

The quality assessment of county territory economy of Jiangsu Province based on quality attribute

Wei Teng & Ping Gu*

School of Economics and Management, Jiangsu University of Science and Technology, Zhenjiang, Jiangsu, China

ABSTRACT: A frame diagram is constructed from four aspects, including the quality of sharing, the quality of benefit, the quality of coordination and the quality of openness. The author designs an indicator system for the county territory economy of Jiangsu Province, calculates the quality score with the method of factor analysis, and carries out a cluster analysis. The result indicates that the development of the county territory economy in Jiangsu Province is unbalanced. People's livelihood and economic benefit factors are of vital importance for the improvement of economic quality.

Keywords: quality attribute; county territory economy; factor analysis; cluster analysis

1 INTRODUCTION

The importance of county territory economy can be seen from old maxims. For example, counties are the base of a country; the peace of a country comes from counties governance. The county territory economy of Jiangsu Province has gained a rapid development since the reform and opening-up. But many problems are exposed during the development such as structural imbalance, polarization between the rich and the poor, resource waste and so on. It is stated in the Central Economic Working Conference of 2014 that improving quality and benefit should be the core of the economic development. Government work report of 2015 underlines that urbanization should be highlighted during the realization of economic development quality and benefit. These policies suggest that the idea of economic development is transforming from speed-centered to quality-centered and the macroeconomic policy is changing towards county territories.

Studies on economic quality date back to the 1970s when the former Soviet Union formulated many economic plans to catch up with the United States. Although it surpassed the United States in terms of the mass of a number of indicators, the efficiency was much lower than that of the United States. Thus, economists of the former Soviet Union began to pay

close attention to the economic quality. Kamayev (1983) regards economic quality as the utilization efficiency of factors^[1]. Jiye Wang (2000) believes that the accumulation of productive factors and the improvement of resource utilization form the source of economic quality^[2]. Xiaojing Chao and Baoping Ren (2011) believe that economic quality includes economic structure, stability, welfare distribution and ecological environment costs^[3]. Jiandong Wen, Hui Li and Yunluo Shi (2012) build an indicator system from the creation of economic gain and the sharing of economic gain, finding out that there is a large gap of economic equality between regions^[4]. Liang Zhang (2012) analyzes the relation between gain sharing and economic quality with the proportion of labor remuneration as the entry point^[5]. Kai shi and Lizhen Liu (2012) construct an indicator system from four aspects, namely quantity, efficiency, stability and the welfare of people's livelihood, finding out that the economic growth quality of China presents three states, fluctuant stability, fluctuant improvement and steady improvement^[6]. Huanxia Geng and Xiaolin Zhang (2014) carry out a study on the economic quality of prefecture-level cities of Jiangsu Province from stability, effectiveness, optimization, sustainability and residents' economic conditions^[7]. With the method of principal component analysis, Baoping Ren and Feng Ge (2014) analyze the economic quality of Inner Mongolia, finding out that the economic development

*Corresponding author: 2472262311@qq.com

quality index of Inner Mongolia is rising gradually^[8]. Yun Liao and Zhenzhen Zhao (2015) establish an indicator system from four aspects, including economic development condition, development potential, people's livelihood and environmental protection, and carry out an empirical analysis on the provincial characteristics of China's economic quality^[9].

In a word, existing studies on economic quality can be divided into two categories, namely in a narrow sense and a broad sense. Studies in a narrow sense start from the perspective of resource utilization while studies in a broad sense start from multiple perspectives which include resource utilization and emphasize the human-centered principle. More attentions are paid to studies in a broad sense. Relevant studies have the following limitations: (1) There is no clear definition on economic quality. In this paper, the economic quality refers to the fact that products and services in a certain region are provided through resource input as well as the satisfactory degree of these products and services in terms of social development and people's livelihood. (2) The expression of economic quality attributes is too vague and unable to identify economic quality attributes accurately. (3) Most studies are carried out on the whole nation and large and medium-sized cities. Studies on micro economies like county territories are quite rare.

