Received: 3 Jun. 2024 | Revised: 13 Jul. 2024 | Accepted: 17 Jul. 2024 | Published online: 25 Jul. 2024
RESEARCH ARTICLE

Journal of Global Humanities and Social Sciences
2024,Vol. 5(7)246-251
DOI: 10.61360/BoniGHSS242016580703

Empirical Analysis of the Impact of Capital Structure on Firm Value — Based on the Empirical Data of High-Tech Listed Enterprises

Haiqi Jiang[1,*]
[1] *Geely University, China*

Abstract: This paper selects computer, communication and other electronic equipment manufacturing enterprises as the representative of high-tech enterprises, and takes the data of 76 listed high-tech enterprises in the industry from 2019 to 2020 as samples, and carries out empirical test and research analysis on the impact of capital structure on enterprise value. The research shows that for high-tech enterprises, there is a significant positive correlation between capital structure and enterprise value, enterprises can improve the capital structure appropriately within a reasonable range, and then promote the development of enterprises.

Keywords: capital structure; enterprise value; high-tech enterprise

1. Introduction

Since the 21st century, the relationship between scientific development and economic operation has become more and more close. Scientific and technological innovation is the core driving force of the economy and high-tech enterprises play an important role in the national economy. The sound and steady development of high-tech enterprises means that the scientific and technological strength is gradually enhanced, and it is a strong guarantee for the sustainable operation of the national economy. In the era of rapid technological development in other countries, China should provide a healthy development environment for technology-intensive enterprises, so as to gradually improve its comprehensive national strength and technological competitiveness.

With the continuous improvement of China's market and enterprise management system, enterprise value evaluation and control have gradually become an important part of the management of enterprises, which is of great significance for the stable operation and sustainable development of enterprises. The operation of an enterprise is not only affected by internal factors, but also by the external environment of the enterprise. Therefore, the enterprise value has many factors. Among them, capital structure refers to the value composition of each capital of a company, reflecting the financing mix of an enterprise, and is usually used to measure the debt ratio or leverage level of an enterprise. As an important financial index of a company, capital structure can reflect important aspects of corporate governance structure and has a non-negligible impact on corporate value. Since the financial crisis, leverage risk has received more and more attention, and the company's management gradually considers reducing leverage to reduce the business risk. From the perspective of risk, high leverage means high risk, which will lead to the decline of enterprise value. However, in recent years, many Chinese enterprises have a phenomenon of high debt preference. Enterprises believe that debt pressure can promote management to operate and invest more efficiently. In this context, the influence of capital structure on the value of high-tech enterprises is still unclear, so it is necessary to conduct research and discussion on the above issues. At the same time, China's high-tech enterprises are mainly concentrated in the fields of cloud computing, pharmaceutical manufacturing, artificial intelligence, etc. However, enterprises in different industries have different profit models, operating characteristics, etc. For different industries, the impact of capital structure on enterprise value is not necessarily completely consistent, so the comprehensive analysis of multi-industry enterprises may lead to deviations in the research results.

To sum up, this paper selects the computer, communication and other electronic equipment manufacturing industry as the research object of high-tech industry, and measures the value of science and technology innovation enterprises from the

Corresponding Author: Haiqi Jiang
Geely University, China
Email: 1991813005@qq.com

perspective of value multiplier, so as to carry out empirical test on the impact of capital structure and enterprise value.

2. Literature Review and Hypothesis Proposal

2.1. Capital structure and enterprise value

Domestic and foreign scholars have conducted a large number of empirical studies on the relationship between capital structure and firm value. However, due to the differences in economic growth stage, research object, research perspective and other directions, scholars have reached different conclusions. Based on the perspective of risk taking, Gao and Pang (2017) found that corporate debt ratio has a significant negative relationship with corporate performance, and this relationship is affected by the nature of corporate ownership. Jin and Li (2015) took the data of manufacturing companies listed on China's A-share small and medium-sized board as samples to study the difference between capital structure and growth, and the results show that the increase of debt in the capital structure of small and medium-sized manufacturing enterprises has A positive impact on enterprise value. There is a significant interval effect between capital structure and growth. Parrino and Poteshman (2005) research found that the level of enterprise risk taking will increase with the increase of debt ratio. Meanwhile, Li (2016) found through his research that the overall debt level of capital structure has an inverted U-shaped influence on enterprise value, that is, too low or too high debt level is not conducive to the improvement of enterprise value.

