Proceedings of the Quantum Machine Learning: Bridging Quantum Physics and Computational Simulations - CONFMPCS 2024
DOI: 10.54254/2753-8818/52/2024CH0124

# Research on regional difference of economic development level in Zhejiang Province based on factor analysis

**Yuao Feng[1], Ji Zhang[2,3]**

[1]Tianfu Middle School, Chengdu, 610000, China
[2]School of Mathematics and Statistics, Huaibei Normal University, Huaibei, 235025, China

[3]20150725250@mail.sdufe.edu.cn

**Abstract.** Regional economic disparities are widespread, especially in China. This is reflected not only in the differences between the four regions, but also in the differences between provinces. At the same time, the regional economic differences within each province are also very obvious. This paper studies the gap between the economic development levels in Zhejiang Province, which contributes to the balanced development and sustainable development of the overall economy of Zhejiang Province, in order to intuitively see the gap between the cities. This paper uses SPSS to reduce the dimension of factor analysis and calculate the comprehensive score through 10 indicators reflecting the level of economic development in 11 cities. Finally, this paper finds that the economic development of each city in Zhejiang Province has great potential. But at the same time, it exposes the imbalance of economic development in the province. The economic development level of Hangzhou, Ningbo and Zhoushan is far higher than that of other cities in the province, and the economic development level of some cities is general. The development level of some cities is poor. According to the research results, the causes and problems of the current situation of economic development are analyzed. Reasonable suggestions are put forward to further promote the coordinated development of the economy.

**Keywords:** Economic development, factor analysis, Zhejiang province.

## 1. Introduction

As a major economic province, Zhejiang Province ranked fourth in the country in 2023, and its total economic output expanded steadily. The total economic output exceeded 8 trillion yuan. However, there are always economic differences among the cities in the province. The problem of regional economic differences refers to the per capita meaning between regions in a certain period of time under the influence of population, social resources and political factors. The overall level of economic development is not equal, the speed of development among regions is not equal, and some regions are more developed. Developed regions and relatively backward regions coexist [1].

For the study of the current situation of economic development and regional differences, Myrdal put forward the theory of circular accumulation causality in 1957.The elimination of "geographically dual economy" is explained by circular cumulative causality. Under the mutual influence of backflow effect and diffusion effect, a cumulative cycle development trend is formed. Albert Hirschman put forward the theory of unbalanced growth in 1985 through the recognition that major scarce resources should be fully

DOI: 10.54254/2753-8818/52/2024CH0124

utilized. It is believed that developing countries should invest selectively in the sector. Perroux proposed the growth pole theory in 1950 [2]. He believed that in real life, only the rapid growth of individual regional economy can drive the overall economic growth, and balanced growth only exists in the ideal [2].

At present, more and more scholars in China have invested in this kind of research. Li Yue used factor analysis and other research methods to study Guangdong. The economic differences between provinces and cities have been systematically studied [3]. Zhao studied the regional economic differences in the western region and measured the relative differences through Theil index and Gini coefficient. The Theil index from 1978 to 2021 is decomposed in one stage, and the results of intra-regional and inter-regional differences in the western region are obtained. It is found that the growth rate of per capita GDP in Southwest China is basically higher than that in Northwest China in the past ten years [4]. Wang used the entropy weight TOPSIS method to comprehensively evaluate and analyze the regional economic development of Guangxi. This paper explores the main factors affecting the differences of regional economic development in Guangxi. It is concluded that the level of Guangxi's total economic output is stable and progressive, but the economic growth rate is relatively low, and the per capita economic output is small. The industrial structure is unreasonable and the urbanization process is slow [5]. Fang selected 18 prefecture-level cities in Henan Province in 2020 as research samples. On the basis of literature review, this paper selects 14 indicators that directly reflect the development level of logistics industry. Through the method of factor analysis, the logistics development level of each prefecture-level city is analyzed, and the factor scores of each city are ranked [6]. Peng and Liu found that with the passage of time, the gap of economic development level among provinces in China has gradually widened [7]. In 2021, Liu analyzed the diversification of market economy development in rural areas. And put forward in the government policy guidance, strengthen the leading effect of investment projects, promote agricultural science and technology innovation, reasonable adjustment of rural industrial structure. Effective measures have been taken to alleviate the gap in the development of rural regional market economy. It effectively promotes the harmonious development of economy and society in rural areas [8]. When Yang studied the changing trend of regional economic disparities from 1952 to 1990, it is found that: China's economic development difference shows an inverted "U" change around 1978.Moreover, the economic development differences of different regional division systems have different changing trends [9]. According to the research of Liu and others in 2009, the regional disparity from 1978 to 2007 was analyzed by applying the Theil index. The results show that due to the unbalanced development within the region, the overall development differences in China are gradually emerging [10]. Although the contribution of the eastern region is outstanding, the contribution of the western region is small but shows an expanding trend. In addition, the study also classified China according to the latitude of north and south.

