Analysis of Capital Structure, Corporate Environment, and Corporate Performance of Listed Companies in China

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Abstract. The relationship between capital structure and firm performance has been one of the important directions of market economy research. Based on the information samples of Vanke, a representative real estate company, and 31 listed electric power companies, this paper analyzes and studies the relationship between them empirically by applying Spss, Python, and other data analysis tools. It is found that the experimental findings are contrary to the current findings of "positive correlation between the two" in this academic field in the West, and the Tobin's Q value indicates that capital structure is mostly negatively correlated with firm performance, and there is a high probability of optimal capital structure. Finally, the paper analyzes the reasons why the results contradict the hypothesis: different industries and different corporate environments affect the relationship between capital structure and performance, and proposes a reasonable range of corporate finance and debt.

Keywords: capital structure, enterprise environment, reasonable liability range, corporate performance, data analysis

1   Introduction

Previously, according to the "irrelevance theorem", i.e., the MM theorem [1], the capital structure was not correlated with firm performance under the perfect capital market hypothesis. Subsequently, market theorists broke the premise of the perfect capital market hypothesis and proved that the financing structure is inextricably linked to firm performance. The market consensus for many years has been that a reasonable capital structure can significantly reduce financing costs, exert the moderating effect of its own financial leverage, and enable the company to obtain a greater return on its own capital. Current academic research shows that listed companies can influence corporate governance performance by adjusting the debt and equity structure of their capital structure, which implies that debt ratio and equity are important factors affecting corporate governance structure [1]. With the development of China's

stock market in recent years, it is necessary to study the capital structure and corporate performance. The profitability of different companies varies widely because of the different environments in which companies operate in different industries and different operating characteristics.

However, there are relatively few studies on the relationship between these two in China. Therefore, the author aims to conduct further empirical analysis and research on the relationship between capital structure and corporate performance. The full paper specifically analyzes Vanke, a real estate company, and 31 listed electric power companies through data analysis tools Spss and Python. In addition to this, the author uses the literature research method, theoretical analysis, and inductive method to explore how exactly debt ratio and equity affect corporate performance if the two are related, using empirical evidence from listed companies. Finally, this paper combines the research results and the actual situation to make some suggestions on how Chinese listed companies can optimize their capital structure to achieve greater firm performance in different environments. The findings of this paper can enrich the related research and provide a more detailed theoretical basis for further research on the latter.

2 Hypotheses and analysis

There are two types of corporate environments: macro environment and micro environment. The focus of this investigation is on the micro-environment, such as actors, suppliers, and other direct factors that influence the firm's decisions and are reflected in the firm's debt-to-equity ratio. A review of the data indicates that the classical Western theory represented by DeAngelo, Masulis, and Kim proves [2] that corporate performance is positively related to the level of debt to some extent. Therefore, this paper hypothesizes that there is a positive relationship between capital structure and firm performance in a certain proportion. However, due to the different micro-environment of companies in each industry, the development speed and profitability levels vary greatly. To make conclusions more reliable, two representative industries, namely, real estate and electricity, are selected as the research objects in this paper.

2.1 Real estate company Vanke's current situation analysis and optimization countermeasures

The first consideration is the representative real estate enterprises with a generally high debt ratio. Taking Vanke [3], a real estate enterprise company, as an example, the following table was drawn up by collecting its comprehensive company data in 2013. The reason for selecting 2013 data is that after the initial serious imbalance in structural real estate in 2003 and the impact of the financial crisis in 2008, the real estate industry has progressively entered a stage of stable development and comprehensive adjustment, and 2013 is a landmark year.

Table 1. Capital structure of Vanke in 2013

	Project/reporting period	2013
Investment and Income	Basic EPS(RMB)	1.37
	BVPS	6.98
	Return on Equity- Weighted Average (%)	21.54
	Earnings per share after deduction	1.37
Debt paying ability	liquidity ratio	1.49
	quick ratio	
	turnover of account receivable	
	balance sheet ratios	93.85
Profitability	ROA	3.52
Capital composition	Equity ratio (%)	72.38
	Fixed assets ratio (%)	0.32

Two primary problems of Vanke's capital can be summarized by the indicators in the table: unreasonable long-term debt and short-term structure; a more diversified equity structure. As illustrated in Figure 1, the unreasonable debt structure is reflected in Vanke's above-average annual current ratio in 2013(1.49, the normal value is usually 1), which points to more net cash flow generated from its operating projects and a lower scale of long-term debt, indicating that the company's liquidity is not fully utilized. If the long-term debt ratio is increased, it reduces the profitability of the company to some extent, but it also reduces the risk that the company will not be able to repay its loans.

