Ranking and Clustering of the Economic Status of Rural Residents in 31 Provinces and Regions in China

TANG Jun *

Science and Education Quality Department，Hubei Province Agricultural Mechanization Management Office，Wuhan 430017，China

Abstract　In order to rank and cluster the economic status of rural residents in 31 provinces，cities and autonomous regions，the MATLAB software is used and the component analysis and the cluster analysis are conducted on the data reflecting the economic status of each area. The results show that the provinces or cities with high comprehensive ，scores are Shanghai Municipality，Beijing Municipality，Zhejiang Province，Jiangsu Province，Tianjin Municipality，Guangdong Province，Fujian Province，Shandong Province and Liaoning Province according to priority；the provinces or autonomous regions with low comprehensive scores are Gansu Province，Guizhou Province ，Tibet，Uygur autonomous region and Yunnan Province. The economic status of rural residents in the 31 provinces and autonomous regions are partly parallel with the comprehensive economic development. The improvement of the economic status of rural residents is helpful for the overall economic elevation. Therefore，the government should coordinate the economic development of urban and rural areas，industry and agricultural，developed region and undeveloped region，and coastal areas and central and western areas to maximize the social welfare of the whole nation.

Key words　Economic status of rural residents，Principal component analysis，Cluster analysis，Economic development，China

　　The economic status of rural residents is one of the important indicators which mark the economic developmental level，the establishment of new village construction and harmonious society. The domestic scholars have conducted survey on the economic status of rural residents[1−3]. The analysis on the ranking and clustering of the economic status of rural residents in each province offers us the macro understanding of the discrepancies of rural economic development from another perspective and provides guidelines for rural economic development of each province. According to the statistics from the statistical yearbook，the principal components which reflect the economic status of rural residents of each province are extracted by using the MATLAB software and the self-programming program. Ranking the main principles according to the comprehensive evaluation function and the KM clustering is conducted on the front five main principles which have reflected 85% information of all the statistics.

1　Data source and research method

1.1　Data source　The data come from *China Statistical Yearbook*[4]，in which 23 indicators concerning the net income of rural households in 31 provinces（excluding Hong Kong，Macau and Taiwan），the net income of rural households according to the income source，the per capita average consumption expenditures of rural households，the cash expenditure of per capita average of rural households，the housing condition of rural households，sown acreage and so on，are selected as the original data to analyze the economic status of rural residents in

each province of China.

1.2　Research method　By using the MATLAB software and self-performing program，I extract the principal components of some statistical indicators which reflect the economic status of each province in China，rank the components by using the comprehensive evaluation function[5] and conduct KM clustering on five components which reflect 85% information of the data[6].

2　Results and analysis

　　The results obtained by computer operation can be seen on Table 1 and Fig. 1，2 and 3. The lower the score of the comprehensive evaluation function，the better the economic status of rural residents in a province. It can be seen from Table 1 that the provinces with the high score in the comprehensive evaluation are Shanghai Metropolis，Beijing Municipality，Zhejiang Province，Jiangsu Province，Tianjin Municipality，Guangdong Province，Fujian Province，Shandong Province，and Liaoning Province in turn；the provinces with low score in the comprehensive evaluation are Gansu Province，Guizhou Province，Tibet，Xinjiang autonomous region，and Yunnan Province in turn. The economic status of rural residents in various provinces roughly parallels to the comprehensive economic developmental level，but not all the same[4].

