Empirical Analysis on The Influence of Capital Structure of Electrical Manufacturing Industry on Enterprise Value

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Abstract: Electrical manufacturing industry occupies a overriding position in the industrial chain. It is not only the rigid demand of people in daily life in the society, but also plays an important role in China's economic growth. This article selects the data of listed electrical manufacturing companies to build the index system with capital structure characteristics. In the empirical analysis, the factor analysis was conducted to extract the representative of the main factors, and the main factor and the representative value of the return on net assets for the enterprise to set up a multiple linear regression model, the improved profitability and solvency can positively promote enterprise value. On this basis, the paper puts forward some suggestions to improve the operating conditions, increase profitability and debt paying ability, and control the proportion of liabilities to increase the enterprise value.

1. Introduction

In recent years, China has maintained a stable condition in electrical appliance manufacturing industry with a certain scale has been developed. Through the adjustment of debt and equity financing in proportion, the enterprise value can be improved from the aspects of profitability, debt paying ability and balance of corporate ownership and control, which is still an area to be further explored[1].The explanatory power of industry factors for the difference of capital structure cannot be ignored. The electric appliance manufacturing industry is endowed with the characteristics of large amount of capital and the transformation of labor resources to technological resources. This paper will take the maximization of enterprise value as the goal, comprehensively discusses the specific influence of the optimization of capital structure on the improvement of enterprise value from the perspective of electrical manufacturing industry in order to theoretically enrich the existing capital structure theory. Empirical analysis on the listed companies of the electrical manufacturing industry was conducted to discuss the most suitable liability and equity structure that can improve enterprise values and adjustments on capital composition and improvement on financing channels can be achieved to improve the enterprise value in financial performance, enterprise scale and governance of companies. As a result, the electrical manufacturing industry will achieve sustained development with strong social and realistic significance.

2. Research and Design

2.1 Sample Selection and Data Sources

According to the industry classification standard in CSMAR database, this paper has chosen 248 home appliances manufacturing listed companies from CSMAR database from 2013 to 2017. The data was screened and eliminated and the samples with abnormal and incomplete information were deleted, the time range is set to 2013-2017. Under the constraints in screening conditions, 248 listed home appliances manufacturing companies from 2013 to 2017 were selected in this paper for comprehensive evaluation in sample quantity, timeliness, etc.

2.2 Variable Selection

2.2.1. Indexes of Explained Variables

Enterprise value is the explained variable in this study, which can be represented by Tobin's Q value and return on equity (ROE). This paper selects return on equity (ROE) for two reasons: First, Tobin's Q value can be obtained by the calculation of asset replacement cost, which is difficult to calculate. Secondly, China's capital market is not highly developed, so ROE is more appropriate to measure enterprise value [2].

2.2.2. Research Hypothesis

This paper will propose the following three research hypotheses:

H1: Business operation and solvency of enterprises promote positive change of enterprise value

H2: The proportion of liabilities promotes the negative change of enterprise value

H3: Profitability promotes the positive change of enterprise value

2.3 Empirical Analysis

2.3.1. Factor based analysis

2.3.1.1 Construction of indicator system

In this paper, SPSS software and factor analysis method were used to categorize the index of selected 8 indicators reflecting the characteristics of capital structure into several main factors. The construction of factor analysis indicator system is shown in Table 1.Before factor analysis, it is necessary to standardize each indicator to offset the influence of different units of indicators on the model [3].

Table 1 Index system of factor analysis

Index	Symbols	Calculation methods
Tangible asset liability	X1	• Total liabilities/total tangible assets
Ratio of liabilities to assets	X2	Total liabilities/total assets
Liquidity ratio	X3	Current assets/current liabilities
Long-term liability ratio	X4	Long-term liabilities/total liabilities
Proportion of shareholders' equity	X5	Total shareholder's equity/total assets
enterprise scale	X6	Log of total assets
rate of return on total assets	X7	(total interest + interest payments)/average total assets
Net profit growth rate	X8	Net profit in current period/margin in base period

2.3.1.2 Premise of factor analysis

This paper studies the linear correlation between variables through the size of correlation coefficient, Bartlett sphericity and KMO test, and then analyzes whether factor analysis is suitable for dimension reduction [4].