2.2. High-tech enterprise value

As emerging enterprises, high-tech enterprises are mainly based on intangible assets such as intellectual property rights and technological innovation ability, which are significantly different from traditional enterprises in terms of profit model and operation characteristics. Therefore, the use of mainstream traditional valuation methods such as DCF method and real option method to evaluate high-tech enterprises may have certain applicable limitations. Wu (2014) believes that the use of absolute valuation technology (such as discounted cash flow method) to evaluate the value of high-tech companies has obvious limitations. Zhang (2011) pointed out that because there are too many limitations and assumptions in the option pricing theory, the real option method is not strong in the operation of high-tech enterprise valuation. At the same time, Hu et al. (2015) conducted research based on the industry differentiation theory and analyzed that different value multipliers have different industry applicability. For technology-intensive enterprises, P/S is of good applicability to enterprise value evaluation.

According to the existing literature, there are few researches on the relationship between capital structure and enterprise value in high-tech industries, and domestic scholars have not reached a unified conclusion on the relationship between the two. At the same time, high-tech enterprises take technology as the core and need a large amount of capital investment in the early stage (Zhang, 2019).Therefore, the importance of capital market support for scientific and technological innovative enterprises is beyond doubt. It can be seen that the improvement of capital structure is conducive to the improvement of the growth of high-tech enterprises, and then promote the rise of enterprise value. In summary, based on the above analysis, this paper puts forward the following hypothesis:

Hypothesis H1: There is a significant positive correlation between capital structure and enterprise value of high-tech enterprises.

3. Research Design

3.1. Sample selection and data source

High-tech enterprises refer to enterprises that continuously conduct research and development technology and transform the results to form the core independent intellectual property rights of enterprises, and carry out business activities on this basis. Common high-tech fields include biology and new medical technology, electronic information technology, new material technology and other industries. Therefore, according to the industry classification of CSRC in 2012, this paper selects computer, communication and other electronic equipment manufacturing enterprises as the sample of high-tech enterprises, excluding ST enterprises, ST* enterprises and enterprises with missing values and abnormal values. Finally, the data of 76 listed enterprises in the industry from 2009 to 2010 is taken as the research sample, and the data is pre-processed. The basic sample data studied in this paper are all from CSMAR database.

3.2. Variable design

Explained variable: Enterprise value V. Enterprise value refers to the value of the enterprise itself, and is the market evaluation of the tangible and

intangible assets of the enterprise. It is closely related to the management level of the enterprise and the internal and external environment factors of the enterprise operation. Most researchers use Tobin's Q value to measure enterprise value. At the same time, enterprises in different industries often have significant differences in business models and profit sources. Considering that this paper adopts enterprise data of computer, communication and other electronic equipment industries as samples, and this industry is a technology-intensive industry, referring to Hu's et al. (2015) research based on industry differentiation theory, the value multiplier P/S has a good applicability to the valuation of technology-intensive enterprises. Therefore, In this paper, the natural logarithm of P/S and the natural logarithm of Tobin's Q value are used to measure enterprise value respectively.

Explanatory variable: Capital structure LEV. The proxy variable of capital structure is generally asset-liability ratio at home and abroad. The asset-liability ratio, also known as debt operation ratio, is usually used to measure the ability of an enterprise to use the funds provided by creditors to carry out business activities. The broad capital structure includes the ratio of total debt to shareholders' equity, while the narrow capital structure represents the composition ratio of long-term debt to shareholders' equity. In the narrow sense of capital structure, enterprises usually manage short-term debt as working capital. Based on this, this paper uses the asset-liability ratio index to measure the capital structure of enterprises.

Control variables: It is composed of five aspects: enterprise SIZE—registered capital, enterprise development ability GROW-- total asset growth rate, enterprise profitability PROFIT—net profit growth rate, equity concentration degree EC—sum of square of the top ten shareholders' shareholding ratio, equity balance degree EB—sum of the second to top ten shareholders' shareholding ratio/the largest shareholder's shareholding ratio. The definitions of the variables in this paper are shown in **Table 1**.