In a word, this paper is committed to in-depth analysis of the main factors affecting regional economic disparities in Zhejiang Province. And to explore the current situation of regional economic development in Zhejiang Province, so as to promote the balanced and coordinated development of the economy in Zhejiang Province.

## 2. Methodology

### *2.1. Data source*

In this paper, 11 cities in Zhejiang Province are taken as the research objects. The data are selected from 10 indicators reflecting the level of economic development in the Statistical Yearbook of Zhejiang Province in 2023.The data are processed as follows: for some indicators of per capita development level, they are not given in the Statistical Yearbook. It can be obtained by dividing the total development level index by the resident population of each city at the end of the year, and there is no missing value in the data. Missing value processing is not required.

DOI: 10.54254/2753-8818/52/2024CH0124

### *2.2. Variable description*

In this paper, the problems studied are classified into three levels from large to small, namely, the first level is the level of economic development, and the second level is the level of economic development. The second-level indicators are the total economic output and per capita economic level, while the third-level indicators are the 10 indicators this paper has selected (Table 1). Finally, the factor analysis process was carried out with 10 indicators in the three-level indicators.

**Table 1.** Variable description.

| The first indicator | Second indicator | Third indicator |
|---|---|---|
| Economy Development Level | Total economic output | The scale is based on the total profit of public enterprises (100 million yuan) X2, the total fiscal revenue (100 million yuan) X6, and the total output value (100 million yuan) X10. |
| | Per capita economic level | Per capita GDP (yuan) X1, per capita total fiscal revenue (yuan) X4, per capita output value of agriculture, forestry, animal husbandry and fishery (yuan) X5, per capita general budget revenue of local finance (yuan) X7, per capita total import and export volume of customs (dollars) X8, per capita total retail sales of social consumer goods (yuan) X9, per capita disposable income of urban residents (yuan) X3 |

### *2.3. Method introduction*

Factor analysis is a statistical method used to describe the relationship between variables in observed data. It also explains the latent factors (or latent variables, hidden variables), which can explain the correlation between variables. The goal of factor analysis is to explain most of the variability in the data by a few factors. It is usually used in psychology, sociology, market research and other fields to identify potential structures. Factor analysis was divided into Exploratory Factor Analysis, EFA and Confirmatory Factor Analysis, CFA. The EFA is used to explore the underlying structure of the data without a preset model, while the CFA is used to validate the preset model.

Factor analysis is generally divided into six steps, the first is data preparation, the collection of raw data and standardized data. The second is to select the number of factors, which can be judged by Kaiser criterion, and the third is to extract factors. Factor loading matrix is often obtained by principal component analysis, which can describe the loading of each variable on each factor. The fourth is factor rotation. It is used to simplify the explanation of factors and make the factor structure clearer. The commonly used rotation methods are orthogonal rotation and oblique rotation. The fifth is factor interpretation, which explains the factor loading matrix. Identify which variables each factor is primarily composed of, and thus name the factors. Finally, the factor score is calculated, and the factor score and the comprehensive score of each observation sample are calculated according to the factor analysis model.

## 3. Results and discussion

### *3.1. Descriptive statistics*

Descriptive statistics of raw data can provide a basic understanding of the data set. Including the central trend and the degree of dispersion of the data, it can also help people get better standardized data. Lay a good foundation for the following research (Table 2).