First, it can be found from the correlation coefficient matrix in Table 2 that the absolute value of five groups of coefficients is above 0.7, indicating that there is a strong correlation between variables.

Secondly, Table 3 shows that the observed value of Bartlett sphericity test is 2009.813, and the P value is 0.000, which is less than the significance level α=1%. Therefore, it can be considered that there is a significant correlation between variables.This also means that the eight indicators selected in this paper are strongly correlated with each other: tangible asset liability ratio X1, asset-liability ratio X2, current ratio X3, long-term liability ratio X4, enterprise size X6, total asset return rate X7,

and net profit growth rate X8, which can be analyzed by factor analysis [5].

Table 2 Correlation coefficient matrix

	Tangible debt ratio/x1	Asset-liability ratio/x2	Liquidity ratio/x3	Long-term liability ratio/x4	Equity ratio/x5	Enterprise scale/x6	Rate of return on total assets/x7	NPG/x8
Tangible asset liability/x1	1.000	0.953	-0.792	0.145	-0.953	0.532	-0.175	-0.114
Asset-liability ratio /x2	0.953	1.000	-0.781	0.119	-1.000	0.537	-0.143	-0.125
Liquidity ratio /x3	-0.792	-0.781	1.000	0.056	0.781	-0.383	0.187	0.075
Long-term liability ratio/x4	0.145	0.119	0.056	1.000	-0.119	0.145	-0.239	-0.033
Equity ratio/x5	-0.953	-1.000	0.781	-0.119	1.000	-0.537	0.143	0.125
Enterprise scale/x6	0.532	0.537	-0.383	0.145	-0.537	1.000	0.091	-0.107
Rate of return on total assets /x7	-0.175	-0.143	0.187	-0.239	0.143	0.091	1.000	-0.007
NPG/x8	-0.114	-0.125	0.075	-0.033	0.125	-0.107	-0.007	1.000

Table 3 Bartlett test and KMO test results

Observed value of KMO test statistics	Bartlett sphericity test		
	The approximate Chi-square	DOD	Significance
0.735	2009.813	28	0.000

2.3.1.3 Process of factor analysis on asset structure

The specific data in Table 4 are finally obtained after factor analysis of standardized data in this paper. It can be seen from Table 5 that the cumulative variance contribution rate of the three factors obtained by factor extraction is 78.305%.These three factors as a whole can explain 78.305% of the total variance. The packet content of the original variable is higher, the loss rate is lower, and the factor analysis effect is more ideal.

Table 4 Explanation table of factor total variance

Factor	Initial eigenvalue			Extract the sum of squares of loads			Sum of squares of rotating loads		
	Total	Percentage of variance	Accumulation %	Total	Percentage of variance	Accumulation %	Total	Percentage of variance	Accumulation%
1	4.037	50.463	50.463	4.037	50.463	50.463	3.940	49.249	49.249
2	1.213	15.158	65.621	1.213	15.158	65.621	1.263	15.788	65.037
3	1.015	12.684	78.305	1.015	12.684	78.305	1.061	13.268	78.305
4	0.913	11.411	89.716						
5	0.509	6.361	96.077						
6	0.255	3.185	99.262						
7	0.059	0.738	100.000						
8	-0.000	-0.000	100.000						

2.3.2 Multiple linear regression

2.3.2.1Construction of index system and modeling

In this paper, SPSS software was used to estimate and build the model 1[6] by using return on equity as the explained variable Y and three main factors: F1 enterprise comprehensive business status and solvency factor, F2 debt structure factor and F3 profitability and development ability factor as the explanatory variable. As shown in Table 5, its estimation equation is:

y=0.099+0.020F1-0.049F2+0.020F3

Table 5 Estimated coefficients of Model 1

Model		Unstandardized coefficients		Standardized coefficients	t	Significance
		B	Standard error	Beta		
1	(Constant)	0.099	0.002		47.132	0.000
	F1	0.020	0.002	-0.665	-23.188	0.000
	F2	-0.049	0.002	0.277	9.642	0.000
	F3	0.020	0.002	0.269	9.364	0.000

