

# The Influence of Debt Management on Corporate Value

## A Case Study of Guangzhou Baiyunshan Pharmaceutical Group Co., Ltd

Yu Wu<sup>1</sup> Bailin Yang<sup>1</sup> Liangchen Zhang<sup>1,\*</sup>

<sup>1</sup> School of Accounting, Xinhua College of Sun Yat-Sen University, Guangzhou, Guangdong 510520, China

\*Corresponding author. Email: zlcchair@163.com

### ABSTRACT

At present, there are some problems in the biomedical industry such as poor financing channels, capital governance structure and business risk and etc. Debt management has certain impacts on financing channels, capital structures, business risks and corporate value. On this base, this paper empirically studies the influence of debt management on the corporate value of Guangzhou Baiyunshan Pharmaceutical Group Co., Ltd. The research proves that there is a significant positive correlation between the level of debt and earnings per share, and that the level of debt affects corporate value and capital structure. The purpose of this paper is to provide reference to enterprises in the biomedical industry to solve problems caused by debt management.

**Keywords:** Debt management, Capital structure, Liabilities to assets ratio, Guangzhou Baiyunshan Pharmaceutical Group Co., Ltd.

## 1. INTRODUCTION

Capital plays an important role in the development and competition of enterprises. Sufficient capital is the foundation of their normal operation and strategy implementation. Capital raising is the primary factor of its development, including internal financing and external financing. External financing mainly includes equity financing and debt financing. It can maximize corporate value by debt management and effective control of debt financing risks.

For the biomedical industry, internal financing is the optimal way to raise capital. When enterprises enlarge their production scale, constantly supplemented debts are a modern way of financing for them. Based on this, the paper takes Guangzhou Baiyunshan Pharmaceutical Group Co., Ltd. (hereinafter referred to as Baiyunshan) as the research object to analyze the influence of debt management on its corporate value.

## 2. THEORETICAL ANALYSIS

### 2.1 Theory of Debt Management

Debt management means to collect and use inactive social funds for the sake of effective of fund use and the reduction of market pressures. A company's borrowing cost represents the interest paid to creditors and preferred shareholders. Capital expenditure is fixed and the balance is reflected in the increase of equity. While increasing the return of shareholders, it operates in debt to achieve the goal of shareholders value.

Financial leverage refers to the leverage effect that the change of earnings per share of common stock is greater than that of EBIT due to debts. Its degree is usually expressed by DFL (degree of financial leverage), as shown in "Figure 1":

$$DFL = \frac{\frac{\Delta EPS}{EPS}}{\frac{\Delta EBIT}{EBIT}} = \frac{\frac{\frac{\Delta EBIT \times (1-T)}{N}}{(\frac{EBIT-I}{N}) \times (1-T)}}{\frac{\Delta EBIT}{EBIT}} = \frac{EBIT}{EBIT-I}$$

Figure 1 Degree of financial leverage formula.

- a EBIT — Earnings before interest and tax
- b EPS — Earnings per share
- c T — Income-tax rate
- d I — Interest
- e N — Number of ordinary shares outstanding

## 2.2 Theory of Corporate Value

Corporate value refers to the present value of the expected free cash flow and weighted average cost of capital discounted by the discount rate, including time value, operation risks and sustainable developing ability. The maximization of corporate value, as one of a company's business targets, helps to realize its long-term, stable and healthy development.

### 2.2.1 Evaluation Method of Corporate Value

The valuated corporate value is comprehensive assets and capital, which is a company's total value for a specific purpose. Up to now, internationally recognized valuation methods include market method, income method, cost method and etc. Besides, there are some derivative valuation indicators, such as stock price, pricing models of capital assets, Tobin's Q value and etc.

Earnings per share is used to valuate corporate value in this paper. The formula is:

$$\text{earnings per share} = \text{net profit} / \text{total number of shares at the end of the period}$$

### 2.2.2 Influence Factors of Corporate Value

Due to the fluctuation of stock price, the investment value of listed companies is changing. The influence factors of the overall corporate value include internal and external factors.