Table 1 Variable Definition Table

Variable Types	Variable name	Abbreviations	Specific definitions
Explained variable	Enterprise value	LNS	LN (market to sales P/S)
		LNQ	LN (Tobin Q value)
Explanatory variables	Capital structure	LEV	Total liabilities/Total assets
Control variables	Business size	SIZE	Registered capital
	Enterprise development ability	GROW	(Total Assets ending Value of the current period - Total Assets initial value of the current period)/Total Assets initial value of the current period
	Corporate profitability	PROFIT	Current period net profit - prior period net profit/prior period net profit
	Ownership concentration	EC	Sum of the squares of shares held by the top 10 shareholders
	Degree of equity balance	EB	Sum of shareholding ratio of the second to top ten shareholders/shareholding ratio of the first largest shareholder

3.3. Model Construction

Referring to Jin and Li's (2015) research model on the relationship between capital structure, growth and enterprise value, this paper takes the natural logarithm of P/S market sales ratio and the natural logarithm of Tobin's Q value as dependent variables, respectively, and constructs the following models for research:

$$\text{Model 1: } \ln S_{it} = \partial_0 + \partial_1 LEV_{it} + \partial_2 SIZE_{it} + \partial_3 GROW_{it} + \partial_4 PROFIT_{it} + \partial_5 EC_{it} + \partial_6 EB_{it} + \mu_{it} \quad (1)$$

$$\text{Model 2: } \ln Q_{it} = \partial_0 + \partial_1 LEV_{it} + \partial_2 SIZE_{it} + \partial_3 GROW_{it} + \partial_4 PROFIT_{it} + \partial_5 EC_{it} + \partial_6 EB_{it} + \mu_{it} \quad (2)$$

Where i represents the i enterprise and t represents the t year

3.4. Multicollinearity test

In a study, if there is a high correlation between two or more explanatory variables, it is difficult to judge the direct impact of each on the explained variable, which constitutes a multicollinearity problem. Therefore, in order to avoid interference to

the research results and further affect the validity of the conclusion, it is necessary to first test whether there is multicollinearity in the study variables. Therefore, this paper first conducts correlation matrix analysis on the selected main variables, and the analysis results are shown in **Table 2**. According to the analysis results, firm size is positively correlated with capital structure and growth ability at a significant level of 1%, that is, there is a high correlation relationship. Therefore, in order to avoid affecting the research conclusion due to multicollinearity, the firm size variable is deleted in this paper, and further regression analysis is carried out. At the same time, the correlation matrix shows that capital structure is negatively correlated with enterprise value, which is contrary to the hypothesis in this paper and needs to be further verified by regression analysis.

Table 2 Person Correlation Coefficient of the Main Variable

	LNS	LNQ	LEV	GROW	PROFIT	SIZE	EC	EB
LNS	1.0000							
LNQ	0.6904 * * *	1.0000						
LEV	0.6702 * * *	0.4428 * * *	1.0000					
GROW	0.1142	0.1732 * *	0.1697 * *	1.0000				
PROFIT	0.0397	0.0574	0.0498	0.0721	1.0000			
SIZE	0.3945 * * *	0.3786 * * *	0.3107 * * *	0.2982 * * *	0.0398	1.0000		
EC	0.0161	0.1114	0.0581	0.0998	0.0498	0.0345	1.0000	
EB	0.3269 * * *	0.1930 * *	0.1635 * *	0.0279	0.0145	0.1235	0.4132 * *	1.0

Note: "*", "**", and "***" mean significant at the 10%, 5%, and 1% levels, respectively, with standard deviation in brackets.

4. Empirical Analysis

4.1. Descriptive statistics

First, the overall descriptive statistics of the study variables are carried out, and the results are shown in Table 3 below. **Table 3** shows the statistical results of various variables of computer, communication and other electronic equipment manufacturing enterprises in China during 2009-2010. The average value of asset-liability ratio of proxy variable used to measure the capital structure of enterprises in the industry is 0.4084. However, it is easy to see from the data in the table that the capital structure of enterprises in the industry fluctuates greatly, with the minimum value being 0.0767 and the maximum value being 0.8257, a difference of more than ten times.