　　It can be seen from Fig. 1 that，the economic status of rural residents in Beijing and Shanghai and that in the other provinces and cities belong to two different kinds. Beijing and Shanghai are special in nature. But Tianjin and other provinces and cities excluding Beijing and Shanghai belong to two different kinds，so Tianjin is special in nature. Zhejiang and other provinces and city excluding Beijing，Shanghai and Tianjin belong to different kinds.
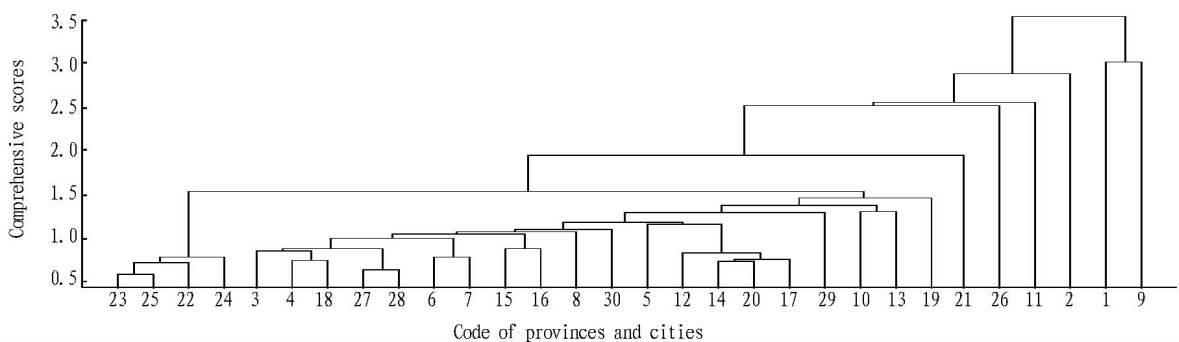
　　It can be seen from Fig. 2 that the gap of economic status of rural residents between Shanghai，Beijing，Zhejiang，Tian-

jin, Guangdong and Fujian with that in the other provinces and cities is great. The economic status of rural residents in Shanghai Metropolis, Beijing Municipality, Zhejiang Province, Tianjin Province, Guangdong Province and Fujian Province stay on the forefront position.

Table 1 Principal component scores, comprehensive evaluation function and rankings of the economic status of rural residents in 31 provinces