DOI: 10.54254/2753-8818/52/2024CH0124

**Table 2.** Description analysis.

| | Min | Max | Average | SD |
|---|---|---|---|---|
| Per capita GDP (yuan) | 72812 | 167134 | 115270.18 | 35482.796 |
| Total profit of the enterprise whose scale is based on public works (yuan) | 85.67 | 1543.04 | 543.0927 | 498.22327 |
| Per capita disposable income of urban residents (yuan) | 55784 | 77043 | 70179.55 | 7160.611 |
| Total fiscal revenue per capita (yuan) | 9475 | 37089 | 19553.36 | 10829.834 |
| Per capita output value of agriculture, forestry, animal husbandry and fishery (yuan) | 2351 | 26113 | 7429.36 | 6446.501 |
| Total fiscal revenue (100 million yuan) | 277.88 | 4590.08 | 1260.3364 | 1391.60301 |
| Per capita general budget revenue of local finance (yuan) | 5929 | 19801 | 10587.73 | 4651.442 |
| Total Customs Imports and Exports Per Capita (USD) | 12906 | 289041 | 80498.27 | 77083.256 |
| Total retail sales of consumer goods per capita (yuan) | 32002 | 58933 | 43919.64 | 7732.553 |
| Gross output value (100 million yuan) | 1831 | 18753 | 7074.09 | 5524.269 |

From the preliminary analysis of the maximum value, minimum value and standard deviation in Table 2, this paper can see that there is a big gap between the economic development level indicators of each city. However, it is impossible to know the overall level of economic development of each city, so this paper proceeds to the next step of analysis.

Before factor analysis, the original data should be standardized. The purpose of standardization is to unify the units of variables involved in the actual problems studied. At the same time, it also paves the way for the calculation of the following factor scores.

### *3.2. KMO test*

Using standardized data and SPSS software, the correlation matrix and KMO and Bartlett test were calculated (Table 3, 4). After observing the correlation matrix table, it is found that the correlation between most variables is above 0.5. It shows that the correlation between variables is relatively strong, and the preliminary judgment can be carried out by factor analysis, and then observe the KMO and Bartlett test table. It can be known that the KMO value is greater than 0.5, and the significance is less than 0.001, indicating that the selected indicators are completely suitable for factor analysis (Table 3).

**Table 3.** KMO and Bartlett test.

| KMO sampling appropriateness measure | 0.54 |
|---|---|
| Approximate chi-square | 169.169 |
| Degree of freedom of Bartlett sphericity test | 45 |
| Significance | <.001 |

DOI: 10.54254/2753-8818/52/2024CH0124

**Table 4.** Correlation results.

| | x1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | X10 |
|---|---|---|---|---|---|---|---|---|---|---|
| X1 | 1 | 0.597 | 0.661 | 0.915 | 0.472 | 0.573 | 0.876 | 0.686 | 0.866 | 0.518 |
| X2 | 0.597 | 1 | 0.627 | 0.658 | -0.339 | 0.964 | 0.822 | -0.013 | 0.724 | 0.968 |
| X3 | 0.661 | 0.627 | 1 | 0.521 | 0 | 0.571 | 0.572 | 0.352 | 0.722 | 0.679 |
| X4 | 0.915 | 0.658 | 0.521 | 1 | 0.432 | 0.712 | 0.953 | 0.641 | 0.859 | 0.588 |
| X5 | 0.472 | -0.339 | 0 | 0.432 | 1 | -0.261 | 0.169 | 0.841 | 0.192 | -0.375 |
| X6 | 0.573 | 0.964 | 0.571 | 0.712 | -0.261 | 1 | 0.847 | 0.037 | 0.75 | 0.966 |
| X7 | 0.876 | 0.822 | 0.572 | 0.953 | 0.169 | 0.847 | 1 | 0.414 | 0.915 | 0.744 |
| X8 | 0.686 | -0.013 | 0.352 | 0.641 | 0.841 | 0.037 | 0.414 | 1 | 0.45 | -0.036 |
| X9 | 0.866 | 0.724 | 0.722 | 0.859 | 0.192 | 0.75 | 0.915 | 0.45 | 1 | 0.687 |
| X10 | 0.518 | 0.968 | 0.679 | 0.588 | -0.375 | 0.966 | 0.744 | -0.036 | 0.687 | 1 |

### *3.3. Model results*

The common factor variance (Table 5) represents the portion of the variance of each observed variable that can be explained by the common factor. This value reflects the dependence of each variable on the common factor, and the larger the value. It shows that more variance of the variable can be explained by the common factor. Through observation, this paper can see that the common degree of variable (per capita disposable income of urban residents) X3 is 56.5%. The information extracted from the rest of the variables is more than 80%, indicating that the extracted common factors are sufficient to explain most of the variables.