Through the past data records of the market[4], it can be understandable that Vanke's shareholding is generally fragmented, with the first major shareholder holding less than 10% before 2000 and only 16.3% after 13 years of China Resources' ownership[4], which means that the major shareholders are not highly concentrated and do not have the awareness to interfere with the company's decision-making; the minority shareholders do not have the ability to influence the company's operation; and in the long run, it is highly likely that corporate managers will not be monitored.

According to the above problems of real estate companies represented by Vanke, the following countermeasures are proposed: 1). Optimizing the internal financing structure by increasing the equity ratio, moderately reducing the debt ratio, and increasing the proportion of direct financing. The theoretical basis here is that profitability is positively proportional to a company's solvency and inversely proportional to the risk of bankruptcy [5]; 2). Broadening financing channels is also a direct way to improve the financing ratio, and among them, equity financing is the most ideal financing channel. Different scales of real estate companies are suitable for different financing channels, and the diversity of channels can avoid the high risk brought by a single channel and make the financing problem relatively simple. 3). Further improve the capital chain to give the company enough time to find a balance between current

and long-term debt ratios (the ratio of the total liabilities of the enterprise divided by the total assets obtained).

2.2 Current analysis and further advice for 31 A-share power companies

Since the reform and opening up [6], the reform of state-owned enterprises has been deepened, and the practice shows that the companies whose management philosophy is synchronized with the market can win this capital. This investigation focuses on regression analysis as the main research method to quantitatively study the effect of capital structure on the performance of electric power companies. Referring to the theory published by Jia Lijun in 2007 [7], capital structure is the long-term choice of financing method. Therefore, although there are 50 listed power companies in China as of 2022, only the public data of 31 power companies listed in a-share before 2000 from 2001-2005 are collected here [6]. These 5 years are the early stage of industrial reform and are more valuable for research.

Table 2. The characteristics of sample companies after the weighted average

Project	financing structure
external financing	63.61
debt financing	46.37(73.24)
equity financing	16.94(26.76)
Internal financing	36.69
retained earnings	9.26(25.22)
total	100

From the above table, it can be concluded that Chinese power-listed companies are characterized by exogenous financing liabilities dominating the market, supported by endogenous financing and dominated by depreciation financing. In making financing choices, external source financing accounted for 63.61% of total financing, while debt financing accounted for 73.24% of external aid financing, nearly three quarters, and equity financing accounted for only 26.76%; Internal source financing was dominated by depreciation financing, accounting for 74.78%. Due to the extremely high proportion of debt in exogenous financing, the assumption is made that the debt ratio is proportional to the firm's performance. A unitary regression model is introduced here to aid in the analysis and proof [8]: $ROE_{it} = \beta_0 + \beta_1 D_{it} + \varepsilon_{it}$. It is worth noting that β1,2 here represent the coefficients of the constant term and the independent variable, respectively.

**Table 3.** Cross - sectional analysis of roe and debt ratio

Year	β average	P
2001	9.35	0.348
2002	14.05	0.086
2003	13.25	0.02

| 2004 | 12.7 | 0.028 |
| 2005 | 6.2 | 0.03 |

Based on the above graph, it can be found that the p-value for 2001 is too large compared to the other four years, and it is difficult to extrapolate. Based on this situation, it is well-established that China's overall economic growth slowed down in 2001 due to the world economic downturn, especially the impact of the September 11 attacks in the United States [9]. In addition, with the introduction of the domestic power system reform, the cost of coal mines increased, the price of electricity generally decreased, and profits decreased. All of these factors had some impact on the performance of the sample companies.

