

## An Analysis of the Factors Affecting the Capital Structure of China's Coal Industry

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### Abstract:

A good capital structure helps to reduce the overall cost of capital. Taking the asset - liability ratio as the representative index of capital structure, 26 listed companies in the coal industry were selected as samples, and the factors influencing the capital structure were studied by SPSS multiple linear regression analysis. The results show that firm size and growth are positively correlated with capital structure. Profitability, Solvency, asset guarantee value and capital structure were significantly negatively correlated. The research seeks to provide practical significance for the current domestic coal industry to optimize the capital structure.

### Key words:

Coal Industry, Capital Structure, Linear Regression Analysis.

### 1. Introduction

The capital structure, as a proportion of the various capitals in the enterprise, reflects the combined results of fund raising during a certain period of time. Building a good capital structure for the company helps to rationally utilize the financial leverage effect brought by the debt, while the advantage of the debt interest to allow pre-tax deduction can reduce the company's comprehensive cost of capital. However, when the proportion of debt in capital is too high, it will increase the risk of debt repayment of the enterprise and even lead to bankruptcy. Therefore, in the capital structure decision-making, it is crucial to properly match debt capital and equity capital. This paper empirically analyzes the asset-liability ratio as a research indicator of capital structure. The formation of capital structure is affected by various macro and micro economic factors. In the past research, various scholars have theoretically elaborated and summarized the influencing factors, but the empirical results are different. This is due to the differences between the industries and The complexity of the marketplace. Based on this, the listed companies in the coal industry were selected as research objects, aiming to use empirical tests to analyze the factors affecting the capital structure.

### 2. Status of capital structure in the coal industry

The coal industry is an industry that focuses on mining coal resources. It is one of the main sources of national energy and one of the important pillars of the national economy.

Through the analysis of asset-liability ratio, we can understand the current capital structure of listed companies in the coal industry. As of the end of 2017, there were 27 coal companies that issued A shares in the Shanghai and Shenzhen Stock Exchanges. In order to ensure the validity and comparability of the data, ST shares were eliminated and 24 valid samples were obtained. This sample was used as a sample for empirical analysis. According to the data disclosure of 26 sample companies listed in the annual report, the asset-liability ratio of the coal industry is shown in Table 1: From 2013 to the end of 2017, the average asset-liability ratio of the coal industry was 57.39%, 54.55%, 57.01%, 33.86%, respectively. 30.51%, showing a steady decline. However, the maximum value increases year by year, and the minimum value is basically unchanged. In recent years, listed companies in the coal industry have developed relatively well, and the asset-liability ratio has become

smaller and smaller, but at the same time the gap between industries has become more and more obvious.

There are three reasons for this: On the one hand, in recent years, the trajectory of the coal industry has risen, the global economy has continued to grow, and oil and natural gas prices have risen sharply, resulting in sustained growth of the global economy and rising prices. Domestic coal demand is strong. Moreover, China's national economy continues to develop rapidly, and the rapid development of power, metallurgy, building materials, and chemical industries has led to a large demand for the coal industry, and consumption has increased year by year. In the second aspect, the state has increased macroeconomic regulation and control, cleaned up coal-in-progress projects, and controlled new construction projects, which have played a certain role in supporting the coal industry. In the third aspect, however, the uneven distribution of railway transportation capacity determines the long-term imbalance of regional coal supply and demand, which leads to the development of good enterprises that can develop faster, thus making the gap between industries larger.

Table 1: Assets and liabilities ratio of the coal industry in the past five years

| Years | Average value | Maximum value | Minimum value |
|-------|---------------|---------------|---------------|
| 2013  | 0.573852      | 0.674522      | 0.26089       |
| 2014  | 0.545520      | 0.718149      | 0.305101      |
| 2015  | 0.570138      | 0.758633      | 0.332276      |
| 2016  | 0.338593      | 0.849055      | 0.338593      |
| 2017  | 0.305095      | 0.844362      | 0.305095      |

### 3. Research design

#### 3.1 Selection of samples and variables

##### 3.1.1 Selection of research samples

The foregoing has clarified the selection of samples. The 25 listed companies analyzed in this paper are listed in Table 2 below. All data are from Guotaian database.