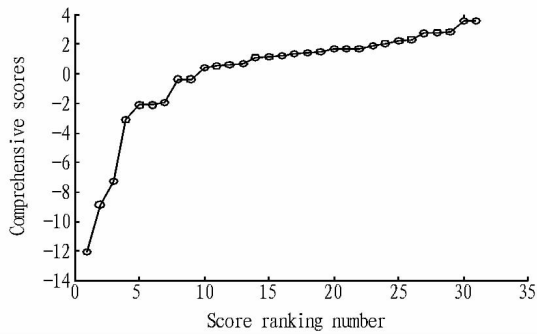| Number	Provinces and cities	Scores of the first five principal components containing 85% information of the original data					Comprehensive evaluation function Scores	Ranking (in a decreasing order)
		1	2	3	4	5		
1	Beijing	−13.356 6	2.543 6	−3.216 6	−1.267 0	−1.417 5	−8.847 0	30
2	Tianjin	−3.392 2	2.053 8	−1.932 7	2.851 9	−2.444 6	−2.148 6	27
3	Hebei	1.316 1	2.237 9	−0.211 0	0.564 7	0.370 3	1.082 4	18
4	Shanxi	1.942 4	1.441 3	−1.428 9	0.467 8	0.523 7	1.349 2	15
5	Inner Mongolian	1.488 7	1.653 9	0.481 2	−1.356 9	0.290 2	1.118 3	17
6	Liaoning	−0.897 4	2.015 9	0.784 5	0.256 5	−1.203 1	−0.391 9	23
7	Jilin	0.312 9	2.922 3	0.526 0	0.583 7	−0.595 8	0.499 1	21
8	Heilongjiang	−0.176 8	4.497 5	1.264 4	−0.272 5	1.252 0	0.392 4	22
9	Shanghai	−17.812 7	−2.527 0	−1.592 5	−1.466 8	−0.210 7	−12.095 0	31
10	Jiangsu	−4.995 8	−0.146 1	1.982 5	0.589 8	0.501 6	−3.138 6	28
11	Zhejiang	−11.207 2	−1.619 8	2.096 6	0.277 0	3.078 4	−7.275 6	29
12	Anhui	1.921 6	0.569 2	1.054 0	−0.162 3	0.153 4	1.379 2	14
13	Fujian	−2.945 9	−2.310 4	1.563 6	1.283 9	0.549 4	−1.983 3	25
14	Jiangxi	1.811 6	−0.970 4	1.248 3	0.430 8	0.025 5	1.198 5	16
15	Shandong	−1.128 3	2.678 2	1.026 6	0.310 4	0.967 5	−0.398 7	24
16	Henan	2.388 1	1.855 8	1.377 8	−0.009 6	1.307 4	1.862 4	9
17	Hubei	0.822 0	−0.699 4	2.150 7	−0.487 5	−0.206 7	0.589 0	20
18	Hunan	1.037 1	−0.750 0	1.058 6	−0.049 4	−0.411 9	0.666 5	19
19	Guangdong	−2.880 0	−3.398 3	1.122 9	1.107 3	−1.037 0	−2.120 8	26
20	Guangxi	3.462 7	−1.837 8	1.392 6	0.101 7	−0.487 6	2.188 6	7
21	Hainan	2.355 1	−2.411 0	0.910 2	2.908 4	−1.901 1	1.430 9	13
22	Chongqing	2.801 8	−1.362 9	0.166 9	−1.578 2	−1.218 1	1.638 6	12
23	Sichuan	2.685 7	−0.605 9	0.958 3	−1.940 4	−0.909 4	1.676 1	10
24	Guizhou	5.669 6	−0.886 2	0.134 2	−2.114 6	−1.565 9	3.535 2	2
25	Yunnan	4.355 1	−1.080 9	0.551 5	−2.110 2	−0.496 0	2.713 8	5
26	Tibet	4.877 2	−2.945 4	−3.912 8	1.136 6	2.587 8	2.824 1	3
27	Shaanxi	3.150 0	0.537 6	−1.519 5	−0.394 3	0.766 4	2.035 6	8
28	Gansu	5.584 5	−0.228 5	−1.572 5	−0.648 4	0.891 3	3.560 5	1
29	Qinghai	4.016 1	−1.933 2	−2.946 1	−0.790 8	0.403 2	2.271 7	6
30	Ningxia	2.729 7	−0.452 4	−2.088 9	0.564 3	0.056 2	1.646 2	11
31	Xinjiang	4.065 0	1.158 2	−1.429 9	1.214 3	0.381 2	2.741 1	4

Fig. 1 The comprehensive score clustering of economic status of rural residents in 31 provinces and cities in China

It can be seen from Fig. 3 that the economic status of rural residents in China can be divided into four steps according to the provinces, and most provinces' comprehensive scores of rural residents are among 1 to 3.

3 Conclusions and discussions

3.1 Conclusions The improvement of economic status of rural residents relies on the overall improvement of economic developmental level. In China, the development of rural residents appears a development group (Shanghai Motroplis, Bei-

jing Municipality, Zhejiang Province, Jiangsu Province, Tianjin Municipality, Guangdong Province, Fujian Province), which motivates a developmental group (other provinces in China). The economic status of rural residents in Beijing and Shanghai is obviously divided into two kinds with other provinces and cities, and Shanghai and Beijing are special in nature. But Tianjin and other provinces and cities excluding Beijing and Shanghai belong to another two kinds, so it has relative specialty. The Zhejiang and other provinces except Beijing and Shanghai belong to the two kinds, and it is sample of significant populariza-

Fig. 2 Rankings of comprehensive scores of the economic status of rural residents in 31 provinces and cities in China
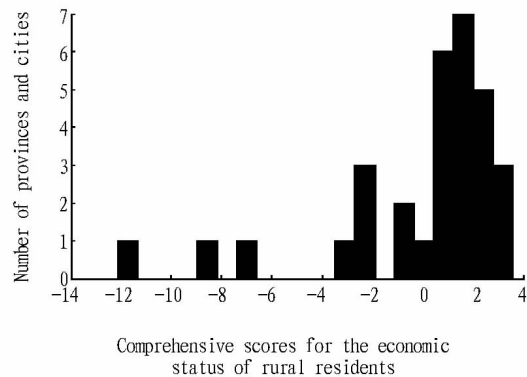
Fig. 3 Distribution of comprehensive scores for the economic staus of rural residents in 31 provinces and cities in China

tion value for improving living standard of rural residents. The economic status of rural residents in China can be divided into four steps. The coastal cities and provinces are the economically advanced area for Chinese economic development and the improvement of rural residents, and they reflect the motivation effect of oversea trade to regional economic development and the improvement of rural residents.

