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Empirical Study on the Evaluation of Financial Competitiveness of Listed Agricultural Companies under the Supply-side Reform

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***Abstract*—At present, China is a country with a large population and a big agriculture. Therefore, agriculture occupies an important position in the national economy. Therefore, this paper chooses to study the listed agricultural companies under the supply-side reform, which establishes the financial competitiveness evaluation system of the listed agricultural companies from the perspective of financial competitiveness, and conducts an evaluation on the financial competitiveness of the listed companies using the factor analysis method, and it also points out some countermeasures to improve the financial competitiveness of listed companies.**

Keywords—supply-side reform; listed agricultural companies; financial competitiveness; factor analysis

I. INTRODUCTION

At present, as a populous country, China's agricultural development is of vital importance to the healthy development of its economy. Since the reform and opening up more than 30 years ago, China's agricultural economy has been developing rapidly and has made remarkable achievements in the world. According to the statistics, the population of China increased 2.46 times from 540 million in 1949 to 1.33 billion in 2016, in the mean time, China's agricultural production has grown faster than the population, which has made it much easier for people in China to consume food. On the contrary, although China has the largest agricultural resources in the world and its agricultural development has achieved great achievements, its agricultural production efficiency is low, per capita occupancy is lower than the world average level, and available agricultural resources are reduced and so on.

Therefore, in the face of china's basic national conditions of a large population with relatively little land, it's worth deep thinking about how to develop agricultural production scientifically, efficiently and sustainably, and improve the productivity and competitiveness of agricultural enterprises. Therefore, this paper focuses on the research of the competitiveness of listed agricultural companies based on the basic national conditions of China as a populous and agricultural country. So in the end, this paper chooses listed agricultural companies as subjects to carry out the evaluation and analysis of their financial competitiveness.

Obviously, the study on the financial competitiveness of listed agricultural companies is of very important practical significance and guiding significance to both the promotion of the effective development of China's agricultural industry and the sustainable development of national economy.

II. EVALUATION AND ANALYSIS OF FINANCIAL COMPETITIVENESS OF LISTED AGRICULTURAL COMPANIES

A. Establishment of Relevant Financial Index System

This paper establishes an evaluation system based on the relevant financial indexes of listed agricultural companies. First, select the financial indexes required for this paper; second, classify the selected financial indexes; third, list the calculation formulas of relevant indexes and indicate the attributes of the financial indexes in accordance with the relevant financial indexes obtained; fourth, establish the evaluation system of relevant indexes of financial competitiveness. And then specifically centered on the four aspects of ability of the "operation, development, profitability and solvency" of the listed agricultural companies, and based on 5-6 relevant financial indexes of each ability, the evaluation system of financial competitiveness of listed agricultural companies can be established[1] as shown in "Table I".

TABLE I. SUMMARY TABLE OF FINANCIAL INDEX EVALUATION SYSTEM OF LISTED AGRICULTURAL COMPANIES

Basic elements	Financial index	Index attribute
profitability	Net profit rate on total assets (x1)	Positive index
	Return on assets (x2)	Positive index
	Cash and total profit ratio (x3)	Positive index
	Return on Invested Capital (x4)	Positive index
Solvency	Asset-liability ratio (x5)	Positive index
	Current Ratio (x6)	Positive index
	Quick Ratio (x7)	Positive index
	Cash Ratio (x8)	Positive index
Assets management ability	Cash and cash equivalents turnover rate (x9)	Positive index
	Current asset turnover (x10)	Positive index
	Stock turnover rate (x11)	Positive index
	Accounts receivable to income ratio (x12)	Positive index
	Accounts receivable turnover (x13)	Positive index
Developmen t ability	Operating profit growth rate (x14)	Positive index
	Total assets growth rate (x15)	Positive index
	Sustainable growth rate (x16)	Positive index
	Capital value maintaining and increasing Rate (x17)	Positive index

[a.] Index source: collected through the statistics of CSMAR.

B. Data Sources of Relevant Financial Indexes

The data of this paper is derived from the statistics of CSMAR. The classification standard of CSMAR is consistent with that of guidelines on the industry classification of listed companies issued by CSRC. Therefore, the 2016 annual report data of 39 listed agricultural companies of Shanghai and Shenzhen A shares are selected from the statistics of CSMAR. Specifically, the selected companies include 30 listed agricultural companies of agriculture, forestry, animal husbandry, fishery and their relevant service industry, of which there are 12 agriculture companies, 2 forestry companies, 8 animal husbandry companies, 7 fishery companies and 1 relevant services company. This paper takes 30 listed companies as analysis samples among the total 38 listed agricultural companies, of which ST, *ST is excluded and 8 other companies' listings are suspended in "Table II".