Table 3 Descriptive Statistics of Main Variables

Variable name	Variable meaning	Mean value	Standard Deviation	Minimum	Maximum
LNS	Enterprise value	1.370614	0.9576	1.8769	3.5524
LNQ		0.8979	0.4247	0.0957	2.3851
LEV	Capital structure	0.4084	0.1824	0.0767	0.8257
SIZE	Size of business	8.26 e+08	8.20 e+08	1.29 e+08	4.62 e+09
GROW	Business growth ability	0.2592	0.6731	0.379	7.6091
PROFIT	Corporate profitability	0.0281	16.81868	193.433	57.87301
EC	Concentration of ownership	0.1516	0.0811	0.021	0.4123
EB	Equity balance degree	0.6168	0.4279	0.0293	1.7864

4.2. Regression analysis

In this paper, STATA12.0 is used to conduct Hausmann test on model 1 and model 2 respectively. The test results show that the model in this paper should be a fixed effect model, so the fixed effect regression model is used to analyze model 1 and model 2 respectively. The regression results are shown in **Table 4**.

Table 4 Regression Estimation of Enterprise Value

Variable names	Model 1 LNS	Model 2 LNQ
Constant term	2.248611 * * *	1.769505 * * *
	(0.363)	(0.335)

Capital structure	LEV	1.01608	0.98151 *
		(0.5310)	(0.489)
Business growth ability	GROW	0.10063 *	0.0431
		(0.047)	(0.043)
Corporate profitability	PROFIT	0.00007	0.00012
		(0.002)	(0.002)
Concentration of ownership	EC	3.27370 *	6.6247122 * * *
		(1.418)	(1.308)
Degree of equity balance	EB	0.01158	0.41642 *
		(0.206)	(0.189)
F-number		3.22	6.51
within-R2		0.1849	0.3144

Note: "*", "**", and "***" mean significant at the 10%, 5%, and 1% levels, respectively, with standard deviation in brackets.

In **Table 4**, the fitting effect of model 1 is average, within-R2 is 0.1849, the model is significant in general, the proxy variable EC of enterprise growth ability and ownership concentration is significant at 10% level, and other variables fail to pass the test. Compared with model 1, model 2 has a better fitting degree, within-R2 of 0.3144, which is about twice of the former. Among them, the proxy variable LEV, which measures the capital structure of an enterprise, and the variable EB, which represents the degree of equity balance of an enterprise, are significant at the level of 10%. Meanwhile, the proxy variable EC, which measures the degree of equity concentration, is significant at the level of 1%. In summary, the fit degree of model 2 is better, that is, the use of Tobin's Q value as a measurement index of enterprise value has good applicability.

According to the regression analysis results of Model 2, the regression coefficient of the proxy variable LEV of capital structure is significantly positive (0.98151 and the standard deviation is 0.489) at the 10% level, indicating that in the computer, communication and other electronic equipment manufacturing industry, enterprise capital structure and enterprise value show a significant positive correlation, and every 1% increase of enterprise capital structure, The natural logarithm of Tobin's Q value, which represents enterprise value, will increase by 0.98% on average. The above conclusions are in line with the hypothesis of this paper, that is, the value of high-tech enterprises will increase with the increase of capital structure. According to the research results, it is easy to see that in the high-tech industry, the increase of enterprise capital structure has a positive impact on the improvement of enterprise value, that is, the management pressure formed by the appropriate increase of enterprise debt ratio will be conducive to the improvement of enterprise operation efficiency and the rationality of resource flow, which will eventually be reflected in the increase of enterprise value. At the same time, as an important driving source of China's stable and sustained economic growth, high-tech enterprises should pay attention to exploring and making use of the impact mechanism of capital structure on enterprise value, and then make timely and reasonable adjustments to the capital structure of enterprises and related aspects, so as to actively promote the operation and development of enterprises and further promote the development of national economy.

5. Main Research Conclusions and Enlightenments

This paper takes the computer, communication and other electronic equipment manufacturing industry as the representative high-tech industry, and selects the data of 76 listed enterprises in the above industries during 2009-2010 as samples to study the impact of capital structure on enterprise value in the high-tech industry. The results show that capital structure, as an important factor in the internal business environment of enterprises, has a significant positive impact on enterprise value, that is, for high-tech enterprises, the improvement of capital structure is conducive to the increase of enterprise value.