2 THE CONSTRUCTION OF THE ASSESSMENT INDICATOR SYSTEM

2.1 Identification and construction of county territory economy quality attributes in Jiangsu Province

According to the existing research findings, this paper defines the quality attribute of the county territory economy of Jiangsu Province as the quality of sharing, the quality of benefit, the quality of coordination and the quality of openness. The quality of sharing refers to the sharing of economic gain, which is the main part of economic quality assessment^[10]. The essence of socialism is to realize common prosperity finally and the core of the scientific outlook on development is to put people first. So, the goal of boosting economic quality is to improve people's livelihood^[5]. The quality of benefit is the concentrated reflection as well as the foundation of economic quality. Economic development without any benefit cannot be measured by quality. The quality of coordination is the coordination degree of the economic structure. The change of economic quality is always combined with the change of economic structure. Economic quality itself has requirements on the optimization of economic structure. A reasonable economic structure is an important part of the economic development with high quality^[3]. The quality of openness refers to the opening degree of county territory economy. Market plays a decisive role in resource allocation so that regional

cooperation deepens increasingly and no region can gain its development in a closed space. Therefore, open development is the only road to the improvement of economic quality.

As shown in Figure 1, the frame diagram of quality analysis of county territory economy in Jiangsu Province is established based on current research achievements.

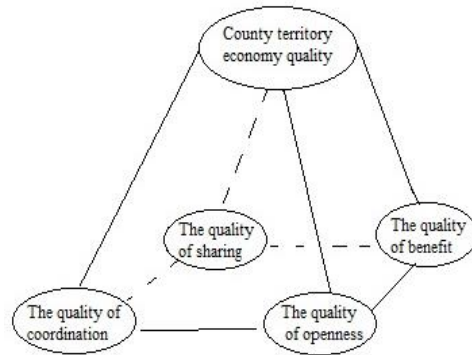


Figure 1. The frame diagram of quality analysis of county territory economy in Jiangsu Province

The quality of sharing, the quality of benefit, the quality of coordination and the quality of openness constitute the quality of county territory economy of Jiangsu Province, which contains the requirements on benefit, coordination, openness and sharing. The quality of sharing mainly includes the possession of economic gain per capita and household savings. The quality of benefit includes the growth rate of per capita GDP, resource allocation rate, etc. The quality of coordination includes industry proportion, fiscal balance, etc. The quality of openness mainly includes the value of import and export, foreign investment and foreign trade dependence.

2.2 The construction principle of the indicator system

The principle of being scientific, feasible and comparable is followed in the process of designing the indicator system.

2.3 The assessment indicator system of the county territory economy quality of Jiangsu Province

In this paper, the hierarchical relationship of the assessment system is established with scattered degrees and a comprehensive assessment is carried out on the county territory economy quality of Jiangsu Province. (See Table 1)

2.4 Data sources and processing

Data in this paper is collected from Statistical Yearbook of Jiangsu in 2014. Data processing is accomplished by SPSS22.0.

Table 1. The assessment indicator system of the county territory economy quality of Jiangsu Province

Target layer	Criterion layer	Indicator layer	Calculation formula	Unit
The county territory economy quality of Jiangsu Province	The quality of sharing	The collection of public books per 10,000 people X_1	The collection of public libraries / year-end permanent resident population	Thousand/ 10,000 people
		The number of beds of health agency per 10,000 people X_2	The number of beds of health agency / year-end permanent resident population	Per 10,000 people
		The number of mobile phones per capita X_3	The number of mobile phone users / year-end permanent resident population	Per capita
		The number of the Internet users per 10,000 people X_4	The number of the Internet users / year-end permanent resident population	Per 10,000 people
		The number of private-owned automobiles per 10,000 people X_5	The number of private-owned automobiles / year-end permanent resident population	Per 10,000 people
		Household savings per capita X_6		Yuan
	The quality of benefit	The growth rate of per capita GDP X_7	(Per capita GDP of the report period—per capita GDP of the last period) / per capita GDP of the last period*100%	%
		Resource allocation rate X_8	The growth rate of fixed-asset investment / the growth rate of regional GDP*100%	%
		The total retail sales of consumer goods X_9		Billion Yuan
		The total profits and taxes of industrial enterprises X_{10}		Billion Yuan
	The quality of coordination	The proportion of secondary industry in GDP X_{11}	Output value of secondary industry / regional GDP*100%	%
		The proportion of tertiary industry in GDP X_{12}	Output value of tertiary industry / regional GDP*100%	%
		Relative variation ratio of economic growth X_{13}	(Economic growth rate of the report period-economic growth rate of the last period) / economic growth rate of the last period*100%	%
		Fiscal balance X_{14}		
	The quality of openness	Export X_{15}	Fiscal budget revenue / fiscal budget expenditure	Billions of dollars
		Import X_{16}		Billions of dollars
		Actual foreign direct investment X_{17}		Billions of dollars
		Foreign trade dependence X_{18}		%

3 AN EMPIRICAL ANALYSIS ON THE COUNTY TERRITORY ECONOMY QUALITY OF JIANGSU PROVINCE

3.1 Factor analysis

3.1.1 Standardization of original data

The effect of dimension is eliminated by the standardization of sample data, which is carried out with the method of Z scores.