#### 2.2.2.1 Internal Factors

- Profitability. Profitability is one of the most fundamental factors to measure a company's asset performance and equity investment value. For listed companies, the rise of their price increases the dividend available for distribution and therefore their stock price increases. Thus, the corporate value increases. The up and down of the stock price and the fluctuation of profit are not completely synchronous. To analyze and determine a company's profitability, we should consider such factors as income of the industry, market competition, asset structure, debt ratio, management levels and etc..
- Capital Structure. Capital structure refers to the composition of value and the share of different capital of a company, embodied in the proportional relationship between long-term debts and stock funds. Long-term debts are the lowest borrowing cost of debt financing. As the debt capital of listed companies accounts for too much of the total capital, their financial risks increases accordingly. When there is no enough cash flow to pay the cost of debts, companies are likely to have difficulties in cash flow and other problems.
- Ownership Structure. Ownership structure is the foundation of a company's governance structure. Its influence on the corporate value of listed companies is reflected in the influence of shareholders' control on companies' performance. As the proportion of shares is related to dividends, more dividends are likely to have negative impacts on management team and decision-making and eventually lead to the decline of corporate value.
- Merger and Acquisition. In general, merger and acquisition bring new blood to a company in some extent and may bring new debts to it as well. M&A includes horizontal M&A and vertical M&A. The former can reduce costs, increase market share and quickly enter new markets. The latter can reduce contracting costs of related transactions.

#### 2.2.2.2 External Factors

External factors affecting corporate value include market environment, market status in the industry, industry cycle, relevant policies and regulations. Under a certain level of corporate

income, if a company's return exceeds the average return of the industry, its value is high.

### **2.3 Research Literature**

In his empirical research of 1983, Masulis found that when the debt ratio of a company changed from 0.23 to 0.45, there was a positive correlation between the debt ratio and its corporate value. In 2003, Frank and Goyal found that a company's performance and financial leverage changed in the same direction. However, the conclusion of Titman and Wessels (1985) was just the opposite: there was a negative correlation between a company's profitability and debt level. Chen Jing's (2017) research showed that with the increase of cash holding ratio, the negative correlation between capital structure and corporate value gradually weakened.

The above-mentioned studies believe that there is a relationship between capital structure and corporate value, but there are few researches on the biomedical industry. According to the above literature, this paper takes Baiyunshan as a research object.

## **3. EMPIRICAL ANALYSIS ON BAIYUNSHAN**

### **3.1 Introduction of Baiyunshan**

Baiyunshan is a listed company controlled by Guangzhou Pharmaceutical Group Co., Ltd. (A share code: 600332, H share code 00874). Its products mainly include Chinese patent medicines, Chinese herbal pieces, chemical preparations, chemical raw materials, etc. It has four well-known trademarks in China, twenty famous trademarks in Guangdong Province and twenty-seven famous trademarks in Guangzhou city.

### **3.2 Financial Analysis**

#### **3.2.1 Selection of Data Sources and Financial Indicators**

Data from 2011 to September 30, 2018 of Baiyunshan is selected as the data source. The ending liabilities to assets ratio is used to evaluate the proportion of its debt. The formula is as Formula 3.1.

*liabilities to assets ratio = total liabilities at the end of the period / total assets at the end of the period (3.1)*

Current debt ratio and non current debt ratio are used to better understand the influence of structures of short-term debts and long-term debts on its corporate value. The formulas are as Formula 3.2 and Formula 3.3

*current liabilities ratio = total current liabilities / total liabilities (3.2)*

*non current liabilities ratio = total non current liabilities / total liabilities (3.3)*

The above financial indicators are used to analyze the relationship between liabilities to assets ratio and earnings per share of Baiyunshan.

