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**Research Article**

# Empirical Research on Growth of Listed Companies in Food Industry

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**Abstract:** This study uses empirical research method to analyze the growth of listed food companies in order to provide a new analytical method for the theoretical study of company growth. Meanwhile, this study offers valuable references about strategic development decisions for the listed food companies as well. As one of the main components, the food industry supports the growth of China's national economy. This study focuses on the characteristics of food industry. It studies the relationship between capital structure and growth of listed companies in food industry through financial ratios and empirical approaches. Firstly, listed companies from the A-share and none special treatment market in Shanghai and Shenzhen stock exchange within year 2011 to 2013 are chosen as research subjects. Next, nineteen test indexes, from seven factors, such as profitability, debt-paying ability, operating capacity, cost management ability, development capacity, Marketing capability and innovation capacity, are selected to construct the enterprise appraisal model based on factor analysis. The dependent variables of the model are seven test indexes picked from aspects of profitability, debt-paying ability and operating capacity. Finally, this study draws the conclusion that the listed food companies' profitability and debt-paying ability have a negative relationship with the firms' growth ability. However, there is a positive relationship between their operating capacity and growth ability.

**Keywords:** Enterprise growth, factor analysis, food industry, regression analysis

## INTRODUCTION

The growth of enterprises is the source of the economic growth of the society. Currently, the contribution of food industry for GDP has a 10% increase every year. The scale of the industry has been extended as well. However, since the quality of product failed to be guaranteed, the food safety issues appeared frequently, which cause devastating loss to some large food enterprises. In essence, the food enterprises have limited knowledge about what factors impact their growth rate; thus, they cannot develop a strategy for their long term development. Therefore, this research, which focuses on the growth of listed food companies, is not only beneficial to firms' strategy formulation and execution, but also result in better comparison among the listed companies. Consequently, the topic has high value on theoretic research.

According to Marshall (1920), the principle how a enterprise grow is similar to the law how a tree grows up in the forest. In other words, the enterprise's growth rate would keep increasing until meeting the critical point. The point is the turning point from rise to decline. Stigler (1951) analyzed the general rule of enterprise growth in the perspective of industry life cycle. He proposed that firms achieved growth target by internal division of labor in initial stage's development; however, as market extended, firms has to enlarge their size by increasing the degree of specialization at this stage. The number of firms would increase as well. Davidsson and Wiklund (2001) use sales as the enterprise growth. Based on theory of industrial Organization, Sleuwaegen and Goedhuys (2002) investigate the correlation among labor demand, business growth and industrial evolution; then illuminated how industrial organization impacted firm development.

So far, the theoretical study of enterprises growth has not formed a complete system in China. For the analysis of growth ability to the listed companies in food industry, there is no unified research at present. According to the available literature, several typical analysis are listed below.

Jing *et al*. (2005) established a new growth evaluation model for 18 small and medium-sized enterprises. Then principal component analysis was used to analyze the data. Wang *et al*. (2006) conducted empirical research of entity growth. He chose cause and effect chain in BSC as research approach and Analytic Network Process as evaluation method. Hejie and Bicheng (2007) combined Analytic Hierarchy Process and Grey Relationship Analysis Method in their empirical research of middle and small-sized enterprises sustainable growth evaluation; furthermore,

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they also take harmonious society building and ecological conservation index into consideration. Xingcun and Furong (2009) proposed that the Fisher Model in Discriminant Analysis could predict firm growth effectively. Qiusheng *et al*. (2010) and other scholars evaluated 30 listed companies in Communications industry by analyzing thirteen financial indexes from six aspects, such as profitability, operating capacity, debt-paying ability, development capacity, ownership structure and company scale.

Based on the characteristics of the food industry, this study established the food industry enterprises growth evaluation system and tried to analysis the specific indicators' explanatory power of food enterprise enterprises growth.