**Table 5.** Common Factor Variance.

| | Initial | Extract |
|---|---|---|
| X1 | 1 | 0.937 |
| X2 | 1 | 0.971 |
| X3 | 1 | 0.565 |
| X4 | 1 | 0.933 |
| X5 | 1 | 0.947 |
| X6 | 1 | 0.942 |
| X7 | 1 | 0.931 |
| X8 | 1 | 0.905 |
| X9 | 1 | 0.884 |
| X10 | 1 | 0.959 |

The selected common factor generally requires the characteristic value to be greater than 1. There are two factors whose eigenvalues are greater than 1, so it is preliminarily considered that there are two common factors. By observing the total variance interpretation table (Table 6), the contribution rate of the first factor is 59.368%, and the contribution rate of the second factor is 30.365%. Therefore, the cumulative contribution rate of these two common factors is 89.732% (> 85%). Most of the information of the 10 indicators that can reflect the level of economic development can be seen from the rotated load matrix table (Table 7).

The first public factor represents the per capita GDP X1, the total profit of industrial enterprises X2, and the per capita disposable income of urban residents X3.Per capita total fiscal revenue X4, total fiscal revenue X6, per capita local general budget revenue x7, per capita total retail sales of social consumer goods X9,Gross output value X10,Most of these indicators reflect the economic productivity, income level of residents, consumption capacity and government financial situation in the region. It represents

DOI: 10.54254/2753-8818/52/2024CH0124

the health and vitality of the overall economy. Therefore, this factor can be interpreted as "regional economic development and prosperity factor".

The second common factor represents the per capita output value of agriculture, forestry, animal husbandry and fishery X5 and the per capita total import and export volume of customs X8. They reflect the level of agricultural development and the strength of external economic ties in the region. It represents the breadth and depth of the region's economic activity in both domestic and international markets. It can be interpreted as "economic diversity and external economic openness factor".

**Table 6.** Explanation of Total Variance.

| Ingredient | Initial eigenvalue | | | Extract the sum of the load squares | | |
|---|---|---|---|---|---|---|
| | Total | Percent variance | Cumulative% | Total | Percent variance | Cumulative% |
| 1 | 6.402 | 64.022 | 64.022 | 6.402 | 64.022 | 64.022 |
| 2 | 2.571 | 25.711 | 89.732 | 2.571 | 25.711 | 89.732 |
| 3 | 0.596 | 5.955 | 95.687 | | | |
| 4 | 0.207 | 2.072 | 97.759 | | | |
| 5 | 0.102 | 1.017 | 98.776 | | | |
| 6 | 0.08 | 0.799 | 99.575 | | | |
| 7 | 0.032 | 0.323 | 99.898 | | | |
| 8 | 0.01 | 0.097 | 99.994 | | | |
| 9 | 0 | 0.004 | 99.999 | | | |
| 10 | 0 | 0.001 | 100 | | | |

**Table 7.** Rotated Component Matrix.

| | Ingredient | |
|---|---|---|
| | 1 | 2 |
| X1 (GDP per capita) | 0.698 | 0.671 |
| X2 (the scale is based on the total profit of industrial enterprises) | 0.975 | -0.143 |
| X3 (per capita disposable income of urban residents) | 0.722 | 0.21 |
| X4 (total fiscal revenue per capita) | 0.75 | 0.609 |
| X5 (per capita output value of agriculture, forestry, animal husbandry and fishery) | -0.216 | 0.949 |
| X6 (total fiscal revenue) | 0.966 | -0.09 |
| X7 (per capita general budget revenue of local finance) | 0.888 | 0.376 |
| X8 (total customs import and export per capita) | 0.119 | 0.944 |
| X9 (per capita total retail sales of consumer goods) | 0.844 | 0.414 |
| X10 (GDP) | 0.959 | -0.198 |

The resulting two common factors are scored to obtain a component score coefficient matrix for each variable (Table 8).