Calculating methods of corporate value, such as market method, income method and cost method have been described. There are some indicators to valuate corporate value, such as EVA (Economic Value Added) and CAPM (Capital Asset Pricing Model) of income method. However, due to the great fluctuation of the stock price in China, the valuation of corporate value is interfered by many factors. Thus, earnings per share are used as a financial indicator for valuation in this paper. It can not only directly reflect the profitability of shareholders, but also maximize their value. The use of it can make the change of corporate value not affected by company scale. The formula is as Formula 3.4.

*earnings per share = net profit / total number of shares at the end of the period (3.4)*

#### **3.2.2 Descriptive Statistics**

The relevant data of Baiyunshan from 2011 to September 30, 2018 is described and analyzed in "Table 1". The analysis structures are as follows:

Table 1. Financial analysis on liability of Baiyunshan from 2011 to Sept. 30, 2018

	N	Mean	Variance	Standard Deviation
Liabilities to Assets Ratio	31	0.37397	0.99947	0.010
Current Liabilities Ratio	31	0.93517	0.030538	0.001
Non Current Liabilities Ratio	31	0.06483	0.030538	0.001
Earnings per Share	31	0.63023	0.445251	0.198
Effective N	31			

a Data Source: Annual Reports of Baiyunshan from 2011 to Sept.30, 2018

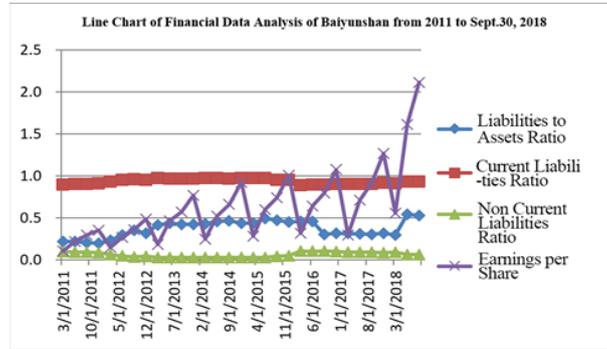


Figure 2 Line chart of financial analysis of Baiyunshan.

"Figure 2" shows that total liabilities to assets ratio of Baiyunshan from 2011 to September 30, 2018 had been fluctuating, exceeding 50% in Q2 and Q3 of 2018 and current liabilities ratio and non current liabilities ratio had been stable. In other words, the company has maintained stable structures of current liabilities and non current liabilities from the initial stage to now. Its short-term loans and long-term loans account for a high proportion of current liabilities and non current liabilities; earnings per share has been fluctuated upward, especially in Q2 and Q3 of 2018, up to RMB 1.611 and RMB2.115. The results prove that the company's debt ratio is still on the high side in the industry.

### 3.2.3 Pearson Correlation Analysis

Pearson correlation coefficient is a kind of linear correlation coefficient, used to reflect the

Table 2. Correlation of liabilities to assets ratio and earnings per share of Baiyunshan

		Liabilities to Assets Ratio	Current Liability Ratio	Non Current Liability Ratio
Earnings per Share	Pearson Correlation	0.473	-0.055	0.055
	Significant Bilateral	0.007	0.770	0.770
	N	31	31	31

a Data Source: Appendix A1

"Table 2" shows that the correlation coefficient of liabilities to assets ratio and earnings per share is 0.473, greater than 0,  $|r| = 0.473$ , according to the

degree of linear correlation between two variables statistics. In statistics,  $r$  represents correlation coefficient,  $n$  represents sample size. The larger the absolute value of correlation coefficient, the stronger the correlation is. The formula is as follows.

$$r = \frac{N \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{N \sum x_i^2 - (\sum x_i)^2} \sqrt{N \sum y_i^2 - (\sum y_i)^2}}$$

The correlation analysis is shown in "Table 2". Data  $N = 31$  is from March 31, 2011 to September 30, 2018. Data, such as Baiyunshan's liabilities to assets ratio, current liability ratio, non current liability ratio and earnings per share in those eight years are taken as sample data. Pearson correlation is calculated by software SPSS.

