

## Research Article

### Relationship Analysis between Profitability and Capital Structure of the Food Industry Listed Companies

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**Abstract:** This study aims to analyze the relation between profitability and capital structure of the food industry listed company and improve their capital structure. According to income rank of the food industry listed companies in China on August 1, 2014, provided by Chinese commerce intelligence network, this study makes a study on the growth level and operating status of the food industry listed companies from their panel data of third quarter report in 2014 and the profitability of enterprises is one of the important content of corporate financial analysis; corporate capital structure directly affects the business performance and long-term development. This study selects 4 indicators which mainly affect the profitability of enterprise, uses the method of factor analysis to make the comprehensive evaluation score on the 21 representative food industry listed companies in China, and carries on the correlation analysis and regression analysis to the assets and liabilities rate of the enterprise which is a main index to reflect the capital the structure, obtains the relationship between profitability and capital structure of the food industry listed companies.

**Keywords:** Capital structure, food industry listed companies, profitability, relationship

## INTRODUCTION

Food industry is a production department which process and manufacture products produced by the agriculture, forest, animal husbandry, vice, fishery department to obtain food. It is very important to everyone for its close relation with people's life. A strong profitability is a key performance element of food industry listed companies. From the point of view of the food industry development, the listed companies have an important role in promoting the structural upgrading of the food industry market. However, at present, the food industry listed companies in China have not played a leading role in the food industry; the overall profitability has been the general level. Therefore, the paper launches its development research from the perspective of food industry listed companies' profit.

A large number of scholars had investigated and studied the China's industry profitability of listed companies (Hu, 2013; Huang, 2008; Li and Wang, 2003; Lin *et al.*, 2004; Liu, 2012; Lv and Yi, 2012; Xin and Yang, 2011). More research has concluded that the company size, capital structure, ownership structure and corporate risk have a significant impact on the company's profitability through experience empirical test data. In terms of profitability, many scholars believe that the performance of listed companies in China's food industry rely on the support policies,

which is subject to the impact of very large. So the policy support has become an important indispensable factor support for the food industry listed companies to achieve good performance. This study thinks the food industry listed companies should strengthen their competitiveness and improve profitability, and study the relationship between profitability and capital structure of the food industry listed companies, in order to increase profitability of food industry listed companies.

## CORPORATE PROFITABILITY AND CAPITAL STRUCTURE CONSTITUTE

Corporate profitability refers to the ability of companies to earn profits, corporate marketing capabilities, and the ability to obtain cash, the ability to reduce costs and avoid the risk of other comprehensive ability to reflect. All the related people, including the investors, creditors and business managers, are concerned about the growing importance and profitability of enterprises. Based on the balance sheet, income statement, profit distribution table, the financial analysis profitability mainly constructs a set of indicators system through logical relationship between each item in the table, then calculate the value of the index and corporate profitability analyses is general from production operations, asset profitability. Production operations to achieve profitability reflects

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Table 1: The basic information of 21 food industry listed companies