Table 2: Sample company name

|                               |                   |                         |                             |                               |
|-------------------------------|-------------------|-------------------------|-----------------------------|-------------------------------|
| Jingyuan Coal and Electricity | New Continent A   | Jizhong Energy          | Xishan Coal and Electricity | Open pit coal industry        |
| Orchid Science                | Yongtai Energy    | Chongzhou Coal Industry | Yangquan Coal Industry      | Panjiang Coal Industry        |
| Anyuan Coal Industry          | Shanghai Energy   | Jinrui Mining           | Hongyang Energy             | Hengyuan Coal and Electricity |
| Datong Coal Industry          | China Shenhua     | Yuhua Energy            | Shaanxi Coal Industry       | Pingmei                       |
| Diane Energy                  | China Coal Energy | New energy              | Yitai B shares              |                               |

##### 3.2.2 Selection and design of variables

The asset-liability ratio is selected as a representative indicator of the capital structure. This paper argues that the growth, solvency, profitability, firm size and asset guarantee value of the enterprise may affect the capital structure. Considering the particularity of the industry and the Availability of data, the net profit growth rate, quick ratio, The net profit rate of total assets, the natural logarithm of total assets and the proportion of fixed assets are representative indicators of these influencing factors. The variable names and variable symbols are shown in Table 3.

Table 3: Variable Names and Variable Symbols

| Variable type | Variable name | Variable symbol | Variable description                                 |
|---------------|---------------|-----------------|--|
| Explained     | Assets and    | Y               | Total liabilities / total assets (capital structure) |

| variable              | liabilities                       |    |   |
|-----------------------|-----------------------------------|----|---|
| Explanatory variables | Net asset growth rate             | X1 | (current net profit - net profit in the previous period) / net profit in the previous period (growth) |
|                       | Quick ratio                       | X2 | Quick-moving assets/current liabilities (solvency)  |
|                       | Total net profit margin           | X3 | Net profit / average total assets (profitability)   |
|                       | Natural logarithm of total assets | X4 | In total assets (enterprise size)   |
|                       | Fixed assets                      | X5 | Fixed assets/total assets (asset guarantee value)   |

### 3.2 Research hypothesis

Hypothesis 1: There is a positive correlation between the growth of the company and the capital structure.

The growth of a company represents its development during a certain period of time. Companies with good growth performance are showing growth in terms of asset size, revenue or profit, and there is considerable room for growth in the future. [8] Such enterprises will use the means of debt financing if the internal financing cannot meet the investment expansion.

So suppose the better the growth of the company, the higher the asset-liability ratio.

Hypothesis 2: There is a correlation between the solvency of an enterprise and the capital structure.

Solvency represents the ability of an enterprise to repay debts as they fall due. [9] Firms with good solvency represent small repayment pressures and financial risks. In the same situation, it is easier to obtain loans, and at the same time, you can use debt to play financial leverage.

So suppose the better the solvency of the company, the higher the asset-liability ratio.

Hypothesis 3: There is a negative correlation between the profitability of the firm and the capital structure.

Profitability represents the ability of a company to make a profit within a certain period of time. Companies with stronger profitability can make full use of their retained earnings to meet the funding needs of the operation process. Endogenous financing is the safest way to raise funds. Enterprises will minimize debt financing when they have good profitability, thus avoiding financial risks. So suppose the better the profitability of the company, the lower the asset-liability ratio.

Hypothesis 4: There is a positive correlation between firm size and capital structure.

At this stage, China regards the number of employees, sales, and total assets as the criteria for dividing the scale of enterprises. Larger companies often use diversification to spread risk. Small financial risks represent a strong ability to obtain external funding.

So suppose the larger the company, the higher the asset-liability ratio.

Hypothesis 5: There is a positive correlation between asset guarantee value and capital structure.

Asset guarantee means that the debtor uses the self-owned assets as a guarantee for the purpose of paying off the debts. The more fixed assets in an asset, the stronger the creditworthiness of the enterprise, and the less risk the creditor has to recover the loan, so that the debtor is more likely to obtain the loan.

So assume that the greater the value of the asset guarantee, the higher the asset-liability ratio.