analysis of 31 data from 2011 to September 30, 2018. They prove to have positive correlation. The correlation coefficient is in medium degree, greater

than 0.35, ranging from 0.4 to 0.6. The test result of p value is 0.007, indicating that the positive correlation is significant during the period. The influence of current liabilities and non current liabilities on enterprises is different. Table 3-2 shows that the correlation coefficient of non current liabilities and earnings per share  $|r| = 0.055$ , ranging from 0.0 to 0.2, indicating that the correlation is the same as that of total liabilities to assets ratio. Both are positive but are very weak or null, while the correlation of current liabilities ratio and earnings per share is negative. Moreover, the correlation p value of earnings per share and current liability ratio and non current liability ratio is greater than 0.05, indicating that the correlation between them is too weak or even there is no linear correlation. The results prove that the higher proportion of short-term loans of Baiyunshan, the lower its corporate value is.

### 3.2.4 Regression Analysis

The above-mentioned Pearson correlation coefficient analysis proves that the correlation coefficient between liabilities to assets ratio and earnings per share of Baiyunshan is positive. Linear regression model is used to analyze their relationship more specifically.

The paper analyzes the relationship between debt management and corporate value but corporate value is affected by many factors besides the level of debt. In order to understand the linear relationship between liabilities to assets ratio and earnings per share more accurately, the paper only use liabilities to assets ratio and earnings per share, ignoring other affecting factors. It is determined that liabilities to assets ratio are the independent variable and earnings per share is the dependent variable. Thus, the following current model is used to analyze their relationship.

$$Y_i = \alpha + \beta X_i + \varepsilon_i \quad (3.6)$$

$Y_i$ : Earnings per share

$\alpha$ : Regression constant

$\beta$ : Coefficient

$X_i$ : Liabilities to assets ratio

$\varepsilon_i$ : Residual

The above-mentioned Pearson correlation analysis has prove the positive correlation coefficient between liabilities to assets ratio and earnings per share of Baiyunshan. Unitary linear regression model and curvilinear regression model are analyzed by using software SPSS. Specific data is listed in "Table 3".

Table 3. Model summary of liabilities to assets ratio and earnings per share of Baiyunshan

Model	R	R Square	Adjusted R Square	Error of Standard Estimation
1	0.473 <sup>a</sup>	0.223	0.196	0.399

a. Predictive variables: (Constant), liabilities to assets ratio

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.328	1	1.328	8.336	0.007 <sup>a</sup>
Residual	4.620	29	0.159		
Total	5.947	30			

a. Predictive variables: (Constant), liabilities to assets ratio

b. Dependent variable: earnings per share

Model	Nonstandard coefficient		Standard coefficient	t	Sig.
	B	Standard Error	Trial Version		
1 (Constant)	-0.157	0.282		-0.557	0.582
Liabilities to Assets Ratio	2.105	0.729	0.473	2.887	0.007

a. Dependent variable: earnings per share

a Data Source: "Table 1"

According to "Table 3", the fitting functions of liabilities to assets ratio and earnings per share of Baiyunshan from 2011 to September 30, 2018 are as follows.

$$Y = -0.157 + 2.105X + \varepsilon_i \quad (3.7)$$

In "Table 3", p value of liabilities to assets ratio and earnings per share of Baiyunshan is 0.007, less than 0.01, indicating that the test result is

significant. However, the determination coefficient  $R^2 = 0.223$ , indicates that the sum of explanatory squared deviations by sample regression accounts for only 22.3% of total sum of squared deviations, less than 50%, which indicates that the explanatory

power is very weak, and that earnings per share is mainly affected by many other factors represented by disturbance term  $\varepsilon_i$ . Curve regression model is analyzed by using software SPSS (shown in "Table 4").