## MATERIALS AND METHODS

This study evaluates the growth opportunity of listed food companies by factor analysis and regression analysis. The detailed process contains two procedures. Firstly, seven kinds of indexes which reflect corporation growth are primarily picked and their principal components are analyzed. After that, multivariate linear regression analysis method is used to identify the relationship between enterprise growth and the influencing factors; then test what specific variables influence the listed companies' growth.

**Factor analysis:** Factor analysis was proposed by Hoteling (1933). It is a multivariate analysis method using dimensionality reduction. The method has several advantages below. First of all, factor analysis is a mathematical model using a few factors to explain the relationship between the relevant variables. The independent factors strongly support the index's explanation for enterprises' growth. In addition, the method eliminates the same information among different indexes in order to quantify the index value. Finally, the evaluation result turns out to be accurate and objective on account of the method which reduce the impact from subjective factors. Therefore, the listed food companies' comprehensive growth rate can be effectively evaluated by factor analysis.

**The principle of factor analysis:** Assuming the sample size is n, the original variables are $X_1$, $X_2$… $X_n$ and the original variables can be classified as a series of common factors ($F_1$, $F_2$… $F_P$). The matrix composed by all factors in the factor model above called factor loading matrix:

$$x = \begin{bmatrix} x_{11} & x_{12} & x_{13} & \cdots & x_{1p} \\ x_{21} & x_{22} & x_{23} & \cdots & x_{2p} \\ x_{31} & x_{32} & x_{33} & \cdots & x_{1p} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & x_{n3} & \cdots & x_{np} \end{bmatrix} = (X_1 X_2 \cdots X_p)$$

Combine vectors ($X_1$, $X_2$, …, $X_p$) as linear combination below:

$$\begin{cases} F_1 = a_{11}X_1 + a_{21}X_2 + a_{31}X_3 \cdots + a_{p1}X_p \\ F_2 = a_{12}X_1 + a_{22}X_2 + a_{32}X_3 \cdots + a_{p2}X_p \\ F_3 = a_{13}X_1 + a_{23}X_2 + a_{33}X_3 \cdots + a_{p3}X_p \\ \cdots\cdots \\ F_p = a_{1p}X_1 + a_{2p}X_2 + a_{3p}X_3 \cdots + a_{pp}X_p \end{cases}$$

In order to facilitate the analysis, the coefficient $a_i = (a_{1a}, a_{2a}, a_{3a}, \ldots a_{pa})$ are settled as follows:

$$a_{1i}^2 + a_{2i}^2 + a_{3i}^2 + \cdots + a_{pi}^2 = 1 \; i = 1, 2, 3, \cdots, p$$

$a_i$ is determined by four factors:

- $F_i$ and $F_i$ ($i \neq j$, $j$ = 1,2,3, …,$p$) are uncorrelated variables, that is $Cov(F_i, F_j) = 0$
- $F_1$ has the highest variance among the linear combination ($X_1$, $X_2$, $X_3$,…, $X_p$); that is $Var(F_1) = \max_{cc=1} Var\left(\sum_{i=1}^{p} c_i X_i\right) C = (c_1, c_2, c_3, \cdots, c_p)$
- $F_2$ has the highest variance among the linear combination ($X_1$, $X_2$, $X_3$,…, $X_p$) that unrelated with $F_1$; $F_3$ has the highest variance among the linear combination ($X_1$, $X_2$, $X_3$,…, $X_p$) that unrelated with $F_1$, $F_2$; $F_1$, $F_2$, $F_3$, $F_p$ has the highest variance among the linear combination ($X_1$, $X_2$, $X_3$,…, $X_p$) that unrelated with $F_1$, $F_2$, $F_3$, …$F_{p-1}$. In other words
- $F_j = a_{j1}X_1 + a_{j2}X_2 + a_{j3}X_3 + \ldots + a_{jp}X_p$, $j$ = 1,2,3, …,$m$. The principal components are comprehensive vectors ($F_1$, $F_2$, $F_3$, …, $F_p$) that compile with the requirements above. Variance is used to measure how much information every main component extract. Moreover, the information that extracted from the original index decreased in the p main components.
- Next, put the standardized data into formula and generate the score of n main components. Thus, the comprehensive score of P samples is received based on the formula; that is $F = a_1F_1 + a_2F_2 + a_3F_3 + \ldots a_mF_m$., $F_j$ and $a_j$($j$ = 1,2,3, …,$m$) are the formula's main divisor and weight of indices.