### 3.3 Empirical test

#### 3.3.1 Model construction and testing

Based on the research hypothesis and the selection of variables, the following regression models were established:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \quad (1)$$

Where Y represents the interpreted variable, and X1, X2, X3, X4, and X5 represent the explanatory variables, respectively. B0 is a constant term, and  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$  represent regression coefficients of respective explanatory variables, And  $\varepsilon$  is an error term.

### 3.3.2 Descriptive statistical analysis of samples

Table 4: Descriptive statistics

|    | Average value | Standard deviation | N   |
|----|---------------|--------------------|-----|
| Y  | .52758236     | .135854995         | 118 |
| X1 | -.78328679    | 30.598527680       | 118 |
| X2 | .86579547     | .361951122         | 118 |
| X3 | .02446988     | .051626361         | 118 |
| X4 | 10.22336514   | .620962850         | 118 |
| X5 | .41136493     | .785511847         | 118 |

From the descriptive statistical analysis, the standard deviation of the net asset growth rate (X1) is very large, indicating that the net asset growth rate (X1) in the industry varies greatly and is very unstable. The total net profit margin (X4) is very stable. Asset-liability ratio (Y), net asset growth rate (X1), quick ratio (X2), net profit margin (X3), and natural logarithm of total assets of 24 listed companies in the coal industry from 2013 to 2017 (X4) and fixed assets (X5) have descriptive statistics, reflecting the concentration trend and dispersion of sample values of each variable.

From the perspective of the statistical data reflecting the standard deviation value of the discreteness of the sample values of each variable, the listed company's asset-liability ratio is 0.58, the degree of dispersion is small, and the fluctuation is small, indicating that the company's asset-liability ratio (Y) does not exist. The big difference is that the capital structure of listed companies in each coal industry is quite equal.

### 3.3.3 Sample correlation test

Table 5: Relevance

|                     |    | Y     | X1    | X2    | X3    | X4    | X5    |
|---------------------|----|-------|-------|-------|-------|-------|-------|
| (Pearson) relevance | Y  | 1.000 | .030  | -.434 | -.495 | .122  | -.039 |
|                     | X1 | .030  | 1.000 | .022  | -.010 | -.092 | .009  |
|                     | X2 | -.434 | .022  | 1.000 | .277  | .058  | .077  |
|                     | X3 | -.495 | -.010 | .277  | 1.000 | .087  | -.042 |
|                     | X4 | .122  | -.092 | .058  | .087  | 1.000 | .108  |
|                     | X5 | -.039 | .009  | .077  | -.042 | .108  | 1.000 |
| Sig. (one side)     | Y  | .     | .372  | .000  | .000  | .095  | .339  |
|                     | X1 | .372  | .     | .408  | .459  | .160  | .460  |
|                     | X2 | .000  | .408  | .     | .001  | .266  | .202  |
|                     | X3 | .000  | .459  | .001  | .     | .174  | .328  |
|                     | X4 | .095  | .160  | .266  | .174  | .     | .122  |
|                     | X5 | .339  | .460  | .202  | .328  | .122  | .     |
| N                   | Y  | 118   | 118   | 118   | 118   | 118   | 118   |
|                     | X1 | 118   | 118   | 118   | 118   | 118   | 118   |
|                     | X2 | 118   | 118   | 118   | 118   | 118   | 118   |
|                     | X3 | 118   | 118   | 118   | 118   | 118   | 118   |
|                     | X4 | 118   | 118   | 118   | 118   | 118   | 118   |
|                     | X5 | 118   | 118   | 118   | 118   | 118   | 118   |

It can be seen from the table that the correlation between asset-liability ratio (Y) and net asset growth rate (X1) and fixed assets (X5) is significant; asset-liability ratio and quick ratio (X2), total net profit margin (X3), the correlation between the natural logarithm of the total assets (X4) is not significant. The net asset growth rate (X1), the natural logarithm of total assets (X4), the proportion of fixed assets (X5) and the asset-liability ratio (Y) are positively correlated. However, the quick ratio (X2) and the total net profit margin (X3) have no significant effect on the asset-liability ratio (Y).