The debt ratio exhibits an increasing trend on a yearly basis from 2001 to 2005. The debt ratio of electric power companies is low compared to the generally high debt ratio of real estate, first try to use a scatter plot to observe the relationship between the return on net assets and the debt ratio more visually over 5 years, as shown in Figure 1.
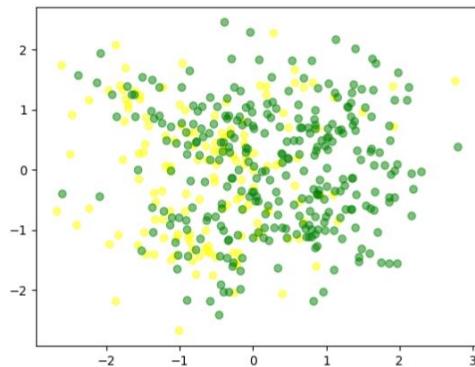
Fig. 1. Scatter plot of return on equity and debt ratio

(Note: yellow is a debt ratio and green is ROE)
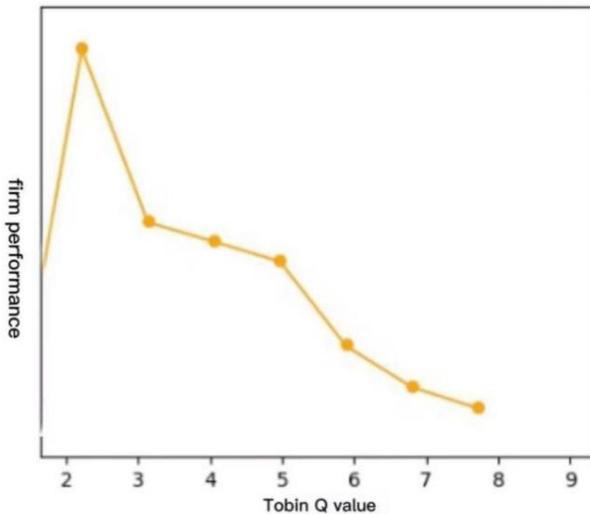
Fig. 2. Tobin Q value and net asset return

Tobin's Q [10] simply relates the market value of a firm to the replacement of its assets and compares the ratio. Based on the above figure, it can be inferred that if the effect of the macroenvironment is ignored, there exists Tobin's Q value between 1 and 3 that makes the capital structure of the power industry optimal, i.e., the relationship between corporate performance and debt ratio first rises to a peak and then falls.

Although Tobin's Q alone as a measure of firm value does not allow for the most convincing conclusions, it does illustrate that different electric utility environments have different effects on a firm's financing decisions and, ultimately, capital structure. In addition, according to agency cost theory and preferred financing theory [11], firms' decisions prefer risky assets when the interests of shareholders and creditors conflict and a form of asset security exists in this case. Based on the above, the inference is that more economically efficient firms have higher levels of debt holdings.

3 Discussion

Considering the effect of multiple factors on Tobin's Q, this paper believes that the difference lies in the imperfect market economy system in China [12], which is manifested in:1) the same as the real estate industry, bank borrowing is the main channel of debt financing, and the strong path dependence leads to the variability of the fitted curves, which cannot be deduced by a single U-shape. 2)The macro-environment is set as an irrelevant variable, but in reality, companies face many uncertainties. Enterprise size, enterprise growth rate, national policies, etc. should be taken into consideration, so this calculation has a large error. 3)Similarly to the previously mentioned asset liquidity issue, a larger share of liquid assets. Western theory [13] suggests that asset liquidity and capital structure interact, i.e., firms with high liquidity are more inclined to pay short-term debt than long-term debt; and that an increase in liquid

assets leads to faster capital turnover and a corresponding decrease in the financing of debt. The capital structure is affected.

4   Conclusion

Through the analysis of representative Chinese real estate companies and A-share listed electric power companies, it can be obtained that the situation of Chinese listed companies is opposite to the classical western theory. Western scientists believe that there is a positive relationship between corporate performance and capital structure, and this paper concludes that the capital structure of listed companies in China shows a negative relationship with corporate performance. Corporate performance is positively correlated with equity concentration, negatively correlated with debt ratio, and the share of outstanding shares is positively correlated with corporate performance and capital structure. Besides, different industries, national policies and business goals will change the company's decision and the relationship between capital structure and performance will be influenced to some extent.

In summary, it is desirable to use data analysis to seek a debt interval that maximizes the company's performance. The critical value obtained from the theoretical analysis can also be used as a reference value for corporate decision-making. Listed companies can optimize their capital structure models by making decisions based on their business objectives and the maximum value of return on net assets. This paper analyzes relatively few industries and has limitations in the factors considered in the corporate environment. In future research, variables can be gradually optimized to take into account the influence of the macro environment, and the data can be more meticulously divided and further optimized to obtain more reliable conclusions.

Acknowledgments

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