Study on the Difference Measurement and Coordination Development of Regional Economy in Shaanxi Province

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Abstract: Referring to the measurement methods of regional economic development differences at home and abroad, this paper takes Guanzhong, Northern and Southern Shaanxi as the research object. Firstly, using the indicators of extreme difference, standard deviation and coefficient of variation, the economic development status, absolute differences and relative differences of the cities under the jurisdiction of Shaanxi Province are measured and analyzed. Secondly, the decomposable Theil index method is used to measure the economic development differences between the "three major regions" in Guanzhong, Shanbei and southern Shaanxi. Finally, based on the quantitative measurement results, the countermeasures and suggestions for promoting the coordinated development of regional economy in Shaanxi Province are proposed.

1. Introduction

Regional development imbalance is a universal problem in the current global economic development. How to narrow regional differences and promote regional coordinated development has become an important proposition that many countries and regions need to seriously solve. The main contradiction in China has been transformed into a contradiction between the people's growing need for a better life and the development of an imbalanced and inadequate development. It is of great significance to scientifically analyze the differences in the process of regional economic development and objectively judge the current situation, causes and trends of unbalanced economic development in order to promote the coordinated and full development of regional economy and society.

Shaanxi Province is located in the middle reaches of the Yellow River in the eastern part of Northwest China. It is an important hub to undertake the eastern, central and northwest and southwest regions of China. Geography is narrow in the north and south, narrow in the East and west, and the topography of the area is complex. From south to north, the area is divided into Qinba Mountains in southern Shaanxi, Guanzhong Plain and Loess Plateau in northern Shaanxi in turn according to geography, history, culture and climate. There are 11 urban districts under the jurisdiction of the three regions. Quantitative measurement and analysis of the economic development differences in the three major regions and urban areas are of great practical significance for promoting the coordinated and sustainable development in Shaanxi Province.

2. The Status Quo and Trends of Regional Economic Disparity in Shaanxi Province

2.1 Overview of Shaanxi Regional Economic Development

According to geographical and administrative divisions, Shaanxi Province is divided into three major regions: northern Shaanxi, Guanzhong and southern Shaanxi.

<div align="center">Table 1 Shaanxi Province Regional Division Table</div>

Region	Prefecture-level cities (districts)
Guanzhong	Xi'an City, Baoji City, Xianyang City, Weinan City, Tongchuan City and Yangling District
Northern Shaanxi	Yulin City and Yan'an City
Southern Shaanxi	Hanzhong City, Shangluo City and Ankang City

Horizontally, the per capita GDP of the province in 2017 was 57,266 yuan, and only 4 of the 11 cities exceeded this figure, namely Xi'an, Baoji, Yangling in the Guanzhong area and Yulin in the northern Shaanxi area. However, in Weinan and southern Shaanxi of Guanzhong area, the cities of Hanzhong, Ankang and Shangluo are all less than 40,000 yuan. The data show that under the premise of sustained economic growth, the economic development gap between different regions in the same region is large.

2.2 Absolute Difference Analysis-Absolute Difference Expansion

In the past 10 years, the extreme difference of Shaanxi's GDP has increased year by year, from 183.1 billion yuan in 2007 to 732.8 billion yuan in 2017, an increase of about four times. From Figure 1, the per capita GDP standard deviation of each urban area also shows a year-on-year growth trend. The standard deviation has increased from 7427 in 2007 to 18605 in 2017, which is more than 2.5 times. The year-on-year increase in the range and standard deviation indicates that the absolute difference in regional economy in Shaanxi Province has expanded year by year.
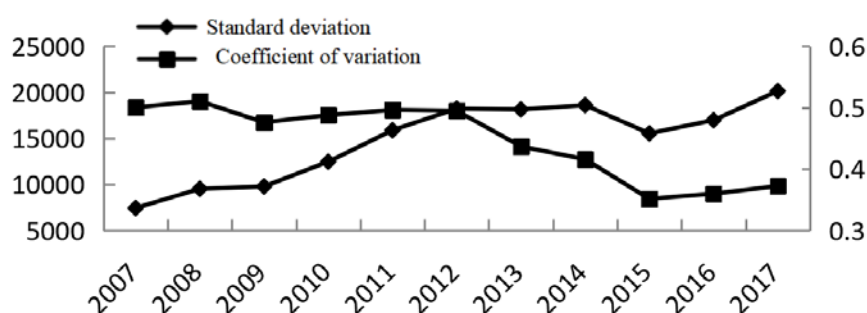