3.1.2 KMO test and Bartlett sphericity test

Standardized data is tested by KMO test method and Bartlett sphericity test method. The results are shown in Table 2. It can be known from Table 2 that the value of KMO is 0.849 and the value of P of Bartlett sphericity test is 0. Therefore, factor analysis is suitable for this sample.

Table 2. KMO test and Bartlett sphericity test

KMO measure of sampling adequacy		.849
Bartlett sphericity test	Read chi-square of the last time	1001.403
	Freedom degree	153
	Significance	.000

3.1.3 Confirmation of main factors and the factor loading matrix

The total variance explained table, of which the initial eigenvalue is larger than 1, is obtained through the calculation of SPSS22.0. It can be concluded from Table 3 that three common factors are larger than 1 and the accumulated variance contribution rate of the three factors is 77.017%. It suggests that the three common factors contain 77.017% information of the original 18 indicators. So, the three factors that replace original indicators are able to carry out an analysis

Table 3. Total variance explained table

Factors	Initial eigenvalue			Quadratic sum of rotating load		
	Total	Variance proportion	Accumulation %	Total	Variance proportion	Accumulation %
F1	10.703	59.458	59.458	6.458	35.880	35.880
F2	1.684	9.353	68.812	5.141	28.560	64.440
F3	1.477	8.205	77.017	2.264	12.578	77.017

perfectly on the economic quality of 45 counties of Jiangsu Province.

Table 4. The factor loading matrix after rotation

Variables	Common factors		
	F1	F2	F3
Zscore(X ₁)	0.664		
Zscore(X ₃)	0.744		
Zscore(X ₄)	0.843		
Zscore(X ₅)	0.816		
Zscore(X ₆)	0.914		
Zscore(X ₇)	-0.668		
Zscore(X ₉)	0.647		
Zscore(X ₁₁)	0.795		
Zscore(X ₁₄)	0.844		
Zscore(X ₁₀)		0.657	
Zscore(X ₁₅)		0.945	
Zscore(X ₁₆)		0.903	
Zscore(X ₁₇)		0.810	
Zscore(X ₁₈)		0.854	
Zscore(X ₂)			0.609
Zscore(X ₈)			0.854
Zscore(X ₁₂)			0.508
Zscore(X ₁₃)			-0.636

Table 4 is the factor loading matrix obtained from the largest variance orthogonal rotation of factors. F₁ has a large load capacity on X₁, X₃, X₄, X₅, X₆, X₇, X₉, X₁₁ and X₁₄. So F₁ can be named the factor of people's livelihood and economic benefit. F₂ has a large load capacity on X₁₀, X₁₅, X₁₆, X₁₇ and X₁₈. So F₂ can be named the openness and tax factor. F₃ has a large load capacity on X₂, X₈, X₁₂ and X₁₃. X₈ reflects not only the information of investment and output but also the coordination degree of investment growth rate and GDP growth rate. So F₃ can be named the coordination factor.

3.1.4 Scores of factors and the comprehensive quality score

Matrixes of factor score coefficient can be obtained from factor loading matrixes through the regression method. The score estimation formula of each factor can be acquired from matrixes of factor score coefficient and standardized data, namely:

$$F_1 = 0.093X_1 - 0.007X_2 + 0.122X_3 + 0.166X_4 + 0.143X_5 + 0.254X_6 - 0.137X_7 - 0.065X_8 + 0.057X_9 - 0.001X_{10} + 0.21X_{11} + 0.064X_{12} + 0.226X_{13} + 0.181X_{14} - 0.159X_{15} - 0.14X_{16} - 0.065X_{17} - 0.086X_{18};$$

$$F_2 = -0.003X_1 - 0.082X_2 + 0.031X_3 - 0.043X_4 - 0.023X_5 - 0.175X_6 + 0.086X_7 - 0.076X_8 + 0.066X_9 + 0.143X_{10} - 0.057X_{11} - 0.116X_{12} - 0.128X_{13} - 0.067X_{14} + 0.328X_{15} + 0.287X_{16} + 0.212X_{17} + 0.239X_{18};$$

$$F_3 = 0.041X_1 + 0.033X_2 - 0.089X_3 - 0.026X_4 - 0.007X_5 - 0.002X_6 - 0.073X_7 + 0.484X_8 + 0.003X_9 - 0.048X_{10} - 0.168X_{11} + 0.247X_{12} - 0.388X_{13} - 0.024X_{14} - 0.056X_{15} + 0.006X_{16} - 0.009X_{17} - 0.012X_{18}.$$