DOI: 10.54254/2753-8818/52/2024CH0124

**Table 8.** Component Score Coefficient Matrix.

| | Ingredient | |
|---|---|---|
| | w1 | w2 |
| X1 (GDP per capita) | 0.078 | 0.189 |
| X2 (the scale is based on the total profit of industrial enterprises) | 0.191 | -0.126 |
| X3 (per capita disposable income of urban residents) | 0.117 | 0.021 |
| X4 (total fiscal revenue per capita) | 0.092 | 0.163 |
| X5 (per capita output value of agriculture, forestry, animal husbandry and fishery) | -0.112 | 0.359 |
| X6 (total fiscal revenue) | 0.185 | -0.106 |
| X7 (per capita general budget revenue of local finance) | 0.135 | 0.068 |
| X8 (total customs import and export per capita) | -0.05 | 0.331 |
| X9 (per capita total retail sales of consumer goods) | 0.124 | 0.085 |
| X10 (GDP) | 0.192 | -0.144 |

The data from Table 8 is combined with the expression for the principal component:

$$F1 = 0.078ZX1 + 0.191ZX2 + 0.117ZX3 + 0.092ZX4 - 0.112ZX5 + 0.185ZX6 + 0.135ZX7 - 0.05ZX8 + 0.124ZX9 + 0.192ZX10$$

$$F2 = 0.189ZX1 - 0.126ZX2 + 0.021ZX3 + 0.163ZX4 + 0.359ZX5 - 0.106ZX6 + 0.068ZX7 + 0.331ZX8 + 0.085ZX9 - 0.144ZX10$$

Where ZX1 to ZX10 are the values in the normalization of the original data of the table, and they are substituted into the above equation. The score table of each factor can be obtained (Table 9).

**Table 9.** Scores of each factor.

| FAC1_1 | FAC2_1 |
|---|---|
| 2.15293 | -0.29334 |
| 1.55949 | 0.2287 |
| -0.32485 | -0.91866 |
| 0.08777 | -0.1866 |
| -0.14713 | 0.02611 |
| 0.14068 | 0.04694 |
| -0.47369 | -0.40896 |
| -0.90913 | -0.38434 |
| -0.48847 | 2.85885 |
| -0.47281 | -0.37758 |

After getting the score of each common factor, this paper can calculate the comprehensive score of the level of urban economic development. The comprehensive score of factor analysis is the sum of the scores of each common factor multiplied by their respective contribution rates. The comprehensive score formula in the factor analysis of this paper is:

$$F = F_1 \times 0.59 + F_2 \times 0.3 \quad (1)$$

Finally, by ranking the comprehensive scores, this paper can intuitively see the economic development level of each city (Table 10). According to Table 9, the city with the highest comprehensive score is Hangzhou, and the city with the lowest comprehensive score is Lishui.

DOI: 10.54254/2753-8818/52/2024CH0124

**Table 10.** Comprehensive Scores and Ranking of Economic Development Level of Cities in Zhejiang Province in 2022.

| City | F1 | F2 | F | F1 rank | F2 rank | F Rank |
|---|---|---|---|---|---|---|
| Hangzhou | 2.15293 | -0.29334 | 1.18 | 1 | 6 | 1 |
| Ningbo City | 1.55949 | 0.2287 | 0.99 | 2 | 2 | 2 |
| Zhoushan City | -0.48847 | 2.85885 | 0.57 | 9 | 1 | 3 |
| Shaoxing City | 0.14068 | 0.04694 | 0.1 | 3 | 3 | 4 |
| Jiaxing City | 0.08777 | -0.1866 | 0 | 4 | 5 | 5 |
| Huzhou City | -0.14713 | 0.02611 | -0.08 | 5 | 4 | 6 |
| Taizhou City | -0.47281 | -0.37758 | -0.39 | 7 | 7 | 7 |
| Jinhua City | -0.47369 | -0.40896 | -0.4 | 8 | 9 | 8 |
| Wenzhou City | -0.32485 | -0.91866 | -0.47 | 6 | 11 | 9 |
| Quzhou City | -0.90913 | -0.38434 | -0.65 | 10 | 8 | 10 |
| Lishui City | -1.1248 | -0.59112 | -0.84 | 11 | 10 | 11 |

### *3.4. Discussion*

According to the comprehensive score, this paper divides the level of economic development into three echelons, the first echelon is the city with a comprehensive score of more than 0.5. Among them are Hangzhou, Ningbo and Zhoushan, which shows that the economic development level of these cities is better. The second echelon is a city with a comprehensive score between 0.5 and 0.5, including Shaoxing, Jiaxing, Huzhou and Taizhou. Jinhua City and Wenzhou City show that the economic development level of these cities is general, and the third echelon is the city with a comprehensive score below -0.5. Among them, Quzhou City and Lishui City show that the economic development level of these cities is poor.