Fig.1. Trends in the standard deviation and coefficient of variation of GDP per capita in Shaanxi Province

2.3 Relative difference analysis - relative differences are reduced but fluctuating

From Figure 1, in the past 10 years, the regional economic coefficient of variation in Shaanxi Province is in a downward trend, indicating that the relative differences in regional economic development tend to shrink. Before 2012, the volatility was slowed down but it was basically sTable. After 2013 began to decline rapidly, it increased slowly after 2016. Before 2012, the Shaanxi Provincial Government Plan pointed out that the key to maintaining sTable and rapid economic development is to promote the coordinated development of the three major regions. In addition, the sustained growth of the economic volume has led to a gradual reduction in the relative differences in regional economies. Since 2013, due to the dual effects of energy price reduction and domestic macroeconomic pressure, the economic development has been sluggish, and the degree of regional economic relative disparity in Shaanxi has declined for a time. Since the second half of 2016, energy prices have gradually slowed down and risen. The transformation and upgrading of high-end energy and chemical industries in northern Shaanxi and the acceleration of the circular economy system in southern Shaanxi have increased the relative differences of regional economy in Shaanxi.

3. Analysis of Regional Development Differences Based on Theil Index

3.1 Theil exponential decomposition method

Compared with other indicators, Theil index can not only analyze the evolution of regional differences, but also deeply analyze the extent of differences within the region and compare the differences in economic development between different regions. The analysis was performed using

the most commonly used second Tyre index T_0 indicator.

$$T_0 = \sum N_i \times \log(N_i / W_i) + \sum N_i \times T_i \qquad (1)$$

T0 represents the Thail index of Shaanxi Province, and $\sum N_i \times \log(N_i/W_i)$ represents the inter-regional gap. $\sum N_i \times T_i$ represents the intra-regional gap, i is the number of groups divided, i = 1, 2, 3 represent the northern Shaanxi, Guanzhong and southern Shaanxi, respectively, and Ni is the proportion of the population of the i-th group to the total population of Shaanxi Province. Wi is the most important component of GDP in Group I in Shaanxi Province. Ti is defined by Formula (2):

$$T_i = \sum \frac{n_{ij}}{n_i} \times \log\left[\frac{n_{ij} / n_i}{w_{ij} / w_i}\right] \qquad (2)$$

Ti is the unweighted regional Tyre index, ni is the i-th population, and nij is the population of the jth city (district) in the i-th group. Wi is the GDP of the i-th group, Wij is the GDP of the jth city (district) in the i-th group, and $\sum N_i \times T_i$ is the Tyre index in the weighted area. Theil index ranges from 0 to 1. The larger the value, the greater the regional economic disparity. According to the decomposable Theil index, the inter-regional contribution rate and intra-regional contribution rate are calculated as follows:

Inter-regional contribution rate = inter-regional gap / T_0 (3)

Intra-region contribution rate = intra-regional gap / T_0 (4)

3.2 Theil index measure

According to the statistical data from 2007 to 2017, the population of the "three major regions" of Shaanxi Province accounted for the proportion of the total population of the province as the weight, and the Taier index of Shaanxi Province was calculated as shown in Table 2. It can be seen from the Table that the economic development differences between the "three major regions" in Shaanxi Province continue to shrink. Generally speaking, the differences of economic development in Shaanxi Province mainly come from regional differences, but with the rapid economic growth, the impact of regional and inter-regional disparities on regional economic development tends to be close.