**Regression analysis:** In statistics, regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. The analysis is widely used for prediction and forecasting. It is also used to understand which among the independent variables are related to the dependent variable and to explore the forms of these relationships. The steps of the analysis are listed as follows:

**Determine the variables:** The dependent variable is depended on the predicted target. The independent variables are selected among the main influencing factors.

**Construct the prediction model:** Build the regression equation based on the statistics of the dependent and independent variables. The equation is also called regression analysis and prediction model.

**Analyze correlation:** Work out the relativity coefficient of correlation. The size of the figure determined how the dependent and independent variables interrelated. The regression equation is useful unless that there is a connection between the dependent and independent variables.

**Calculate the margin of error:** Whether the model is useful in real world prediction depends on the tested result of the model and the margin of error.

**Determine the predicted value:** Do a comprehensive analysis of the predicted value and work out the ultimate one.

**Research hypothesis:** Based on the previous studies on the capital ability and enterprise growth of listed companies in food industry, the following hypotheses are proposed.

**Hypothesis 1:** The profitability and enterprise growth of listed companies in food industry are positively related.

**Hypothesis 2:** The debt-paying ability and enterprise growth of listed companies in food industry are negatively related.

**Hypothesis 3:** The operational capacity and enterprise growth of listed companies in food industry are positively related.

## RESULTS AND DISCUSSION

**Sample selection:** Listed food companies from the A-share and none special treatment market in Shanghai and Shenzhen stock exchange within year 2011 to 2013 are chosen as research subjects. The purpose of the research is study the growth of China's listed food companies. There are 101 listed food firms in the market till the end of the year 2013. The data relates to the newly listed and the delisted stocks are removed for the purpose of guarantee the accuracy of the research. Meanwhile, in order to keep the data's integrity and continuity, the researchers get rid of the companies whose data is incomplete. Finally, follow the sample selection requirements above, 77 listed food enterprises are chosen as research objects.

**Data sources:** The source of the data in this study comes from two sources:

- The CAMR database provided by CSMAR Solution
- The published annual report from Shanghai and Shenzhen stock exchange

**Factor analysis:**

**Index selection:** This study selected 19 evaluation indexes from seven factors, such as profitability, debt-paying ability, operating capacity, cost management ability, development capacity, marketing capability and innovation capacity. Details are shown in Table 1.

Table 1: Description of index

| Index type | Symbol | Index name | Formula |
|---|---|---|---|
| Profitability | $X_1$ | Operating net profit margin | Net profit/revenue |
| | $X_2$ | Return on equity | Net profit/average net assets |
| | $X_3$ | Return on total assets | Net profit/average total assets |
| | $X_4$ | Gross profit rate | (revenue-operating cost)/revenue |
| | $X_5$ | Earnings per share | (gross profit-preferred stock dividend)/period-end total equity |
| Debt-paying ability | $X_6$ | Current ratio | Liquid assets/current liabilities |
| | $X_7$ | Quick ratio | Quick assets/liquid liabilities |
| | $X_8$ | Cash ratio | Cash and cash equivalents/liquid liabilities |
| | $X_9$ | Debt asset ratio | Total assets/total liabilities |
| Operational capacity | $X_{10}$ | Inventory turnover ratio | Operating cost/average inventories |
| | $X_{11}$ | Payable turnover ratio | Revenue/average accounts receivable |
| | $X_{12}$ | Current assets turnover ratio | Revenue/average liquid assets |
| | $X_{13}$ | Total asset turnover ratio | Revenue/average total assets |
| Cost control ability | $X_{14}$ | Ratio of profits to cost | Revenue/(operating cost+selling expenses+administrative expenses+financial expenses) |
| Development capability | $X_{15}$ | Total assets growth rate | (period-end total assets-period-beginning total assets)/period-beginning total assets |
| | $X_{16}$ | Rate of capital accumulation | (period-end shareholders' equity-period-beginning shareholders' equity)/period-beginning shareholders' equity |
| | $X_{17}$ | Revenue growth rate | (current revenue-period-beginning revenue)/period-beginning revenue |
| Marketing ability | $X_{18}$ | Ratio of expenses to sales | Marketing expenses/main business income |
| Innovative capability | $X_{19}$ | Intangible assets ratio | Intangible assets/total assets |