ID	Stock code	Name of the listed companies
C <sub>1</sub>	600887.SH	Inner Mongolia Yili Industrial Group Co., Ltd.
C <sub>2</sub>	603288.SH	Foshan Haitian Flavouring and Food Co., Ltd.
C <sub>3</sub>	002570.SZ	Beingmate Baby and Child Food Co., Ltd.
C <sub>4</sub>	600429.SH	Beijing Sanyuan Foods Co., Ltd.
C <sub>5</sub>	002216.SZ	Sanquan Food Co., Ltd.
C <sub>6</sub>	600298.SH	Angel Yeast Co., Ltd.
C <sub>7</sub>	600186.SH	Henan Lotus Flower Gourmet Powder CO., LTD.
C <sub>8</sub>	002650.SZ	Jiajia Food Group Co., Ltd.
C <sub>9</sub>	300146.SZ	By-health Co., Ltd.
C <sub>10</sub>	000716.SZ	Nanfeng Black Sesame Group Co., Ltd.
C <sub>11</sub>	002661.SZ	Kemen Noodle Manufacturing Co., Ltd.
C <sub>12</sub>	002329.SZ	Royal Group Co., Ltd.
C <sub>13</sub>	600866.SH	Guangdong Zhaoqing Starlake bioscience co.,inc.
C <sub>14</sub>	002507.SZ	Chongqing Fuling Zhacai Group Co., Ltd.
C <sub>15</sub>	002481.SZ	Yantai Shuangta Food Co., Ltd.
C <sub>16</sub>	002626.SZ	Xiamen Kingdomway Group Company
C <sub>17</sub>	002719.SZ	Maiquer Group Co.,Ltd.
C <sub>18</sub>	300381.SZ	Guangdong Vtr Bio-Tech Co., Ltd.
C <sub>19</sub>	002495.SZ	Guangdong Jialong Food Co., Ltd.
C <sub>20</sub>	300149.SZ	Quantum Hi-Tech (China)Biological Co., Ltd.
C <sub>21</sub>	600419.SH	Xinjiang Tianrun Dairy Co., Ltd.

the profit per hundred the number of sales made, which is mainly represented by a net profit margin on sales and gross profit margin on all sales. Asset use efficiency is a measure of the profitability of corporate assets, reflecting the effect of the investment on the whole; only when it is higher than the social average profit margin, the company's development will be in a favorable position and this capability uses rate of return on common stockholders' equity (ROE) and profit rate to net worth to represent.

Under normal circumstances, capital structure consists of long-term debt capital and equity capital. This study uses the asset-liability ratio to reflect the company's capital structure, which reflects the proportion of funds from creditors, as well as the extent of corporate assets to protect the interests of creditors in the enterprise total assets.

#### TO SELECT EVALUATION INDICATORS AND SAMPLE DATA

In this study, food industry listed companies referred to the listed companies which are only engaged in food industry, excluding forestry, animal husbandry and fisheries listed companies. According to the data statistics provided by Chinese commerce intelligence network in China on August 1, 2014, there are 26 food industry listed companies which are chose to be made the research via the ranked income, and report data of 5 companies are not complete, finally 21 effective samples of food industry listed companies could be obtained. With the help of statistical software, the paper uses factor analysis to study the relationship among the four corporate profitability indicators: Net Profit Margin on Sales ( $X_1$ ), Profit Rate to Net Worth ( $X_2$ ), ROE ( $X_3$ ), gross profit margin on all sales ( $X_4$ ), and then a comprehensive evaluation index of corporate earnings ( $Z$ ) could be got and finally the correlation and regression analysis are used to study the relation between the comprehensive evaluation index ( $Z$ ) and the asset-liability ratio ( $X$ ) which reflects the debt ratio

and capital structure. The ticker symbol and company name of the 18 food industry listed companies selected are shown in Table 1. Their panel data of third quarter report in 2014 are used to analyze and specific indicators data are shown in Table 2.

#### DATA PROCESSING OF SELECTED SAMPLE

This study is mainly using principal component analysis method for analysis of sample data, in which the statistical software is used.

**To conduct sample validity:** As can be seen from Table 3, the results of KMO test is 0.780, which is far greater than 0.5, this shows that this case is suitable for factor analysis and the Bartlett test of sphericity Sig. is 0.000, which is far smaller than 0.05, this shows hypothesis is established that independent of the variables are rejected.

**To extract the main factor:** By means of STATISTICAL software, factor analysis is made. Firstly, the elementary factor loading matrix can be obtained via the extraction method of principal component analysis. Secondly, the total explained variance in Table 4 can be obtained via the rotation method of varimax with Kaiser Normalization. As can be shown at the Table 4, the contribution of the first main factor was 60.460%, and the contribution of the second main factor was 32.809%. According to the principle that cumulative contribution rate is greater than or equal to 85%, so this study selects first main factor and second main factor to represent all the information of the original variables.