2.3.2.2 Significance test

Table 6 ANOVA

Mode;		Quadratic sum	DOF	Mean square	F	Significance
1	Regression	1.575	3	0.525	239.444	.000[d]
	Residual error	1.088	496	0.002		
	Total	2.663	499			

Table 6 is an ANOVA table of the model, which contains information that can be used for significance F test of the model as a whole. The statistic value of F is 239.444. When the significance level αis 5%, the critical value F is 2.584. Therefore, the statistic value F of this model is greater than the critical value. Model 1, as a whole, passed the F test and goes against the null hypothesis at the significance level of 5%. The model, as a whole, was statistically significant.

2.3.2.3 Test of goodness of fit

The goodness of fit is tested. By estimation model 1, the obtained R^2 is 0.59, which is used to measure the explanatory ability of independent variable to dependent variable in the model. The test results show that the main factors F1, F2 and F3 can explain the fluctuation of enterprise value (Y) of 58.9%. Although the fitting effect of this regression is not the best, it is still good on the whole.

2.3.2.4 Model evaluation

The last step is the evaluation process of the model. The conclusion of the influence of capital structure on enterprise value is shown in Table 7.

Table 7 Influence of capital structure on enterprise value

Projects	Index of correlation
Positively correlated with enterprise values	Business status and solvency factor F1
	Profitability factorF3
Negatively correlated with enterprise values	Debt structure factorF2

3. Conclusions and Recommendations on Policies

3.1 Conclusion

3.1.1. Corporate debt repayment and profitability can promote corporate value

To improve the operating conditions of enterprises and improving debt paying and profitability by optimizing capital structure can enhance enterprise value, which conforms to the research hypothesis [7].

3.1.2. Excessive debt will negatively inhibit the growth of enterprise value

In the electric appliance manufacturing industry, the influence of trading on equity on enterprise value is different from the theory mentioned above, which conforms to the research hypothesis.

3.2 Suggestions on Policies

3.2.1. Optimizing financial management activities to improve the awareness of capital structure management

Optimization of financial management activities can reduce the cost in human resource and time, etc. Good capital structure management can generate tax shield value and avoid financial distress [8].

In the case of the scarcity of digital talents in the field of financial management, only by applying digital technology to financial management activities can the process be truly optimized.In the regression results, the ratio of liabilities is negatively correlated with the enterprise value, which is different from the theoretical results and it indirectly reflects the lack of capital structure management awareness and ability in the electrical manufacturing industry[9].The real realization of the reform and breakthrough in the electric appliance manufacturing industry is closely related to the advanced capital structure management idea. Only by perfecting the financial management mechanism in the financing, investment and operation activities, can the enterprise value be truly improved.

3.2.2. Attaching importance to the ratio adjustment of short-term and long-term liabilities

In the result of multiple linear regression, F1, the main factor representing solvency, is in direct proportion to enterprise value. Due to the existence of tax shield effect, the value range of liabilities is within an interval. If the debt is too high, it will easily lead to financial distress; if the debt is too low, the tax credit effect is not obvious. In both cases, it may lead to the reduction of solvency and thus the loss of enterprise value. In the financing process, electrical manufacturing enterprises need to pay attention to the coordination of short-term and long-term liabilities, so as to reduce the potential risks of financing [10].

3.2.3. Diversified operation and expand the scale of the company

Under the condition that the technology and cost conditions are satisfied, the electrical manufacturing industry can realize product diversification and expand product range, thus forming scale effect and expanding enterprise scale. In the result of multiple regression, the comprehensive operation status and enterprise value of an enterprise are positively changing, while diversified operation can not only improve profitability, but also contribute to the construction of enterprise ecological environment. Under the influence of scale effect, it can expand market share, improve operation status and realize the increase of enterprise value.

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