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Evaluation of Growth of Agricultural Listed Companies Based on AHP Weighting Method

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Abstract Agriculture is the foundation of national economy, and agricultural development is related to the rapid development of long-term stability of the society and economy. Agriculture includes farming, forestry, animal husbandry, and fisheries. Agricultural listed company as an agricultural enterprise "leader", which directly affects the development of the entire growth of the agricultural industry development and policy, so the study of agricultural listed company's growth is particularly important. This paper uses AHP weighting method to evaluate 2012 financial data on the growth of agricultural listed companies.

Key words AHP weighting method, Agricultural listed companies, Growth, Evaluation

1 Introduction

Agriculture is the foundation of the national economy, and the rapid development of agriculture is related to long-term stable development of society and the economy. As of April 1, 2013, a total of 40 A-share agricultural listed companies covered farming, forestry, animal husbandry, and fisheries. Agricultural listed company as an agricultural enterprise "leader", whose growth is related to the development of the agricultural sector and policies, so the study of the growth of agricultural listed companies is particularly important. This paper uses AHP weighting method to evaluate 2012 financial data on the growth of agricultural listed companies.

2 Study design

2.1 Sample selection and data sources China Securities Regulatory Commission promulgated *Listed Company Industry Classification Guideline* (2012 Revision), and China Securities Regulatory Commission released 2013 first quarter results of listed companies in the industry classification on April 1, 2013. This paper selects 40 animal husbandry and fishery listed companies in the Shanghai and Shenzhen Securities Exchange as the initial samples, 13 of which is related to farming, 5 of which is related to forestry, 11 of which is related to animal husbandry, and 10 of which is related to fisheries. We finally get 37 valid sample companies after excluding B-share listed companies. In this paper, we use cross-sectional data in 2012, the data from Sina Finance website, and additional data from Securities Star website.

2.2 Indicator selection Evaluation of growth is closely related to the selected indicators. If the selected indicators are more theoretical, the growth will be truly reflected. However, there is an overlap which is not conducive to fair assessment between growth indicators, so based on previous studies and relevant principles, this paper selects profitability, solvency, operational capability and developmental capacity concerning five listed companies to evaluate agricultural growth. The profitability indicator includes return on assets, rate of return on net assets and earnings per share; solvency includes current ratio, quick ratio and debt ratio; operational capability includes total asset turnover, inventory turnover and receivable turnover ratio; developmental capacity includes main business revenue growth, net asset growth and net profit growth; ability to get cash is the ratio of operating cash flow per share and sales of cash. A total of 14 indicators are selected, as shown in Table 1.

2.3 Research methods In this paper, AHP weighting method is used for evaluating the growth of agricultural listed companies. AHP weighting method combines the two methods of analytic hierarchy process and variance weighting method. The principles of AHP evaluation objectives are broken down into hierarchical structure of the evaluation system, and we use variance weighting method to seek a comprehensive weight evaluation method for the evaluation of the target. This approach not only makes up for the defect of AHP that many indicators in the evaluation need to pass an one-time test, but also solves the shortcoming of variance weighting method that the subjective requirements are ignored, so that the evaluation results more accurately reflect the evaluation object, and the calculation is simple. The calculation is based on various financial indicators of listed companies. In indicator layer, current ratio, quick ratio and assets and liabilities are modest targets, and others are positive indicators. We first use $Z_i = \{ \max |Z_i - S| \} - |Z_i - S|$ for calculation. Z_i is the positive indicator of an appropriate treatment and S is the theoretical optimal value. Current

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ratio, quick ratio and the theoretical optimal value of assets and liabilities used in this paper are 2, 1, and 50% , respectively. Then all the indicators are normalized.

3 Evaluation of growth of agricultural listed companies

3.1 Construction of hierarchical growth structure model of

Table 1 Hierarchical growth structure model of agricultural listed companies

Goal layer X	Criteria layer Y	Indicator layer Z	The formula
Public Division Into Long Sex X	Profitability Y_1	Return on Assets Z_{11}	The average total gross profit / assets $\times 100\%$
		Return on net assets Z_{12}	Net profit / total net assets $\times 100\%$
		earnings per share Z_{13}	Net profit / average number of ordinary shares outstanding
	Solvency	Current Ratio Z_{21}	Current Assets / Current Liabilities
		Quick Ratio Z_{22}	Assets / Current Liabilities snap
		Asset-liability ratio Z_{23}	Total liabilities / total assets $\times 100\%$
		Total asset turnover Z_{31}	Operating income / average total assets
	Trading Y_3	Inventory turnover Z_{32}	Cost of goods sold / average inventory balance
		Accounts receivable turnover Z_{33}	Operating income / average accounts receivable balance
		Main business revenue growth Z_{41}	The amount of main business revenue growth this year / last year the main business income $\times 100\%$
	Developmental ability Y_4	Net asset growth Z_{42}	Increase the amount of the net assets of the year / beginning of net assets $\times 100\%$
		Net profit growth Z_{43}	The amount of net profit growth this year / last year net profit $\times 100\%$
		Ability to get cash Cash flow from operations per share Z_{51}	Net operating cash flow / average number of ordinary shares
	Ability to get cash Y_5	Cash sales ratio Z_{52}	Net operating cash flow / main business income $\times 100\%$

3.2 Analytic hierarchy weight calculation The expert score is used for calculating the pairwise comparison between Y_4 and Y_5 and structured judgment matrix in each criteria layer Y_1 , Y_2 , Y_3 , and seeking judgment matrix characteristic root. We first calculate the overall weight of objective criteria layer α_i . The results are