TABLE II. STATISTICS OF LISTED AGRICULTURAL COMPANIES

S/N	Code	Company name	S/N	Code	Company name
1	000713	Fengle Seed Industry	16	600265	ST Jinggu
2	002041	Denghai Seed Industry	17	000735	Luolanshang
3	002772	Zhongxing Flora Industry	18	002234	MINHE
4	300087	Quanyin High-tech	19	002299	SUNNER
5	300143	Xingpu Medical Technology	20	002321	Huaying Agriculture
6	300189	Shennong Gene	21	002458	Yisheng Shares
7	300511	Xuerong Biology	22	002477	ChuYing Agro-Pastoral
8	600313	Nongfa Seed Industry	23	002714	Muyuan Shares
9	600371	Wanxiang Denong	24	300498	Wenshi Shares
10	600506	XINJIANG KORLA PEAR Co.,Ltd	25	000798	Water Fisheries
11	600598	Heilongjiang Agriculture Company Limited	26	002069	Zhangzidao
12	002679	Fujian Jinsen	27	002086	ORIENTAL OCEAN
13	300094	Guolian Fishery	28	002696	Baiyang Shares
14	600097	Shanghai Kaichuang Marine International Co.,Ltd	29	600467	Homek
15	601118	Hainan Rubber	30	600965	FUCHENG GROUP

[b.] Data source: collected from the financial statements of Shanghai and Shenzhen stock markets.

C. Empirical Study on the Evaluation of Financial Index Competitiveness of Listed Agricultural Companies

This paper conducted a factor analysis on the financial competitiveness of 30 listed agricultural companies in the stock markets of Shanghai and Shenzhen by utilizing SPSS22.0 statistical software and "dimensionality reduction" ideology, of which the process of analysis and its results are as follows:

1) KMO test and Bartlett test

TABLE III. KMO AND BARTLETT TEST

KMO Measure of Sampling Adequacy		.504
Bartlett sphericity test	Last time read chi-square value	519.256
	Degree of freedom	136
	Obviousness	.000

The KMO statistical coefficient and Bartlett sphericity test are the most postive indexes that determine whether or not the factor analysis can be used, of which the KMO is an important index to measure the adequacy of samples. KMO has a statistical coefficient between 0 and 1. In addition, the Bartlett sphericity test is analyzed from the correlation coefficient matrix, and is subject to the x2 distribution under certain conditions. The null hypothesis is that the correlation coefficient matrix is the identity matrix, and the obviousness of the correlation coefficient matrix can be determined by the conventional hypothesis test.

From the results of the analysis in "Table III", it can be seen that the statistical coefficient of KMO is 0.504, which is the basic condition of factor analysis. The results of Bartlett sphericity test showed that the last read chi-square was 519.256 and the obviousness level was 0.000, which is obviously smaller than the significance level. Therefore, the null hypothesis of Bartlett sphericity test can be rejected. In conclusion, factor analysis can be used to carry out related research.

2) Principal component analysis: From the analysis of Table IV, it can be found that the extracted coefficients from

the common factor variance of 17 financial indexes are all above 0.5, most of which are close to or more than 0.7. Therefore, it can be considered that the quality of the selected financial indexes is good enough to be able to explain the relevant information of the original variables better.

TABLE IV. COMMON FACTOR VARIANCE

Relevant financial indexes	Initial value	Extraction
x6	1.000	.959
x5	1.000	.958
x7	1.000	.895
x8	1.000	.906
x17	1.000	.664
x15	1.000	.812
x14	1.000	.314
x16	1.000	.694
x2	1.000	.939
x1	1.000	.943
x3	1.000	.595
x4	1.000	.762
x12	1.000	.504
x13	1.000	.922
x11	1.000	.715
x9	1.000	.658
x10	1.000	.861

From the "Table V", it can be found that the initial eigenvalues, the sums of squared loadings and the sums of squared rotational loadings of the 17 sets of financial indexes are analyzed systematically, which extracted 5 common factors and obtained relevant initial eigenvalues and variance aggregate values, of which the initial eigenvalue of the first component is 4.325; The initial eigenvalue of the second component is 3.776; The initial eigenvalue of the third component is 2.294; The initial eigenvalue of the fourth component is 1.575; The initial eigenvalue of the fifth component is 1.129. Obviously, all of the initial eigenvalues of the above five components are greater than 1. Therefore, the total contribution rate of 77.055% is extracted by selecting 5 common factors.