Through the ranking table of two common factors, this paper finds that in the first common factor, Hangzhou, Ningbo, Shaoxing, Jiaxing ranks in the top four, indicating that these four cities have a high level of overall economic health and vitality. This paper argues that these cities are located in the Yangtze River Delta region along the southeastern coast of China, close to Shanghai, and have convenient transportation networks. This advantageous geographical location has promoted economic exchanges and trade within and outside the region. At the same time, the private economy in these cities is very active, entrepreneurship is strong, and many innovative enterprises and industrial clusters have emerged. It provides impetus for the sustained and healthy development of the economy. In the second public factor, Zhoushan, Ningbo, Shaoxing and Huzhou are the top four cities. It shows that the level of agricultural development and the intensity of foreign economic ties in these cities are relatively high. This paper argues that due to geographical advantages, abundant natural resources, policy support, agricultural modernization and superior transportation and logistics conditions, etc. The result of the interaction of heavy factors.

Comparing the ranking of the two public factors, this paper finds that Zhoushan ranks the bottom in the overall economy. However, the level of agricultural development and foreign economy is relatively high. It shows that Zhoushan's advantages in agriculture and foreign economy have not been fully transformed into the health and vitality of the overall economy. This suggests that in the future development, Zhoushan needs to pay attention to the diversification of economic structure and enhance the integrity of the industrial chain. Increase infrastructure construction and service level, enhance domestic demand market, and enhance support for high-end talents and innovation. Optimize government policies and support to achieve coordinated, healthy and sustainable development of the overall economy.

## 4. Conclusion

In general, by studying the regional difference of the economic development level of the cities in Zhejiang province, this paper can intuitively see the differences in the development of each city. This

DOI: 10.54254/2753-8818/52/2024CH0124

paper roughly divides the level of economic development into three echelons, which shows that the differences between regions are still obvious. Therefore, this paper puts forward the following suggestions:

First of all, the author needs to promote industrial transfer and upgrading, and encourage the transfer of high-end industries and technologies from developed areas to relatively backward areas. Promote regional integration of the industrial chain. Industrial cooperation zones can be established to promote cross-regional cooperation and share technology, resources and markets.

Second, it is necessary to optimize infrastructure construction and strengthen the construction of provincial transportation network. In particular, highways, railways and ports connecting relatively backward areas will enhance the level of regional connectivity. Facilitate the flow of logistics and personnel. At the same time, this paper should speed up the construction of digital infrastructure, improve network coverage and informatization level, and promote the development of smart cities and smart countryside.

Third, this paper will increase financial support and targeted poverty alleviation, and increase financial transfer payments to underdeveloped areas. This paper will continue to promote targeted poverty alleviation and ensure that the poor do not return to poverty. Through comprehensive measures such as industrial poverty alleviation, education poverty alleviation and health poverty alleviation, the self-development ability of poor areas and poor people will be enhanced.

## Authors contribution

All the authors contributed equally and their names were listed in alphabetical order.

## References

[1] Li X H 2013 Research on the Regional Difference of Retail Business Performance and Its Influencing Factors. Chengdu: Southwestern University of Finance and Economics.
[2] Wu D T 2009 Regional Economics. Beijing: Science Press, 261-262.
[3] Li Y 2012 Research on Urban Economic Disparity in Guangdong Province. Chengdu: University of Electronic Science and Technology of China.
[4] Zhao C C 2023 Study on the Spatio-temporal Evolution and Influencing Factors of Regional Economic Disparity in Western China. Yan'an University.
[5] Wang D Q 2023 Spatio-temporal Evolution Analysis of Regional Economic Development Differences in Guangxi. Guangxi Normal University.
[6] Fang M Y 2021 Research on Regional Logistics Development in Henan Province Based on Factor Analysis and Cluster Analysis. Zhengzhou University.
[7] Peng W B and Liu Y J 2010 Spatio-temporal Evolution Characteristics of Regional Economic Disparity in Eastern, Central and Western China. Economic Geography, 574-578.
[8] Liu S Q 2021 Analysis and Countermeasures of Rural Regional Economic Development Differences. Shanxi Agricultural Economy, 52-53.
[9] Yang K Z 1994 Study on the Change of Regional Economic Disparity in China. Economic Research, 28-33.
[10] Liu J, et al. 2009 Historical Investigation and Empirical Study of Regional Disparity in China. Economic System Reform, 128-132.