Table 2: KMO and Bartlett's test

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin measure of sampling adequacy | | 0.600 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 3423.955 |
| | df | 171 |
| | Sig. | 0.000 |

Table 3: Total variance explained

| | Initial eigenvalues | | | Extraction sums of squared loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.956 | 20.822 | 20.822 | 3.956 | 20.822 | 20.822 |
| 2 | 3.110 | 16.368 | 37.190 | 3.110 | 16.368 | 37.190 |
| 3 | 2.540 | 13.370 | 50.561 | 2.540 | 13.370 | 50.561 |
| 4 | 1.666 | 8.767 | 59.328 | 1.666 | 8.767 | 59.328 |
| 5 | 1.447 | 7.618 | 66.946 | 1.447 | 7.618 | 66.946 |
| 6 | 1.133 | 5.963 | 72.910 | 1.133 | 5.963 | 72.910 |
| 7 | 0.957 | 5.037 | 77.947 | | | |
| 8 | 0.873 | 4.597 | 82.544 | | | |
| 9 | 0.798 | 4.201 | 86.745 | | | |
| 10 | 0.687 | 3.616 | 90.362 | | | |
| 11 | 0.537 | 2.826 | 93.187 | | | |
| 12 | 0.488 | 2.566 | 95.753 | | | |
| 13 | 0.261 | 1.371 | 97.125 | | | |
| 14 | 0.223 | 1.174 | 98.298 | | | |
| 15 | 0.141 | 0.741 | 99.039 | | | |
| 16 | 0.071 | 0.374 | 99.413 | | | |
| 17 | 0.056 | 0.296 | 99.708 | | | |
| 18 | 0.039 | 0.206 | 99.915 | | | |
| 19 | 0.016 | 0.085 | 100.000 | | | |

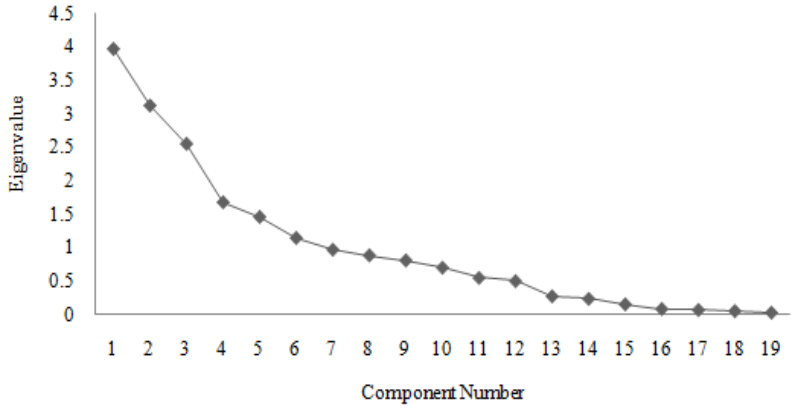


Fig. 1: Scree plot

These indexes are used to evaluate the growth of listed food companies.

**KMO and Bartlett's test:** Use SPSS19.0 to calculate the enterprises growth of listed companies in food industry. According to Table 2, the KMO is 0.600, which illustrate the correlation between indicators. Bartlett's test value is 3423.955 (Sig. = 0.000), it get through the significant inspection.