### 3.3.4 Sample regression analysis

Linear regression analysis by SPSS22.0, the following results are shown in Table 5:

Table 6: Coefficient A

| Model | Non-standardized coefficient |                | Standardization coefficient | T     | Significant |      |
|-------|------------------------------|----------------|-----------------------------|-------|-------------|------|
|       | B                            | Standard error | Beta                        |       |             |      |
| 1     | (Constant)                   | .244           | .170                        |       | 1.438       | .153 |
|       | X1                           | .003           | .000                        | .051  | .684        | .025 |
|       | X2                           | -.122          | .029                        | -.324 | -4.155      | .000 |
|       | X3                           | -1.113         | .206                        | -.423 | -5.418      | .000 |
|       | X4                           | .041           | .017                        | .188  | 2.479       | .015 |
|       | X5                           | -.009          | .013                        | -.052 | -.687       | .024 |

a. Dependent variable: Asset-liability ratio.

It can be seen from the equation coefficient of Table 6 that the significance level of X1 net asset growth rate, X2 quick ratio, X3 total asset net profit rate, X4 total asset natural logarithm, and X5 fixed asset proportion in the regression model is less than 0.05, you can enter the equation. In the regression coefficient test, the X1 net profit growth rate, the natural logarithm of X4 total assets and the asset-liability ratio are linearly positively correlated. The X2 quick ratio, X3 total net profit margin, X5 fixed assets and asset-liability ratio were linearly negatively correlated. The regression equation can be expressed as:

$$Y = -0.244 + 0.003X1 - 0.122X2 - 1.113X3 + 0.041X4 - 0.009X5 \quad (2)$$

## 4. Research conclusions

Through the regression empirical analysis of 24 listed companies in the coal industry, the paper draws the following conclusions:

There is a significant positive correlation between the two financial indicators and the capital structure of the scale of the enterprise and the growth of the enterprise. Hypothesis 1. Hypothesis 4 is established. On the one hand, coal enterprises with large scale or high-speed growth period often have their own retained earnings that cannot meet the growing demand for funds and require external financing. On the other hand, the state provides multi-channel preferential treatment for coal enterprises. For example, in terms of financing, it gives differentiated interest rates, credit lines, and interest subsidy policies to encourage and support the growth of environmental protection enterprises. Therefore, coal companies are more likely to obtain loans than other industries. However, an excessively high asset-liability ratio will bring certain financial risks to the company, resulting in capital chain scission and even bankruptcy. The financial staff of coal companies should always pay attention to this ratio.

There is a significant negative correlation between the profitability of the enterprise and the capital structure. Hypothesis 3 is established. On the one hand, companies with better profitability are more willing to use endogenous financing to meet funding needs. On the other hand, due to the particularity of the industry, some coal companies have advanced equipment and technology. In order to avoid information disclosure when issuing stocks, they have certain private equity financing preferences, which will also lead to a reduction in asset-liability ratio.

There is a significant negative correlation between the solvency of the firm and the capital structure, which is inconsistent with Hypothesis 2. In this paper, the quick ratio is used as an indicator to reflect the solvency. The correlation coefficient is 1.12, and the significance level is 0.000. It can be seen that the negative correlation between the ratio and the asset-liability ratio is very significant. The quick ratio reflects the liquidity of the quick-moving assets in a certain period of time. The stronger the capability, the more the company can make full use of its own liquidity to solve the financing demand, resulting in a lower asset-liability ratio.

There is a significant negative correlation between the asset guarantee value of the enterprise and the capital structure, which is inconsistent with Hypothesis 5. It can be seen from the equation coefficient of Table 6 that although the explanatory variable of the fixed assets ratio enters the final equation, the correlation coefficient is 0.024, indicating that the degree of influence on the asset-liability ratio of the interpreted variable is small. possible

The reason is that some of the 24 coal companies in the sample have advanced equipment, while others have advanced patented technology. Patent technology as an intangible asset is not included as a representative indicator of the asset guarantee value of this article.

The current domestic research on the coal industry is selected as a sample, and whether the conclusions obtained are applicable to other industries remains to be explored. In addition, considering the availability of data, it only starts with the micro factors that affect the capital structure. Macroeconomic factors such as economic growth rate, inflation, and loan interest rate also affect the capital structure of enterprises, which will be the direction of future research.

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