{t-1}^{***} \quad (3)$$

T=(-2.51)(4.58)(1.78)(1.08)(3.98)(4.60)

R2=0.9724 Adjusted R2=0.9448

As mentioned above, the ECM model confirms that, in the short term, the attractiveness of the

economic development environment for entrepreneurs is most related to the number of enterprises and the policy and legal environment.

For indicators that do not pass the stationarity test or do not explain the dependent variables significantly, this paper makes the following considerations: X1 (GDP per capita), X2 (enterprise output value), X5 (total retail sales of social consumer goods) have a strong direct correlation with economic development or the time trend of the indicator data itself is strong. If the sample size of the time series is increased, it may become a stable series and be available. According to the regression results, X6 (average number of industrial parks) has no significant explanation for the number of entrepreneurs of the dependent variable, no matter in the long term or short term. In the long run, there is a significant relationship between the number of entrepreneurs and the number of enterprises, the urban-rural income ratio and the legal equity index. This also means that if an economic development environment wants to attract more talents to return for entrepreneurship in the long term, it should start from three main aspects: expanding the number and scale of enterprises, narrowing the income gap between township residents and urban residents, and improving the policy and legal environment. For the indicator X4 urban-rural income ratio, its impact on the dependent variable is not significant in the short term. In the short term, if we want to improve the influence of the economic development environment on returning home and entrepreneurship, we need to focus on expanding the number and scale of enterprises in the region, and improving the policy and legal environment.

3.3 Analysis on the Differences of Economic Development between Eastern and Western Provinces

In this study, Shaanxi in the west and Zhejiang in the east are selected as the objects of this study. According to Table 1, six indicators of the provincial economic development environment indicator system in the east and west are selected. Representative Zhejiang is selected in the east, while Shaanxi is selected in the west. The data is from the National Bureau of Statistics. See Table 2 for a comparison.

Table 2 Comparison of Important Economic Indicators between Shaanxi and Zhejiang in 2021

Indicator	Province	New employment (10000 persons)	GDP(trillion)	Number of new enterprises above designated size (10000 households)	Urban-rural income ratio	Total retail sales of consumer goods (trillion)	Mileage of expressway (km)
Province in the east Zhejiang		122.4	7.35	122	1.94	2.92	5113.0
Province in the west Shaanxi		44.56	2.98	10	2.76	1.03	6469.9
P value			<0.05				

From the above table, we can see that in the comparison of six indicators between the eastern and western provinces, except for the mileage of highways, Zhejiang is significantly better than Shaanxi in five other indicators, with significant differences.

3.4 Result Analysis

The empirical analysis shows that, based on the characteristics of economic development in eastern and western provinces, the six indicators can basically reflect the difference. Among the relevant indicators, 3 have a good expression and interpretation of the economic environment and the status of enterprises. Among them, the number of employments, the number of large-scale enterprises, the income gap between urban and rural residents, and the legal rights and interests index have a significant positive relationship with the dependent variables. In the short term, the two variables of the number of enterprises and the policy and legal environment are most relevant to the construction of the economic development environment.

In the economic development environment, the number of big-scale enterprises can reflect the overall development level of enterprises in the region and the proportion of powerful enterprises. With the continuous deepening of industrialization in China, the demand for the secondary and tertiary industries has been activated to a certain extent, so that they can be developed incrementally.

For the eastern and western provinces, whether in the east or in the west, these important indicators of economic development are common. While the west can use college students to return to their hometown and start businesses to speed up the attraction of talents, at the same time, divert talents to different cities, and speed up the diversion of manufacturing industry to villages and towns. In particular, some labor-intensive industries, which are highly industrialized, are increasingly difficult to shelter in eastern cities and are seeking better development space. Therefore, western provinces can fully use this to attract investment. At the same time, it can better attract the western labor force, so that they can meet the requirements of "nearby employment". Therefore, the more enterprises, the larger the scale and the better the development, the more jobs will be provided for the development of human resources, and it will also be more conducive to attracting more college students and talents to return and follow the example of entrepreneurship.

The income gap between urban and rural residents in eastern and western provinces is large, which also reflects the economic level and private capital strength of the two cities. The way to narrow the gap is to let more talents return to the west and learn the management concepts and technologies selected from the east, so as to better help the development of the west. We should take the practical improvement of people's living standards and people's happiness as the guidance, meet the public's needs for public services and improve the quality of public life, more effectively improve the level of public services, and improve the supply level of the external environment for returning home and starting businesses.

Legal rights and interests' index: In the context of economic development, the differences between eastern and western provinces are also reflected in the rule of law environment and efficiency. Therefore, to achieve rapid economic development, the business environment is particularly important and should be free, open, inclusive and equal. To some extent, the imbalance and inadequacy in a system are caused by the environment of economic development and the environment of the rule of law. The disordered operation, management and law enforcement have caused a bad impact on the economic development environment, making the business subject lose fair market competition opportunities. Based on this situation, we need to rely on the government to optimize and guide, regulate the fair participation of the economic development environment and the rule of law environment. Only by strengthening these two aspects can we better improve the overall environmental quality.