Table 2 Regional economic disparity and its decomposition in Shaanxi Province

Year	Theil index	Interregional disparities	Intra-regional disparities
2007	0.0542	0.0341	0.0200
2008	0.0571	0.0379	0.0192
2009	0.0486	0.0292	0.0195
2010	0.0494	0.0321	0.0173
2011	0.0466	0.0314	0.0151
2012	0.0468	0.0317	0.0151
2013	0.0391	0.0252	0.0140
2014	0.0373	0.0222	0.0150
2015	0.0380	0.0216	0.0163
2016	0.0381	0.0197	0.0184
2017	0.0313	0.0153	0.0161

3.3 Contribution rate of interregional and intraregional disparities

The Theil index of Shaanxi Province decreased from 0.0542 in 2007 to 0.0313 in 2017, which shows that the economic development disparity of Shaanxi Province shows a decreasing trend year by year on the regional scale. From the composition of the Theil index, the change of its numerical

value is mainly caused by the change of regional economic disparity. The change of regional disparity is small and keeps around 0.02. From Table 3, the contribution rate of the "three major regions" in Shaanxi Province is lower than the inter-regional contribution rate, and the contribution rate in the region generally remains around 40%, while the inter-regional contribution rate remains at 60%, but from 2016. At the beginning, the contribution rates between regions and regions were basically flat. The above shows that the regional economic disparity in Shaanxi Province is mainly caused by the inter-regional gap, and it is necessary to narrow the economic gap between the three major regions as the primary task.

Table 3 Inter-regional and intra-regional contribution rates of regional economic differences in Shaanxi Province

Year	Inter-regional contribution rate	Intra-region contribution rate
2007	63.02	36.98
2008	66.39	33.61
2009	59.96	40.04
2010	64.90	35.10
2011	67.49	32.51
2012	67.76	32.24
2013	64.26	35.74
2014	59.63	40.37
2015	56.98	43.02
2016	51.76	48.24
2017	48.75	51.25

3.4 Analysis of the Tyre index in the region under the weight of population

From Figure 2, the economic differences in Shaanxi Province from 2007 to 2017 are from Guanzhong, Shanbei and Shannan. In 2007-2013, the Thai index of Guanzhong area decreased steadily, and the economic difference gradually narrowed. After 2013, the volatility grew steadily and increased sharply after 2016. This is the biggest economic situation in Xi'an in recent years. Caused by big. Compared with the Guanzhong area, the Taier index in northern Shaanxi and southern Shaanxi is small and the trend is small, and it is the smallest in southern Shaanxi. Before 2014, the Taier index in northern Shaanxi fluctuated slightly. After 2015, the trend of growth increased significantly and fluctuated. This shows that the price of energy products in northern Shaanxi has a greater impact on the region, and regional differences still exist. The economy of the three cities in southern Shaanxi has been steadily advancing and maintaining good coordination.
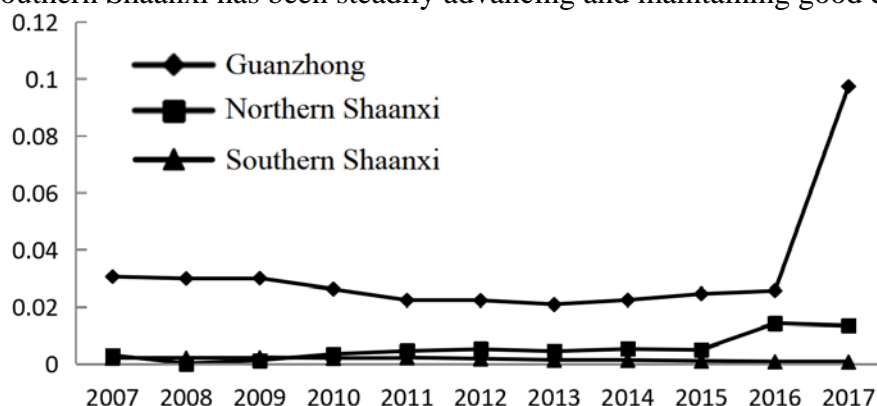