Table 2 $X - Y$ judgment matrix and weight

	Profitability	Solvency	Operating capacity	Developmental capacity	Ability to get cash	α_i
Profitability	1	0.333 3	0.2	0.25	0.142 9	0.044 8
Solvency	3	1	0.333 3	0.5	0.2	0.094 3
Operating capacity	5	3	1	2	0.25	0.221 3
Developmental capacity	4	2	0.5	1	0.333 3	0.156 1
Ability to get cash	7	5	4	3	1	0.483 5

3.3 Weighting By the mean and variance of various indicators obtained, the weighting is carried out before further decentral-

Table 3 Weighting of indicator layer and criteria layer

	Profitability			Solvency			Operating capacity			Developmental capacity			Ability to get cash	
	Return on Assets	Operating margin	Earnings per share	Current Ratio	Quick Ratio	Asset-liability ratio	Total asset turnover	Inventory Turnover	Accounts receivable turnover	Main business revenue growth	Net asset growth	Net profit growth	Cash flow from operations per share	Cash sales ratio
	Z_{11}	Z_{12}	Z_{13}	Z_{21}	Z_{22}	Z_{23}	Z_{31}	Z_{32}	Z_{33}	Z_{41}	Z_{42}	Z_{43}	Z_{51}	Z_{52}
Decentralized weight	0.052 2	0.072	0.062 4	0.070 7	0.080 3	0.093 5	0.091	0.077 2	0.066 5	0.081 6	0.078 2	0.050 6	0.060 9	0.062 9

agricultural listed companies The aim of this paper is to evaluate the target layer X , namely the growth of agricultural listed companies; Y_1, Y_2, Y_3, Y_4 and Y_5 are profitability, solvency, operational capability, developmental capacity and the ability to be present in the criterion layer, respectively. 14 financial indicators are selected respectively corresponding to each evaluation criterion layer . The structured hierarchical model is shown in Table 1.

shown in Table 2. AHP further test results are as follows: $\lambda_{\max} = 5.1863$, $CI = 0.04668$, $RI = 1.12$, $CR = 0.0416 < 0.1$, passing the consistency test, indicating that the results are reasonable and credible.

ization. The results are shown in Table 3. The overall goal weight and weight of each indicator is further derived.

3.4 Calculation of composite score Based on the hierarchical analysis and weighting, we get the composite score value of growth of agricultural listed companies in descending order, as shown in Table 4.

Table 4 Composite score value of growth of agricultural listed companies

Listed companies	Scores	Rank	Category	Listed companies	Scores	Rank	Category
One hundred foreign shares	0.10787	1	Fisheries	Fortune Ng Fun	0.07081	19	Livestock
Xin Sai	0.10468	2	Agriculture	Yon Gan Forestry	0.07053	20	Forestry
Create international	0.09543	3	Fisheries	Prebiotics	0.07036	21	Livestock
Roland animal husbandry	0.09283	4	Livestock	WINALL Tech	0.06934	22	Agriculture
Deng Hai	0.08666	5	Agriculture	Western Animal Husbandry	0.06788	23	Livestock
Tian shan biological	0.08093	6	Livestock	Shen Nong Da Feng	0.06639	24	Agriculture
Huaying Agriculture	0.07968	7	Livestock	Long Ping Gao Ke	0.06554	25	Agriculture
Hainan Rubber	0.07805	8	Agriculture	People and shares	0.06215	26	Livestock
Yasheng	0.07788	9	Agriculture	ZhangZi Dao	0.0615	27	Fisheries
New Ng Fung	0.07605	10	Livestock	Industrial Welfare	0.06069	28	Forestry
Sunner Development	0.0757	11	Livestock	Homey	0.05972	29	Fisheries
One Bridge fry	0.07517	12	Fisheries	East Ocean	0.05959	30	Fisheries
Water fisheries	0.07374	13	Fisheries	Xinnongkaifa	0.05738	31	Agriculture
Great Northern Wilderness	0.07369	14	Agriculture	Great Lakes shares	0.0562	32	Fisheries
Fengle Seed	0.07285	15	Agriculture, forestry, animal husbandry and fishery service	Eagles farming	0.05618	33	Livestock
				Fujian Higginson	0.0512	34	Forestry
Denon universal	0.07271	16	Agriculture	Guolian aquatic product	0.04967	35	Fisheries
Galaxy biological	0.07141	17	Agriculture	Luo Niu Shan	0.04758	36	Livestock
Dun Huang Seed	0.07131	18	Agriculture	Pear shares	0.03102	37	Agriculture

4 Conclusions

Agriculture is the foundation of national economy, and agricultural development is related to the rapid development of long-term stability of the society and economy. Agriculture includes farming, forestry, animal husbandry, and fisheries. Agricultural listed company as an agricultural enterprise "leader", which directly affects the development of the entire growth of the agricultural industry development and policy, so the study of agricultural listed company's growth is particularly important. This paper uses AHP weighting method to evaluate 2012 financial data on the growth of agricultural listed companies. From the ranking of growth value of the 37 agricultural listed companies covering farming, forestry, animal husbandry and fisheries, it is found that among top 10 companies, 4 are related to farming, accounting for 30.8% of farming classes, 4 are related to animal husbandry, accounting for 36.7% of animal husbandry classes, and 2 are related to fishery, accounting for 22.2% of fishery classes. Animal husbandry, farming and

fishery show good growth momentum, but there are differences in the growth of listed companies between different areas.

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