**Total variance explained:** Factor analysis uses principal component analysis to extract factor variables, select factors with eigenvalues greater than 1 as the final main ingredient. The results are shown in Table 3.

From Table 3, six factors explained 72.910% of the variance among the 19 variables. After extracting the first six factors as the common factor, the scree plot is generated according to the calculated characteristic roots. Figure 1 showed that the characteristic roots of the six factors are greater than 1.

**Rotated component matrix:** According to Table 4, the first characteristic factor's positive load is larger on quick ratio ($X_7$), current ratio ($X_6$) and cash ratio ($X_8$), the negative load is smaller on debt asset ratio($X_9$), which indicate that the first factor represents the company's debt-paying ability. The positive load of second characteristic factor's is larger on ratio of expenses to sales ($X_{14}$), earning per share ($X_5$) and return on total assets ($X_3$), indicating that the second factor represents the company's cost control ability and profitability. The third characteristic factor's positive

Table 4: Rotated component matrix

| | Component | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| $X_7$ | 0.976 | 0.001 | -0.041 | 0.01 | -0.005 | -0.013 |
| $X_6$ | 0.975 | 0.008 | -0.042 | 0.038 | -0.019 | 0.003 |
| $X_8$ | 0.961 | 0.042 | -0.025 | 0.025 | -0.029 | -0.028 |
| $X_9$ | -0.647 | -0.303 | 0.017 | -0.133 | -0.013 | -0.28 |
| $X_{19}$ | -0.291 | -0.22 | -0.105 | 0.261 | -0.21 | 0.095 |
| $X_{14}$ | 0.102 | 0.937 | 0.068 | -0.144 | -0.085 | 0.07 |
| $X_5$ | 0.019 | 0.885 | 0.055 | 0.022 | 0.069 | 0.005 |
| $X_3$ | 0.085 | 0.816 | 0.016 | 0.032 | 0.234 | -0.093 |
| $X_{13}$ | -0.067 | 0.057 | 0.944 | 0.093 | 0.012 | -0.015 |
| $X_{12}$ | -0.075 | -0.039 | 0.94 | 0.08 | -0.013 | -0.033 |
| $X_{10}$ | 0.012 | -0.1 | 0.88 | -0.068 | -0.046 | -0.091 |
| $X_{11}$ | 0.042 | 0.269 | 0.596 | -0.125 | -0.075 | 0.049 |
| $X_{18}$ | 0.091 | 0.01 | 0.058 | 0.879 | -0.152 | 0.066 |
| $X_4$ | 0.165 | 0.643 | -0.048 | 0.662 | -0.067 | 0.059 |
| $X_1$ | 0.018 | 0.278 | 0.052 | -0.454 | -0.315 | 0.259 |
| $X_{15}$ | -0.004 | 0.237 | -0.046 | -0.067 | 0.794 | 0.121 |
| $X_{17}$ | -0.018 | -0.034 | -0.051 | -0.048 | 0.697 | 0.033 |
| $X_2$ | -0.028 | 0.02 | 0.071 | 0.014 | 0.05 | -0.801 |
| $X_{16}$ | 0.047 | -0.006 | 0.005 | 0.055 | 0.422 | 0.664 |

Extraction method: Principal component analysis; Rotation method: Varimax with kaiser normalization

load on total assets turnover ($X_{13}$) and current asset turnover ($X_{12}$) and receivables turnover ratio ($X_{10}$) is large, which means that the third factor represent the company's operational capacity. The fourth characteristic factor's positive load is larger on ratio of expenses to sales ($X_{18}$), which indicate that the first factor represents the company's marketing ability. For the fifth characteristic factor, the total assets growth rate ($X_{15}$) and revenue growth rate ($X_{17}$) is larger, indicating that the fifth factor represent the development capability. For the sixth characteristic factor, the positive load is larger on the Capital accumulation rate ($X_{16}$), indicating that the fifth factor represent the development capability of listed companies in food industry.