The factor analysis model as follows can be obtained from the weighting with the proportion of common factor variance contribution rate in accumulated contribution rate as the weight:

$$F = (0.3588F_1 + 0.2856F_2 + 0.12578F_3) / 0.77017$$

The comprehensive score of the county territory economy quality of Jiangsu Province F can be obtained through the above model. Coefficients of F₁, F₂ and F₃ are respectively 0.466, 0.371 and 0.163. It indicates that the factor of people's livelihood and economic benefit has the greatest impact on the quality of county territory economy development, which is followed by the factor of openness and tax. The coordination factor has a relatively small impact.

The masses are the main body of social development. Raising people's living standard is the starting point and the foothold of economic quality. The improvement of economic quality must be based on the increase of economic benefits. Therefore, information related to people's livelihood and economic benefit can directly reflect the quality of economic development. Jiangsu is a province with developed export-oriented economy, where the market has played a decisive role in the allocation of resources. Hence, it requires that all regions adhere to open development. The coordinated development is the guarantee of the quality of economic development. If the economic development is not balanced, the efficiency of resource allocation will become lower and the production mode of high consumption and low output exists as well.

As shown in Table 5, the score of factors and the comprehensive quality score of each county territory can be obtained according to the factor estimation formula and the analysis model.

Table 5. Factor scores and the rankings of comprehensive quality scores of 45 county territories in Jiangsu Province

Counties	F ₁		F ₂		F ₃		F	
	Scores	Rankings	Scores	Rankings	Scores	Rankings	Scores	Rankings
Kunshan city	0.056	17	5.962	1	-0.686	37	2.125	1
Zhangjiagang city	1.568	5	1.044	3	2.185	1	1.475	2
Changshu city	1.622	3	0.597	4	2.019	2	1.307	3
Jiangyin city	1.496	6	1.085	2	0.612	11	1.200	4
Taicang city	1.651	2	0.235	7	1.210	4	1.054	5
Yixing city	1.599	4	-0.342	32	0.177	21	0.647	6
Yangzhong city	1.458	7	-0.861	44	0.389	18	0.423	7
Haimen city	1.349	8	-0.358	36	-0.448	33	0.422	8
Jingjiang city	1.243	9	-0.823	43	0.801	7	0.405	9
Danyang city	0.742	14	-0.068	18	0.003	24	0.321	10
Qidong city	0.863	11	-0.190	24	-0.320	27	0.279	11
Haian county	0.798	13	-0.447	40	0.343	20	0.262	12
Yizheng city	0.854	12	-0.348	34	-0.504	36	0.186	13
Rugao city	0.508	15	-0.106	20	-0.082	25	0.184	14
Liyang city	0.988	10	-0.400	37	-0.811	38	0.179	15
Jintan city	2.305	1	-1.266	45	-3.309	45	0.064	16
Rudong county	0.165	16	0.106	11	-0.324	29	0.063	17
Taixing city	-0.015	18	-0.017	15	0.133	22	0.009	18
Jurong city	-0.076	19	-0.005	14	-0.488	35	-0.117	19
Dafeng city	-0.260	21	-0.467	41	0.648	10	-0.189	20
Dongtai city	-0.355	23	-0.565	42	0.975	6	-0.216	21
Gaoyou city	-0.115	20	-0.343	33	-0.387	31	-0.244	22
Siyang county	-0.746	33	-0.214	26	0.689	9	-0.314	23
Pizhou city	-0.763	34	0.250	6	-0.421	32	-0.332	24
Xinghua city	-0.699	30	-0.356	35	0.724	8	-0.339	25
Pei County	-0.531	26	-0.104	19	-0.341	30	-0.342	26
Hongze county	-0.684	29	-0.334	31	0.596	12	-0.345	27
Ganyu county	-0.424	25	0.223	8	-1.422	42	-0.347	28
Jianhu county	-0.564	27	-0.406	38	0.389	17	-0.350	29
Donghai county	-0.308	22	0.104	12	-1.530	43	-0.355	30
Shuyang county	-0.867	37	-0.047	17	0.397	16	-0.357	31
Baoying county	-0.382	24	-0.139	21	-0.886	39	-0.374	32
Jinhu county	-0.731	32	-0.413	39	0.524	13	-0.408	33
Xinyi city	-0.704	31	-0.141	22	-0.212	26	-0.415	34
Sihong county	-1.290	44	-0.278	29	1.666	3	-0.432	35
Funing county	-0.782	35	-0.229	27	0.070	23	-0.438	36
Suining county	-0.938	39	0.153	9	-0.462	34	-0.456	37
Guannan county	-0.594	28	0.033	13	-1.195	41	-0.460	38
Xiangshui county	-0.931	38	-0.031	16	-0.323	28	-0.498	39
Sheyang county	-1.079	41	-0.180	23	0.369	19	-0.509	40
Xuyi county	-1.125	43	-0.209	25	0.458	14	-0.527	41
Binhai county	-1.121	42	-0.230	28	0.445	15	-0.535	42
Lianshui county	-1.303	45	-0.331	30	1.081	5	-0.553	43
Guanyun county	-0.808	36	0.321	5	-1.825	44	-0.555	44
Feng county	-1.069	40	0.137	10	-0.927	40	-0.599	45