**To calculate the overall score of the profitability:** According to component score coefficient matrix and standardized value of the original variable, the overall score of the first main factor and the second main factor can be obtained, which are represented by the symbol

Table 2: The indicator data from third quarter report in 2014 of 21 food industry listed companies

ID	X <sub>1</sub> (%)	X <sub>2</sub> (%)	X <sub>3</sub> (%)	X <sub>4</sub> (%)	X (%)
C <sub>1</sub>	8.5	9.980	20.35	33.09	53.27
C <sub>2</sub>	21.06	20.26	25.00	40.61	17.70
C <sub>3</sub>	3.730	2.580	3.540	58.66	24.75
C <sub>4</sub>	2.980	2.640	6.970	24.28	58.23
C <sub>5</sub>	2.390	2.110	3.900	34.46	38.61
C <sub>6</sub>	5.300	2.260	4.460	29.50	51.05
C <sub>7</sub>	-8.89	-5.03	-24.86	3.690	83.56
C <sub>8</sub>	9.370	4.960	6.470	29.50	29.95
C <sub>9</sub>	34.56	18.71	21.23	66.18	8.890
C <sub>10</sub>	5.470	3.510	5.940	29.28	39.20
C <sub>11</sub>	5.760	6.180	8.880	21.02	31.52
C <sub>12</sub>	5.220	3.090	4.080	28.02	34.04
C <sub>13</sub>	-37.69	-9.34	-16.46	10.91	43.13
C <sub>14</sub>	18.01	10.06	12.34	45.49	17.68
C <sub>15</sub>	13.61	5.790	10.67	23.11	48.14
C <sub>16</sub>	24.80	10.23	10.81	43.07	6.10
C <sub>17</sub>	14.85	5.93	7.74	41.54	17.14
C <sub>18</sub>	15.68	8.16	8.13	64.02	11.58
C <sub>19</sub>	11.87	3.28	3.39	36.99	2.77
C <sub>20</sub>	13.39	2.64	5.09	45.31	5.23
C <sub>21</sub>	7.21	3.97	5.68	23.11	39.20

Table 3: KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.780
Bartlett's test of Sphericity	Approx. $\chi^2$	68.125
	df	6
	Sig.	0.000

Table 4: Total variance explained

Component	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.262	81.555	81.555	3.262	81.555	81.555	2.418	60.460	68.408
2	0.469	11.715	93.269	0.469	11.715	93.269	1.312	32.809	93.269
3	0.196	4.9020	98.171						
4	0.073	1.8290	100.000						

Table 5: Component score coefficient matrix

Variable	Component	
	1	2
X1	0.270	0.110
X2	0.498	-0.226
X3	0.545	-0.315
X4	-0.491	1.192

Z<sub>1</sub> and Z<sub>2</sub> that can be calculated by the Eq. (1) and (2) below:

$$Z_1 = 0.270 * ZX_1 + 0.498 * ZX_2 + 0.545 * ZX_3 - 0.491 * ZX_4 \quad (1)$$

$$Z_2 = 0.110 * ZX_1 - 0.226 * ZX_2 - 0.315 * ZX_3 + 1.192 * ZX_4 \quad (2)$$

$$Z = (60.460 * Z_1 + 32.809 * Z_2) / 93.269 \quad (3)$$

where, component score coefficient matrix is shown on the Table 5, ZX<sub>i</sub> (i = 1, 2, 3, 4) represents standardized value of the original variable X<sub>i</sub> (i = 1, 2, 3, 4), Z represents the overall score of profitability, which is calculated via the Eq. (3). So the overall score of profitability of 18 food industry listed companies can be obtained, which are shown at the Table 6.