On the contrary, the interpretability of the total variance of the 12 common factors that were not extracted is only 22.945%. Obviously, it shows that the first five common factors provide sufficient information for the original data. In other words, the first five common factors account for approximately 77.055% of the interpretation of the total variance, which shows it has a strong interpretability and can explain the analysis result better.

TABLE V. THE INTERPRETATION OF TOTAL VARIANCE

Component	Initial eigenvalue			Extracted sum of squared loadings		
	Total	*Variance percentage*	*Aggregate value %*	*Total*	*Variance percentage*	*Aggregate value %*
1	4.325	25.441	25.441	4.325	25.441	25.441
2	3.776	22.211	47.652	3.776	22.211	47.652
3	2.294	13.494	61.146	2.294	13.494	61.146
4	1.575	9.266	70.412	1.575	9.266	70.412
5	1.129	6.643	77.055	1.129	6.643	77.055
6	1.031	6.067	83.122			
7	.784	4.611	87.733			
8	.600	3.527	91.260			
9	.573	3.373	94.633			
10	.401	2.356	96.989			
11	.273	1.605	98.594			
12	.117	.686	99.280			
13	.084	.495	99.775			
14	.027	.160	99.936			
15	.007	.040	99.976			
16	.003	.020	99.995			
17	.001	.005	100.000			
Extraction method: principal component analysis.						

After determining the main factors in the "Table V", the component matrix and scree chart of the extracted main factors can be established.

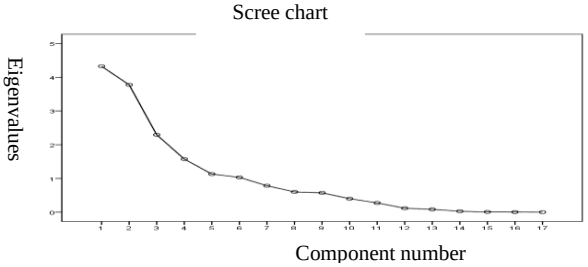

Fig. 1. The scree chart.

Obviously, in "Fig.1", it can be found that the relative slope of the curve reflected by the first 5 factors is relatively steep. Therefore, it can be said that the first 5 factors can reflect the overall information to a certain extent. In conclusion, the extracted factors can be identified as the main component factors.

TABLE VI. COMPONENT MATRIX [A]

Relevant financial index	Component				
	1	*2*	*3*	*4*	*5*
x6	.193	-.936	.187	-.009	.100
x5	.220	-.934	.106	-.005	.164
x7	-.638	.516	.414	-.008	.221
x8	-.680	.500	.370	.038	.236
x17	.691	.198	-.245	.140	.259
x15	.150	.124	-.463	-.351	.661
x14	-.086	.030	-.032	-.315	-.454
x16	.645	-.033	-.498	.077	-.149
x2	.688	.440	.425	-.301	.022
x1	.765	.387	.338	-.305	-.010
x3	.189	-.190	.649	.318	.041
x4	-.426	.055	-.003	.759	.024
x12	-.218	.018	-.579	.102	-.332
x13	.220	-.866	.329	.095	.083
x11	.468	.248	-.364	.469	.287
x9	.650	.276	.311	.139	-.206
x10	.658	.429	.165	.454	-.107

Extraction method: principal component analysis. a. 5 components has been extracted.

"Table VI" can be established through analysis, in which (as shown in "Table VI") it can be found that the loadings of quick ratio, cash ratio, operating profit growth rate and return on invested capital of each component are significantly different. Especially among component 1, component 2 and component 4, it can be seen their loadings varies greatly, which further explained that the economic meaning of the relevant components is difficult to name.

For this, it is necessary to rotate through varimax rotation to better carry out the naming of the economic meaning of the components. Therefore, the factor loading matrix "Table VII" is obtained through varimax rotation.