4. Suggestions on Narrowing the Economic Development Gap between Eastern and Western Provinces and Improving Strategies

4.1 Effectively Activate the Vitality of Existing Enterprises and Give Play to the Demonstration and Leading Effect

The above research shows that the positive development of enterprises in the economic differences between eastern and western provinces has indeed played a great role in attracting talent return. Therefore, the first step is to promote the high-quality development of enterprises and optimize the economic development environment. The main measures are as follows. First, provide land support for entrepreneurship. On the basis of adhering to the red line of land use, entrepreneurs should be given proper priority in land use and simplified procedures, implement the spirit of the central, provincial and municipal documents, and better coordinate to solve the problem of talent entrepreneurship. Second, vigorously cultivate enterprise talents. The western government should strengthen the combination of returned entrepreneurs, enterprises and universities, implement the training of counterpart talents through short-term training classes and other forms, promote the transformation and development of local colleges and universities, vigorously develop vocational and technical colleges, and cultivate students for local construction, so as to provide intellectual and technical support for urban construction and rural revitalization, and solve the internal contradiction between "labor shortage" of private enterprises and "difficult employment" of college graduates. Third, explore new enterprise types or development models, and "Internet plus industry" may become a new business choice for college students to return home and start businesses. Returned

talents combine traditional industries with information technology, and work part-time in e-commerce or micro business industries, such as establishing sightseeing picking areas, production bases, characteristic manors, etc., to form agricultural complex service projects. Fourth, while doing a good job of government guidance, policy support, farmers as the main body, and efficient support, we should give full play to the exemplary role of existing enterprises, share and exchange the business experience of enterprises, and provide entrepreneurial guidance to returned college students in need.

4.2 Strengthen the Construction of Market Environment and Broaden the Channels for Income Increase

First, build a platform for college students to start businesses, support college students to reasonably and fully use the advantages of capital, technology and modern management concepts and experience, combine local infrastructure, select sites and build factories, and help them build entrepreneurial platforms. The second is to ensure public security. On the basis of college students' entrepreneurial risk identification and risk prevention, establish a college students' entrepreneurial risk compensation mechanism, for example, establish a college students' entrepreneurial risk fund or college students' entrepreneurial insurance fund to provide college students with entrepreneurial insurance products. Third, improve operation and management, make every effort to ensure the employment demand of private enterprises for college students in extraordinary times, ensure that there is room for private enterprises of college students to increase financing, expand financing channels by issuing loans and bonds, promote "Internet plus+tax" to ensure the implementation of tax and fee reduction policies, start from production and circulation, optimize enterprise product management and reduce operating costs of small and medium-sized enterprises, reduce the threshold of industry employment and promote the flow of talents.

4.3 Support Innovation and Entrepreneurship, and Improve the Business Policy and Legal Environment

First, continue to implement the tax reduction policy, give due consideration to increasing financial loan support, give loan assistance, including multiple loan services, streamlining administration and delegating power, optimizing loan procedures, etc., especially encouraging and supporting private enterprises with qualified high-level talents to "enjoy free application". The second is to provide legal and regulatory support. For example, the relevant regulations and policies of the *Regulation on Optimizing the Environment for Economic Development* were introduced, and local laws with business characteristics were added. The main purpose of relevant legislation should be to enhance the functions of security and incentives, so that economic and commercial laws and regulations are more timely, systematic, specific and effective. In the process of legislation, scientific investigation should also be used to go deep into the construction experience of the field environment, making it a solid backing for improving the economic development environment and attracting entrepreneurial talents.

4.4 Improve the Comprehensive Consumption Capacity, Promote the Expansion of Township Markets, and Attract Talents Back

The economic development is promoted through consumption, thus improving the attractiveness of the economic development environment. The development of diversified economic sectors led by commodity retail is developed, with emphasis on supporting the development of individuals and small and micro enterprises. The city consumption circle can be diverted to the countryside. By cultivating a new type of consumer and consumption concept under the framework of the new countryside and combining the thinking of talent innovation and entrepreneurship, the construction of modern multi terminal network facilities based on information technology will be further activated, and the rural commodity supply chain service will be established to connect with the urban network. By changing the economic development environment, we will further encourage talents to return to their hometown and start businesses, and further activate the integration of new online and offline diversified new consumers through entrepreneurship and innovation.

5. Conclusion

The difference of economic development between the eastern and western provinces is significant. With the deepening of reform and the continuous encouragement of innovation and entrepreneurship policies, with the support of the local government, more talents will return to participate in the construction of the western region, so as to further narrow the difference between the eastern and western provinces and create conditions for people to better obtain a happy life.

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