Comprehensive quality scores of Kunshan, Zhangjiagang, Changshu, Jiangyin and Taicang are higher than 1, suggesting that the economic quality of the five regions is very high. Comprehensive quality scores of 13 regions, including Yixing and Yangzhong, are between 0 and 1, which means that the economic quality of these regions is relatively high. There are 27 counties whose comprehensive quality scores are less than 0. It means that the economic quality of these regions is relatively low.

It can be seen from the three common factors that regions with higher scores of factor F₁ are Jintan, Taicang and Changshu. The three regions have more

advantages than other regions in open development and industrial enterprise tax. Zhangjiagang, Changshu and Sihong are top three regions with higher scores of factor F₃. These regions have more advantages in the coordination development of economy.

3.2 Cluster analysis

In this paper, a cluster analysis is carried out on 45 county territories with the comprehensive quality score F as the new variable through the method of hierarchical clustering. The method of farthest neigh-

bors is used to calculate the distance between clusters. Results are shown in Table 6.

It can be seen from the table that the clustering situation is basically in accord with the economic development state of Jiangsu Province. Kunshan, Zhangjiagang, Changshu, Jiangyin and Taicang belong to the first category. These five regions, located in south Jiangsu, have active economic elements, higher open development level and higher economic development quality. Other ten regions, including Yixing and Yangzhong, belong to the second category, of which the regional advantages are less obvious than the first category while the economic development quality is high. Jintan, Rudong and other seven regions belong to the third category, of which the economic development quality is medium. Siyang, Pizhou and other 23 regions, mainly located in north Jiangsu, belong to the fourth category, the economic development quality of which is relatively low.

Table 6. Clustering results of the economic development quality of 45 county territories in Jiangsu Province

Category	County territories
First	Kunshan, Zhangjiagang, Changshu, Jiangyin, Taicang
Second	Yixing, Danyang, Haian, Qidong, Liyang, Rugao, Yizheng, Jinjiang, Haimen, Yangzhong
Third	Jintan, Rudong, Taixing, Dafeng, Dongtai, Gaoyou, Jurong
Fourth	Xiangshui, Sheyang, Lianshui, Guanyun, Xuyi, Binhai, Feng county, Donghai, Shuyang, Xinghua, Pei county, Ganyu, Jianhu, Hongze, Pizhou, Baoying, Siyang, Jintu, Xinyi, Suining, Guan-nan, Sihong, Funing

4 CONCLUSION

The assessment of the county territory economy quality of Jiangsu Province is a typical problem of multiple indicators. It can be found from the factors analysis that factors influencing the county territory economy quality of Jiangsu Province mainly include the factor of people's livelihood and economic benefit, the factor of openness and taxes and the factor of coordination. The factor of people's livelihood and economic benefit plays a leading role.

It can be concluded from the assessment results that: (1) Rankings of economic quality of 45 county territories in Jiangsu Province basically agree with the development condition, which means that economic quality is related to economic base. (2) The economic

development quality is quite unbalanced with large gap. The economic quality of south Jiangsu is generally higher than that of north Jiangsu. Development is the top priority for regions with lower economic quality. However, it is noticeable that a reasonable economic structure should be established to avoid drastic fluctuations in the process of pursuing economic benefit. (3) The factor of people's livelihood and economic benefit is of vital importance for the improvement of economic development quality of county territories. Therefore, the government should enhance economic performance through various approaches, deepen the reform of the income distribution system, give consideration to both efficiency and equity in primary distribution and redistribution, and pay more attention to equity in redistribution.

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