**Component matrix:** Use orthogonal solution to get the six factors as follows:

$$F_1 = -0.006\ X_1+0.021\ X_2-0.016\ X_3-0.016\ X_4-0.046\ X_5+0.300\ X_6+0.302\ X_7+0.295\ X_8-0.168\ X_9+0.034\ X_{10}+0.012\ X_{11}-0.003\ X_{12}-0.007\ X_{13}-0.021\ X_{14}-0.007\ X_{15}-0.005\ X_{16}+0.005\ X_{17}-0.009\ X_{18}-0.096\ X_{19}$$

$$F_2 = 0.113\ X_1+0.033+X_2+0.265X_3+0.195\ X_4+0.297\ X_5-0.054\ X_6-0.056\ X_7-0.040\ X_8-0.051\ X_9-0.056\ X_{10}+0.077\ X_{11}-0.040\ X_{12}-0.010\ X_{13}+0.320\ X_{14}+0.038\ X_{15}-0.054\ X_{16}-0.046\ X_{17}-0.025\ X_{18}-0.055\ X_{19}$$

$$F_3 = 0.007\ X_1-0.005\ X_2-0.015\ X_3-0.032\ X_4-0.007\ X_5+0.006\ X_6+0.006\ X_7+0.009\ X_8-0.010\ X_9+0.304\ X_{10}+0.198\ X_{11}+0.324\ X_{12}+0.324\ X_{13}-0.006\ X_{14}+0.007\ X_{15}+0.042\ X_{16}+0.007\ X_{17}+0.023\ X_{18}-0.038\ X_{19}$$

$$F_4 = -0.327\ X_1+0.027\ X_2+0.008\ X_3+0.399\ X_4-0.009\ X_5-0.014\ X_6-0.031\ X_7-0.023\ X_8-0.048\ X_9-0.039\ X_{10}-0.094\ X_{11}+0.060\ X_{12}+0.066\ X_{13}-0.132\ X_{14}-0.008\ X_{15}+0.046\ X_{16}+0.010\ X_{17}+0.557\ X_{18}+0.173\ X_{19}$$

$$F_5 = -0.281\ X_1+0.122\ X_2+0.129\ X_3-0.047\ X_4+0.003\ X_5+0.000\ X_6+0.010\ X_7-0.005\ X_8+0.022\ X_9+0.010\ X_{10}-0.057\ X_{11}+0.032\ X_{12}+0.043\ X_{13}-0.120\ X_{14}+0.508\ X_{15}+0.219\ X_{16}+0.467\ X_{17}-0.057\ X_{18}-0.133\ X_{19}$$

$$F_6 = 0.244\ X_1-0.653\ X_2-0.135\ X_3+0.011\ X_4-0.036\ X_5-0.034\ X_6-0.047\ X_7-0.057\ X_8-0.188\ X_9-0.032\ X_{10}+0.061\ X_{11}+0.012\ X_{12}+0.020\ X_{13}+0.032\ X_{14}+0.003\ X_{15}+0.491\ X_{16}-0.048\ X_{17}+0.052\ X_{18}+0.110\ X_{19}$$

According to Table 5, the comprehensive score model can be established:

$$F = (20.822\%\ F_1+16.368\%\ F_2+13.370\%\ F_3+8.767\%\ F_4+7.618\%F_5+5.963\%F_6)/72.910\%$$

**Regression analysis:**

**Index selection:** This study selects the growth rate of listed companies in food industry as the dependent variable and ROE ($X_2$) from profitability, current ratio ($X_6$), quick ratio ($X_7$) and debt asset ratio ($X_9$) from debt-paying ability, inventory turnover ($X_{10}$), receivables turnover ratio ($X_{11}$) and total assets turnover ($X_{13}$) from operational capacity as the independent variable. The specific variables are shown in Table 6.

Before regression analysis, test the correlation between each variable. The result shows that there is no multicollinearity, as the coefficient between independent variables is very small. Use SPSS19.0 for multiple linear regressions, the results are shown in Table 7 to 9.