TABLE VII. THE ROTATED COMPONENT MATRIX [A]

Relevant financial index	Component				
	1	*2*	*3*	*4*	*5*
x6	-.107	.958	.162	-.059	.009
x5	-.130	.946	.208	.001	-.063
x7	-.044	-.387	-.860	.018	.047
x8	-.115	-.394	-.856	.052	.052
x17	.409	-.078	.459	.487	-.206
x15	.005	-.099	.090	.285	-.844
x14	.006	-.147	.106	-.526	.069
x16	.168	-.057	.793	.161	-.087
x2	.960	-.101	.025	-.013	-.081
x1	.950	-.076	.153	-.017	-.101
x3	.329	.439	-.252	.194	.439
x4	-.479	-.136	-.224	.456	.506
x12	-.486	-.335	.369	-.127	.054
x13	-.012	.945	.087	.004	.143
x11	.121	-.205	.402	.703	-.044
x9	.698	-.058	.231	.127	.312
x10	.604	-.227	.285	.453	.397

Extraction method: principal component analysis.
Rotation method: Kaiser standardized varimax.
a. Rotation converged after 7 iterations.

The loading of the net profit rate on total assets x1 and the loading of the return rate on assets x2 respectively reached 96% and 95% in component 1. These two financial indexes reflect the profitability of the companies, therefore, they can be called as profitability factors.

The loading of the asset-liability ratio x5 and the loading of the current ratio x6 respectively reached 94.6% and 95.8% in component 2. These two financial indexes reflect the solvency of the companies, therefore, they can be called as solvency factors.

The loading of the sustainable growth rate x16 and the loading of the capital maintaining and increasing rate x17 respectively reached 79.3% and 45.9% in component 3. These two financial indexes reflect the development situation of the companies, therefore, they can be called as development ability factors.

3) Component Score Coefficient Matrix: The factor score coefficient matrix formula can be established according to the Component Score Coefficient Matrix "Table VIII". Then, combining with the standardized values of the original variables, theoretically the specific scores of various listed agricultural companies can be calculated, and then the companies can be ranked according to their scores.

TABLE VIII. COMPONENT SCORE COEFFICIENT MATRIX

Relevant financial index	Component				
	1	*2*	*3*	*4*	*5*
x6	-.014	.277	-.005	.017	-.026
x5	-.028	.277	.000	.061	-.074
x7	.044	-.044	-.312	.088	-.048
x8	.018	-.046	-.307	.116	-.045
x17	.058	-.006	.078	.268	-.138
x15	-.007	.035	-.092	.256	-.600
x14	.027	-.099	.130	-.401	.117
x16	-.025	-.070	.289	.007	.021
x2	.304	-.001	-.069	-.086	-.073
x1	.292	-.004	-.020	-.100	-.073
x3	.112	.158	-.143	.137	.223
x4	-.187	-.034	-.034	.331	.309
x12	-.188	-.167	.247	-.127	.129
x13	.013	.279	-.035	.051	.052
x11	-.054	-.044	.084	.426	-.033
x9	.183	-.029	.065	-.024	.220
x10	.116	-.071	.082	.187	.271

Extraction method: principal component analysis.
Rotation method: Kaiser standardized varimax.

III. CONCLUSION

A. Overall Situation Analysis

Through the above factor analysis on listed agricultural companies, and from the analysis on the main factors, it can be found that the overall profitability of the listed agricultural companies is relatively good, development ability is very strong, and the solvency is good. However, their asset management ability and financial competitiveness are relatively weak.

B. Relevant Suggestions

Because agriculture has the characteristics of long production cycle and slow return of money, and it is significantly influenced by factors such as seasons and weather. Therefore, this paper suggests that listed agricultural companies should change from the perspective of supply side, increase profit points diversely and speed up the operation of capital. On the one hand, from the perspective of supply side, they can extend the production chain of agricultural products to increase the related income of main business, through which they can carry out further processing on the agricultural products, so as to improve their additional value. On the other hand, from the perspective of supply side, they can extend the agricultural industry chain by realizing the integration of agricultural production, further processing of agricultural products and sales of agricultural materials, so as to change the weak position of agriculture and add more profit points to the companies, which will improve the sustainability of the company's profitability.

In addition, the listed agricultural companies should base on existing industries, establish diversified operation mode as soon as possible, constantly create their own advantage industries, and design their industrial structure scientifically and reasonably, so as to continuously improve their capital operation ability.

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