3.2 Suggestions The improvement of economic status of rural residents relies on the improvement of overall economic development. So the relevant department should coordinate the development between urban and rural areas, industry and agriculture, economically advanced areas and underdeveloped areas, coastal areas and central eastern areas, to maximize the social welfare of the whole country.

The government should extract the systematic factor, resource endowment, foreign trade factor, science and technology development factor, perfection degree of market mechanism, transportation and energy factor and traditional culture factor from the provincial economic developmental pattern of Shanghai Metropolis, Beijing Municipality, Zhejiang Province, Jiangsu Province, Tianjin Municipality, Guangdong Province, Fujian Province and some other provinces or cities, to provide references for other provinces and cities. They are the experiences and samples for Chinese economic development and improvement of rural residents, so it is worth valuing and being developed and used.

References

[1] ZHANG JL, ZHOU WY, XIANG J. Comparative analysis on status of Chinese rural consumption expenditure [J]. Journal of Anhui Agricultural Sciences, 2009, 37(32):16058 – 16059. (in Chinese).
[2] YUAN JM. An empirical analysis of the gap between urban and rural living standards in China: from the year of 1980 to 2006 [J]. Acta Agriculturae Jiangxi, 2008, 20(11):121 – 123. (in Chinese).
[3] BAI Y, QI YA. Quantitative research of living standards of the rural and urban residents in Inner Mongolia [J]. Journal of Inner Mongolia University for Nationalities: Social Sciences, 2009, 35(4):102 – 103. (in Chinese).
[4] National Bureau of Statistics of China. China statistical yearbook-2009 [EB/OL]. (2010 – 08 – 28) http://www. stats. gov. cn/. (in Chinese).
[5] HE XQ. Multivariate statistical analysis [M]. Beijing: China Renmin University Press, 2004:125 – 138. (in Chinese).
[6] GAO HD. Applied multivariate statistical analysis [M]. Beijing: Peking University Press, 2005:33 – 105. (in Chinese).

5 Conclusion

Larger consumption accommodation space in China leads to greater impact on the development of foreign trade, as well as more significant challenge to the operating level and economic guidance ability of national macro-control policy. When expanding domestic demands, related departments should pay attention to the relevance and continuity of livelihood policies with foreign trade industry, enlarge the marginal contribution ratio of the policies expanding domestic demand to the reasonable growth in foreign trade, and avoid the spillover effects of negative externality caused by economic revitalization policy. This also requires that the decision-making level should have a broader idea of both developing domestic and foreign markets, and ensure the rational balance between the public policy and the macroeconomics and foreign trade by taking various and effective means.

References

[1] Survey and Statistics Department of People's Bank of China. Analysis on China's macroeconomic situation in the first quarter of 2010 [EB/OL]. (2010 – 04 – 23) http://www. pbc. gov. cn/detail. asp?col =100&ID =3606. (in Chinese).
[2] ZHU TB. Comparative political economy [M]. Beijing: Peking University Press, 2006:61. (in Chinese).
[3] PEI CH. Thought on enhancing China's open economy in the post crisis phase [N]. Fujian Daily, 2010 –04 –13. (in Chinese).
[4] ZHOU QR. Money, institutional cost and China's economic growth [EB/OL]. (2008 –04 –15) http://www. cenet. org. cn/article. asp?articleid =30813. (in Chinese).
[5] ZHU XW. Managing inflation expectations to embrace a new growth [N]. China Information News, 2009 – 12 –24. (in Chinese).