**Evaluation of goodness of fit:** It is shown in Table 7 that R-Squared is 0.965, adjusted R-Squared is 0.964, which indicated that about 96% of corporate performance is explained by explaining variables.

Table 5: Scores of common factors

| | Component | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| $X_1$ | -0.006 | 0.113 | 0.007 | -0.327 | -0.281 | 0.244 |
| $X_2$ | 0.021 | 0.033 | -0.005 | 0.027 | 0.122 | -0.653 |
| $X_3$ | -0.016 | 0.265 | -0.015 | 0.008 | 0.129 | -0.135 |
| $X_4$ | -0.016 | 0.195 | -0.032 | 0.399 | -0.047 | 0.011 |
| $X_5$ | -0.046 | 0.297 | -0.007 | -0.009 | 0.003 | -0.036 |
| $X_6$ | 0.300 | -0.054 | 0.006 | -0.014 | 0.000 | -0.034 |
| $X_7$ | 0.302 | -0.056 | 0.006 | -0.031 | 0.010 | -0.047 |
| $X_8$ | 0.295 | -0.040 | 0.009 | -0.023 | -0.005 | -0.057 |
| $X_9$ | -0.168 | -0.051 | -0.010 | -0.048 | 0.022 | -0.188 |
| $X_{10}$ | 0.034 | -0.056 | 0.304 | -0.039 | 0.010 | -0.032 |
| $X_{11}$ | 0.012 | 0.077 | 0.198 | -0.094 | -0.057 | 0.061 |
| $X_{12}$ | -0.003 | -0.040 | 0.324 | 0.060 | 0.032 | 0.012 |
| $X_{13}$ | -0.007 | -0.010 | 0.324 | 0.066 | 0.043 | 0.020 |
| $X_{14}$ | -0.021 | 0.320 | -0.006 | -0.132 | -0.120 | 0.032 |
| $X_{15}$ | -0.007 | 0.038 | 0.007 | -0.008 | 0.508 | 0.003 |
| $X_{16}$ | -0.005 | -0.054 | 0.042 | 0.046 | 0.219 | 0.491 |
| $X_{17}$ | 0.005 | -0.046 | 0.007 | 0.010 | 0.467 | -0.048 |
| $X_{18}$ | -0.009 | -0.025 | 0.023 | 0.557 | -0.057 | 0.052 |
| $X_{19}$ | -0.096 | -0.055 | -0.038 | 0.173 | -0.133 | 0.110 |

Table 6: Description of specific variables

| Variable type | Index type | Index name | Symbol |
|---|---|---|---|
| Dependent variable | | Enterprise growth | F |
| Independent variable | Profitability | Net profit margin on assets | $X_2$ |
| | Debt-Paying ability | Current ratio | $X_6$ |
| | | Quick ratio | $X_7$ |
| | | Debt asset ratio | $X_9$ |
| | Operational capacity | Inventory turnover | $X_{10}$ |
| | | Receivables turnover ratio | $X_{11}$ |
| | | Total assets turnover | $X_{13}$ |

Table 7: Model summary

| Model | R | $R^2$ | Adjusted $R^2$ | Std error of estimate |
|---|---|---|---|---|
| 1 | 0.982[a] | 0.965 | 0.964 | 0.189897812 |

Predictors: (Constant), $X_{13}$, $X_9$, $X_2$, $X_{11}$, $X_7$, $X_{10}$, $X_6$

Table 8: Anova[b]

| | Model | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 222.996 | 7 | 31.857 | 883.403 | 0.000[a] |
| | Residual | 8.042 | 223 | 0.036 | | |
| | Total | 231.038 | 230 | | | |

a. Predictors: (Constant), $X_{13}$, $X_9$, $X_2$, $X_{11}$, $X_7$, $X_{10}$, $X_6$; b. The dependent variable: F