Fig.2. Economic disparities in Shaanxi Province with population as weight

4. Conclusion and suggestion

4.1 Conclusion

(1) Over the past 10 years, the total and average economic growth of Shaanxi Province has been sustained, and the overall socio-economic situation has improved. However, the absolute level of

regional economic disparities has been increasing, the relative disparities have been alleviated and narrowed, but the fluctuations are unsTable, and the regional economic development has deviated from the relative equilibrium. (2) The economic development differences between the "three major regions" of Guanzhong, Shaanxi, and southern Shaanxi in Shaanxi Province continue to shrink, and the differences are mainly caused by the regional gaps between the three regions. However, with the rapid economic growth, the regional and regional gaps have gradually become more consistent with the regional economic gap. (3) Within the three major regions, the economic difference is the largest, followed by northern Shaanxi and the smallest in southern Shaanxi.

4.2 Suggestions on Promoting the Coordinated Development of Regional Economy in Shaanxi Province

According to the regional social and economic development differences, combined with the overall economic situation of the country and the new era, new environment, and new requirements, scientifically formulate plans and policies for coordinated regional economic development. Adhere to the classification and guidance, divisional strategy, linkage and coordination, and strengthen the weak, thus narrowing the absolute gap in the regional economy and maintaining a sTable and sound development of the regional economy. Relying on the resource endowments of the three major regions of northern Shaanxi, southern Shaanxi and Guanzhong. According to the regional development idea of "strengthening Guanzhong, optimizing northern Shaanxi and rejuvenating southern Shaanxi", we should make up for the shortcomings of the region, strengthen the overall regional development, and increase the support to northern Shaanxi and southern Shaanxi through the radiation of the Guanzhong region. Promote the coordination and full development of social economy in the three regions, and generally form a pattern of coordinated development of Guanzhong, sustainable transformation in northern Shaanxi and green cycle in southern Shaanxi.

(1) Strengthening Guanzhong, it is the main body and core of the province's economic development, based on its own advantages, focusing on the development of advanced manufacturing, strategic emerging industries, modern agriculture and services, and forming a number of innovation-driven superior industrial clusters. Due to the large internal differences in the Guanzhong area, it is necessary to adjust and optimize the functional positioning and industrial layout of the Guanzhong urban agglomeration, and expand the Xi'an framework. The decision to build the "Great Xi'an" will not waver, vigorously promote the integration of Xi'an and Xianyang, actively divert the industrial chain, and simultaneously promote the high-quality development of Weinan and Tongchuan.

(2) Excellent Northern Shaanxi, coordinate the two cities of Yulin and Yan'an, and rapidly promote the construction of transportation such as Xiyan and Yanyu High-speed Railway to realize information convection, resource sharing, technology sharing and industrial construction in the two cities. We will steadily promote the chemical industry, extend the industrial chain and promote local conversion, introduce high-tech energy industrial technology, and move toward high-end energy and chemical industry, and actively develop and promote new energy construction. In addition, we should take advantage of the momentum to expand the development of non-energy chemical industry, and promote the continuous development of agriculture and animal husbandry, red cultural tourism, logistics business and new energy resources in Yan'an and Yulin. Constructing a diversified industrial system, guiding private capital, expanding internal investment and construction, and improving the consumption scale and level of residents have become a new growth point to stimulate the economy of northern Shaanxi.

(3) Revitalizing Southern Shaanxi, focusing on building the "life community" of "mountains, rivers, forests, fields and lakes", the three cities of southern Shaanxi, relying on the advantages of mountains and rivers, jointly build a green shared economy and continuously develop the "ecological plus" circular development path. Strengthen the cultivation of agricultural products such as tea, walnuts, medicinal materials, flowers and sericulture, and promote the improvement and upgrading of characteristic industries such as ecological agriculture, rural tourism, biomedicine, leisure experience and healthy pension. We will march towards the goal of building a national

comprehensive demonstration zone for ecological civilization and strive to become an important support for further promoting the quality and efficient development of Shaanxi.

Acknowledgement

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