Evaluation research on natural resource supply index of the pig breeding scale in the six provinces of central China

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Abstract: Promoting the development of the central region has become a basic national policy of China. Based on the data in 2015, this article has used factor analytic method to compare and evaluate the natural resources supply indexes of the pig breeding scale of the six provinces in central China. The results show that Jiangxi province has the highest index, followed by Hunan, Anhui, Henan, Hubei. However, Shanxi province has the lowest index.

1. Introduction
Central six provinces refer to Hunan province, Anhui province, Henan province, Hubei province, Shanxi province and Jiangxi province, which are located in the mainland hinterland. Nowadays, the problem of environment pollution of the pig breeding scale has drawn a wide attention. In March.2004, Premier Wen Jiabao proposed the plans to promote the rise of the central region in his Government Work Report for the first time. Thus, promoting the rise of the central region is a great decision that The State Council has made. This text conducts a research about the natural resources supply indexes of the pig breeding scale in central six provinces.

2. Index Calculation
We adopted the data from the six provinces to make a horizontal comparison of the pig breeding scale natural resources supply indexes. According to documents research and supply research, we are sure to use three indexes to calculate the standardized value Z_{11}, Z_{22}, Z_{33}, including farmland areas per person, per capita water resource and per capita grain possession. As shown in chart 1.

Chart 1 .Central natural resources supply indexes calculation and standardized of the six provinces

Province	The dimensionless processing value of cultivated per capita Z_{11}	The dimensionless processing value of water resources per capita Z_{22}	The dimensionless processing value of grain per capita Z_{33}
Shanxi	1.00	0.06	0.54
Anhui	0.86	0.34	0.90
Jiangxi	0.61	1.00	0.74
Henan	0.77	0.07	1.00
Hubei	0.81	0.40	0.72
Hunan	0.55	0.65	0.69

Then we can get the descriptive analysis of natural resources supply indexes as chart 2.

Chart 2. Summary statistics

	N	Minimum	Maximum	Average	Standard deviation
Z11	6	0.55	1.00	0.7667	0.16525
Z22	6	0.06	1.00	0.4200	0.36006
Z33	6	0.54	1.00	0.7650	0.16270

As can be seen from the chart 2, first, the standard deviation of cultivated land area of the six provinces are small numeric values, it shows the sample's dispersion degree is low. Per capita arable land is the largest in Shanxi province, on the contrary, the smallest is in Hunan, corresponded to the standard deviation. The average value of cultivated per capita is 0.7667, only Jiangxi province and Hunan province under the average level. Second, the water resources per capita dispersion degree is high, the highest per capita water resources belongs to Jiangxi province, the lowest belongs to Shanxi province, the maximum is sixteen times the amount of the minimum. Shanxi, Anhui, Henan and Hubei provinces are under the average level, this illustrate the distribution of water resources in central China is extremely unbalanced. Thirdly, the standard deviation is small, it shows the sample distribute concentrated. Hence, the gap between maximum and minimum is small.

3.Natural Resources Supply Index Calculation

First of all, according to the correlation and applicability of the natural resources supply indexes, we have to estimate whether the factor analysis can be used. The results are shown in chart 3.

Chart 3. The correlation matrix of the original variables

		Z11	Z22	Z33
	Z11	1.000	-0.787	-0.155
correlation	Z22	-0.787	1.000	-0.146
	Z33	-0.155	-0.146	1.000

There is an association among the three original variables in chart 3, and the maximum value reach -0.787. This further illustrate the original variables are fit to the factor analysis. So we get the factor variance contribution rate in chart 4.

Chart 4. Factor variance contribution rate

Element	The initial eigenvalues			Extract quadratic sum						Rotate the sum of squares
	Total	Variance occupation %	Add up %	Total	Variance occupation %	Add up %	Total	Variance occupation %	Add up %
1	1.787	59.577	59.577	1.787	59.577	59.577	1.787	59.575	59.575
2	1.054	35.137	94.714	1.054	35.137	94.714	1.054	35.140	94.714
3	0.159	5.286	100.000						

Extraction method: Principle component analysis

After extracting the factors, we find the variance of factors are high, it shows these factors can describe the three targets well. We use the first two elements as the main components, then we get chart 5.

Chart 5. Component score coefficient matrix

	Component	
	1	2
Z11	-0.528	-0.168
Z22	0.530	-0.170
Z33	-0.002	0.944

We can get expressions of the two components:

Component1:F1=-0.528*Z11+0.530* Z22-0.002*Z33

Component2:F2=-0.168*Z11-0.170* Z22+0.944* Z33

We normalization processing the first two factor variance contribution rates （59.577%、35.137%）then obtained （62.90%， 37.10%）. Regarding each factor variance contribution rate as a weight, the natural resources supply indexes of six provinces can express as

Y1=62.90%* F1+ 37.10%* F2

The results are embodied in chart 6.

Chart 6. The natural resources supply indexes

Province	F1	F2	F3
ShanXi	-0.22728	0.33156	-0.01995
AnHui	-0.04348	0.64732	0.21281
JiangXi	0.37114	0.42608	0.39152
HeNan	-0.16356	0.80274	0.19494
HuBei	0.00158	0.47560	0.17744
HuNan	0.20122	0.44846	0.29295

According to chart 6, Jiangxi province has the highest natural resources supply index, followed by Hunan, Anhui, Henan and Hubei provinces, the lowest index is in Shanxi province. It shows per capita resources in Jiangxi province is the most, so it is enough for Jiangxi to support the consumption brought by the pig breeding scale, Shanxi province is the opposite.

4.Peroration

(1)The scientific discussion about the pig breeding scale natural resources supply indexes
On the one hand, each index of the whole evaluation system is cited from China Statistical Yearbook and Chinese Animal Husbandry Statistical Yearbook, etc. Thus, the results are reliability and authority.
   On the other hand, the index evaluation method is scientific; because the factor analysis is the scientific research method. Based on the correlation analysis, with the help of component extraction and evaluation, we can get the scientific results.

(2)Conclusion
Based on the data from 2015, using the factor analysis, this article had a research about the natural resources supply indexes of the pig breeding scale. As a result, Jiangxi province has the highest natural resources supply index, followed by Hunan, Anhui, Henan and Hubei provinces, Shanxi province has the lowest index .

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