Table 9: Coefficient[a]

| | | Unstandardized Coefficients | | | | |
|---|---|---|---|---|---|---|
| | Model | B | Std Error | Standardized coefficients β | t | Sig. |
| 1 | (Constant) | 0.22 | 0.045 | | 4.905 | 0 |
| | $X_2$ | -0.035 | 0.008 | -0.058 | -4.514 | 0 |
| | $X_6$ | 0.038 | 0.016 | 0.144 | 2.317 | 0.021 |
| | $X_7$ | 0.111 | 0.019 | 0.364 | 5.965 | 0 |
| | $X_9$ | -0.339 | 0.073 | -0.072 | -4.617 | 0 |
| | $X_{10}$ | 0.047 | 0.005 | 0.197 | 10.01 | 0 |
| | $X_{11}$ | 0.053 | 0.001 | 0.597 | 41.909 | 0 |
| | $X_{13}$ | 0.25 | 0.028 | 0.177 | 8.826 | 0 |

a. The dependent variable: F. values how accurate every independent variable predict the dependent variable; The unstandardized coefficient (β) is comparable when test the variables have the same unit; However, the standardized coefficient (β) is comparable when test variables have different units; The standardized coefficient is used in this study since the variables have different units; In the regression model, if the level of significance is less than 0.05 (Sig>0.05); the independent variables do not significantly related to the dependent variable; According to the charts above, both size and year has a strong positive relationship with enterprise growth

**Analysis of variance:** It is shown in Table 8 that F test value is 883.403 and Sig is 0.000, indicating that the result of regression analysis is achieved the required level of statistical significance.

## CONCLUSION

In the micro economic point of view, firm growth is interrelate to the development of social economy. Therefore, researching the growth of the companies among the industry, especially the development of the listed companies, is beneficial to a country's both micro and macro economy. Moreover, it is better for the food companies to understand the main factors that impact their growth rate, so the firms can work out a program for the long-term development. The result of the research shows that:

The standardized coefficients of ROE ($X_2$) is -0.058 (Sig. = 0.000). Generally, company's growth rate determined by production, price and cost. However both price and cost's influence remains relatively stable. The high ROE is not able to guarantee the growth of the entity unless the volume of production keep increasing. Therefore, reject the hypothesis 1.

There is a strong positive relationship between current ratio ($X_6$) and enterprise growth (0.144), (Sig. = 0.021). It indicates that the higher the current ratio, the quicker the enterprise growth. The conclusion is opposite to the hypothesis 2. If a firm's current ratio is low, it means that the company has better solvency, which is beneficial to its growth. The standardized coefficients of quick ratio ($X_7$) is 0.364 (Sig. = 0.000), which shows a strong and significant relationship with entity growth. It means that higher quick assets proportion leads to better prospects for enterprise's development. The conclusion is opposite to the hypothesis 2.

The standardized coefficients of debt asset ratio ($X_9$) is -0.072 (Sig. = 0.000). It indicates that there is a strong negative relationship between debt asset ratio and enterprise growth. The less the debt is, the better the company growth. The result supports the hypothesis 2. In summary, the hypothesis 2 is rejected.

The standardized coefficients of inventory turnover ($X_{10}$) is 0.197 (Sig. = 0.000), receivables turnover ratio ($X_{11}$) is 0.597 (Sig. = 0.000), total assets turnover ($X_{13}$) is 0.177 (Sig. = 0.000), which is same as the expectation. The operation capacity is significantly and positively related with the growth rate of the food companies. Therefore, the hypothesis 3 is established.

In conclusion, all seven test indexes (ROE, current ratio, quick ratio, debt asset ratio, inventory turnover ratio, receivables turnover ratio and total assets turnover ratio) from three aspects (profitability, debt-paying ability and operational capacity) influence the growth of listed companies in food industry. However, according to the factor analysis and regression analysis, only the ratios from operational capacity shows significant and positive relation with enterprise growth; hence, companies in food industry should improve this factor to enhance their growth rate.

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