Science and technology and innovation are important driving forces for the steady growth of economy. Therefore, the development status of high-tech enterprises is of great significance to the development prospect of China's national economy. The conclusion of this study has certain enlightenment for the management guidance of

high-tech enterprises in our country. First of all, enterprise managers should pay attention to capital structure management, not only as an important way of enterprise management, but also should pay attention to the establishment of real time monitoring and control system of enterprise capital structure. Secondly, according to the enterprise's own resource needs and relevant conditions, the enterprise managers should properly adjust the capital ratio, improve the capital structure of the enterprise, increase the available resources of the enterprise, pay attention to the control of the utilization efficiency of the enterprise's resources, and at the same time increase the internal operation and management pressure of the enterprise to a certain extent, and convert it into business motivation to further promote the development of the enterprise. And finally enhance the value of the enterprise. The industry studied in this paper is computer, communication and other electronic equipment manufacturing, which belongs to one of the high-tech industry fields. Whether the conclusion can be extended to other technology-intensive industries such as pharmaceutical manufacturing remains to be tested. In addition, due to the limited sample size and the limitations of researchers' personal experience, empirical research has certain limitations, mainly in the following two points: (1) sample limitations. In order to avoid interference to the analysis results caused by industry differences, enterprises in the single industry of computer, communication and other electronic equipment manufacturing industry are used to represent high-tech enterprises, and other technology-intensive industries such as biology and new medical technology are not involved in the study, so the representativeness of samples is limited. (2) The content of the study is limited. This study only discusses the influence of firm capital structure on firm value. However, there may be other potential important regulatory factors in the above-mentioned influencing mechanism, which has not been tested in this study and needs further research and exploration.

Conflict of Interest

The author declares that she has no conflicts of interest to this work.

References

Zhen, P., & Lu, M. (2006). Cultural interpretation of the entry mode selection of foreign direct investment in China. *World Economy*, *2006*(02), 51–61.

Morosini, P., Shane, S., & Singh, H. (1998). National cultural distance and cross-border acquisition performance. *Journal of International Business Studies*, *1998*(29), 137–158.

R, D., & A, S. (2006). Hofstede, schwartz, or manage-rial perception? The effects of different cultural distance measures on establishment mode choices by multinational enterprises. *International Business Review*, *2006*(15), 361–380.

Du, J., & Wang, L. (2017). The impact of cultural distance on the choice of overseas entry mode of chinese foreign direct investment enterprises. *Contemporary Economy*, *2017*(09), 83–85.

M., D., E, T., & K.W, G. K. W. (2008). Factors affecting perceptions of the choice between acquisition and greenfield entry: The case of western FDI in an emerging market. *Management International Review*, *2008*(48), 6–38.

Zhu, Y. (2018). Empirical analysis on the determinants of Chinese enterprises' international market entry mode selection. *Future and Development*, *42*(04), 41–45.

Li, C., Li, S., Chang, P., & Shi, X. (2015). Can cross-border mergers and acquisitions promote economic growth? - Research on the relationship between FDI entry patterns, endogenous investment and host country economic growth. *Management Review*, *27*(04), 3–12.

Zhang, Y., & Shen, K. (2015). The impact of institutional environment and international experience on the choice of foreign direct investment entry mode of enterprises - an analysis based on the data of listed manufacturing enterprises in class A shares. *Economic Research Referenc*, *2015*(22), 71–77.

Wang, F., & Shen, K. (2015). An empirical study on the influencing factors of the entry pattern of enterprises' foreign direct investment - based on the data of class A share real estate enterprises. *Engineering Economics*, *2015*(03), 115–120.

Gao, Y. (2015). Research on the entry mode of foreign direct investment of multinational companies - taking Chinese listed multinational companies as an example. *Oriental Enterprise Culture*, *2015*(04), 119–120, 122.

How to Cite: Jiang, H. (2024). Empirical Analysis of the Impact of Capital Structure on Firm Value — Based on the Empirical Data of High-Tech Listed Enterprises. *Journal of Global Humanities and Social Sciences*, *05*(07), 246-251.
https://doi.org/ 10.61360/BoniGHSS242016580703