Table 6: The overall score of profitability of 18 food industry listed companies

ID	Z <sub>1</sub>	Z <sub>2</sub>	Z
C <sub>1</sub>	0.54351	1.10844	0.74223
C <sub>2</sub>	1.49482	2.13183	1.71890
C <sub>3</sub>	0.07598	-1.17698	-0.36477
C <sub>4</sub>	-0.37863	0.04808	-0.22853
C <sub>5</sub>	-0.3366	-0.4719	-0.38419
C <sub>6</sub>	-0.33252	-0.22296	-0.29398
C <sub>7</sub>	-2.10436	-1.71714	-1.96815
C <sub>8</sub>	-0.07699	0.16121	0.00680
C <sub>9</sub>	1.99876	1.29493	1.75118
C <sub>10</sub>	-0.23843	-0.04391	-0.1700
C <sub>11</sub>	-0.16492	0.56708	0.09257
C <sub>12</sub>	-0.32983	-0.1346	-0.26115
C <sub>13</sub>	-2.55625	-2.40388	-2.50265
C <sub>14</sub>	0.7256	0.51412	0.65121
C <sub>15</sub>	0.05666	0.71358	0.28774
C <sub>16</sub>	0.79499	0.65641	0.74624
C <sub>17</sub>	0.29694	0.03160	0.20360
C <sub>18</sub>	0.77041	-0.45884	0.33800
C <sub>19</sub>	-0.06486	-0.30389	-0.14894
C <sub>20</sub>	0.11007	-0.49570	-0.10302
C <sub>21</sub>	-0.28434	0.202510	-0.11308

**To make correlation analysis:** By the STATISTICAL software, the closeness of the relationship between the profitability (Z) and the asset-liability ratio (X) of food

Table 7: The outcome of regression analysis

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. Error	$\beta$	t	Sig.
1	(Constant)	0.807	0.333		2.425	0.025
	X	-0.026	0.009	-0.551	-2.880	0.010

industry listed companies will be studied. It is clear that Pearson correlation between Z and X is -0.551 and Sig. (2-tailed) is 0.01, which is bigger than 0.05. The above data demonstrate the correlation between profitability (Z) and asset-liability ratio (X) is not very obvious.

**To perform the regression analysis:** Regression analysis is used to investigate the number's business impact on the profitability (Z) from the assets and liabilities (X). Let profitability (Z) as the dependent variable and let the assets and liabilities (X) as independent variables to perform the regression and the results are shown in Table 7. So the regression equation of factor analysis is seen on the equation (4), the constant term 0.807 passes the test at the significance level of 0.333 and the coefficient term -0.026 passes the test at a significance level of 0.009. The above analysis is content with actual fact.

$$Z = 0.807 - 0.026x \quad (4)$$

### CONCLUSION

Through the correlation analysis and regression analysis of asset-liability ratio and corporate profitability of the selected sample on food industry listed companies, it showed that there is a slight negative correlation between the profitability of the enterprises and their assets and liabilities, that is to say, the capital structure of the food industry listed companies profitability will produce a slight affected to the overall profitability.

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### REFERENCES

- Hu, Y.M., 2013. Capital structure adjustment speed of food industry listed companies. *Friends Account.*, 29: 4-14.
- Huang, C.Y., 2008. Demonstration analysis on the profit status of agricultural listed companies and its influencing factors in China. *J. Anhui Agr. Sci.*, 36: 1226-1228.
- Li, B.R and Z.R. Wang, 2003. Empirical analysis of profitability and capital structure of our country' listed company. *J. Quant. Tech. Econ.*, 4: 150-153.
- Lin, H.M., M.Z. Lin and J.H. Ding, 2004. Empirical analysis of profitability and capital structure of our country' listed company. *J. Quant. Tech. Econ.*, 9: 1-5.
- Liu, Y.A., 2012. The empirical study on profitability of China's agricultural listed companies and its influence factors. M.Sc. Thesis, Department of Bussiness Management, Shandong University, pp: 36-46.
- Lv, S.S and J.B. Yi, 2012. The profitability research of the agricultural listed companies in China. *Friends Account.*, 5: 82-86.
- Xin, H.H and W.J. Yang, 2011. Profitability analysis of agricultural listed companies. *Commun. Financ. Account.*, 5: 110-111.