Table 4. Results of curve regression model of liabilities to assets ratio and earnings per share of Baiyunshan

Model Summary and Parameter Estimates								
Dependent variable: earnings per share								
Regression	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Coefficient	0.281	5.461	2	28	0.010	1.299	-6.549	11.906
Independent variable: liabilities to assets ratio								

a Data source: "Table 1"

"Table 4" that shows intercept, first-order coefficient and second-order coefficient of curvilinear regression model are 1.299, -6.549 and 11.906 respectively. Thus, the equation of the quadratic curve is as follows.

$$Y = 1.299 - 6.549X^2 + 11.906X + \varepsilon_i \quad (3.8)$$

"Table 4" shows that the fitting degree of the quadratic curve model is higher than that of the linear model ( $0.281 > 0.223$ ), which proves that the fitting degree of the quadratic curve is better than that of the linear regression model. The quadratic coefficient is greater than 0, indicating that when liabilities to assets ratio increases to a certain level, earnings per share will increase as well. Thus, it proves that Baiyunshan has the best capital structure, which establishes the theory of the best capital structure for the biomedical industry.

It needs to be clear that no matter how much the fitting degree of quadratic curve is better than that of unitary linear regression model, their fitting degrees are low. In other words, indexes of earnings per share are more affected by other factors.

## 4. CONCLUSION AND SUGGESTION

### 4.1 Conclusion

According to the empirical analysis on financial data of Baiyunshan from 2011 to September 30, 2018, the following conclusions are drawn:

- There is a positive correlation between total liabilities to assets ratio and earnings per share of Baiyunshan.

- Different debt structures have different influences on companies' earnings per share.
- Long-term liabilities are positively correlated with earnings per share, while short-term liabilities are negatively correlated.

From the above-mentioned analysis on unitary linear regression equation model and quadratic curve model of liabilities to assets ratio and earnings per share of Baiyunsha from 2011 to Sept. 30, 2018, it is concluded that earnings per share increases with the increase of liabilities, and so does the profitability.

### 4.2 Suggestion

The above-mentioned data and conclusions show that there is a positive correlation between corporate value and liabilities to assets ratio. The liabilities to assets ratio of Baiyunshan in 2018 is the highest among those 8 years from 2011 to 2018 and its earnings per share is also the highest. It is suggested that enterprises can try to increase their debt ratio to increase their corporate value, e.g. to increase debt proportion in capital. It has been concluded that long-term liabilities are positively related to earnings per share and short-term liabilities are negative. Enterprises should increase their long-term liabilities improve their corporate value when increasing their liabilities to assets ratio.

In addition, according to the unitary linear regression and curve regression valuation model, the biomedical industry should pay more attention to adjust debt proportion in total capital according to companies' actual situations and other

influencing factors, so as to better improve their profitability and corporate value.

### **AUTHORS' CONTRIBUTIONS**

Yu Wu is responsible for experimental design, analyzing data and writing the manuscript. Bailin Yang collected and coordinately analysed data. Liangchen Zhang contributed to revising and editing.

### **REFERENCES**

- [1] Modigliani, F. and M. Miller. The Cost of Capital, Corporation Finance and the Theory of Investment [J]. American Economic Review, 1958, 48:261-297
- [2] Anshan. Analysis of the impact of debt management on corporate value [J]. Finance and Economy, 2010, (11): 77-78
- [3] Zhang Liang: commercial credit motivation and enterprise value from the perspective of monetary policy: Empirical Evidence from Listed Companies in China from 1991 to 2011, Southeast Academic Journal, No.4, 2013
- [4] Xie Rong, Ma Yong. The impact of debt management on corporate value [J]. Cooperative economy and technology, 2015, (4): 137-138
- [5] Masulis, Ronald W. The Impact of Capital Structure Change on Firm Values: So Estimates [J]. The Journal of Finance, 1983.
- [6] Chen Jing, pan Haiying. Cash holdings, capital structure and enterprise value [J]. Monthly finance and accounting, 2017 (15).