# Empirical Analysis of the Capital Structure and Profitability of Chinese Listed Companies

## -- A Case Study of Listed Companies of Hubei Province

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**Abstract.** This paper founds that Hubei Province listed company's capital structure to profitability is negatively related. This paper selects 69 listed companies in Hubei Province as the research objects, aiming to explore the internal relations between capital structure and profitability and provide reference for listed companies in Hubei Province to optimize capital structure. This paper uses stata16.0 software for empirical analysis and conducts multiple linear regression analysis on the collected data with capital structure as the explanatory variable and profitability as the explained variable, and obtains the multiple linear formula. Accordingly, the way to increase the profitability of listed companies is to optimize capital structure.

**Keywords:** Capital Structure; Profitability; Empirical Analysis; Listed Company of Hubei Province.

## 1. Introduction

Since the implementation of the Rise of Central China Strategy, the economy of central China has achieved rapid development, but its economic risk tolerance is still weak, therefore, under this background, studying the relationship between enterprise capital structure and enterprise performance is of great significance to optimize enterprise capital structure, improve enterprise performance, promote high-quality economic development in central China [1]. The emergence of empirical theory of capital structure has narrowed the distance between capital structure and the actual market, but the existing theories are not universally applicable, scholars at home and abroad have carried out many empirical studies on the relationship between capital structure and enterprise performance, due to the differences in the economic systems and capital market perfection of various countries, the research results of different industries and different regions are quite different, therefore, studying the relationship between capital structure and enterprise performance has strong theoretical and practical significance.

The M&M Theorem has laid the theoretical basis for the modern capital structure since the 1950s, domestic research scholars carried out empirical analysis in combination with the previous research results of domestic and foreign scholars and China's national conditions, although have achieved many results, due to the large differences in the industries, regions and company natures selected in the research samples, it is impossible to draw the unified conclusion, and the research results are not universal and comparable either [2]. Moreover, domestic studies on enterprise capital structure and enterprise performance mainly study factors of various industries, there are still few empirical studies on enterprise capital structure and enterprise performance of various regions. Therefore, under the constraint conditions of China's economic environment and specific regional, this paper makes the empirical analysis on the correlation between capital structure and enterprise performance of listed companies of Hubei Province, which has great practical significance for promoting the long-term and stable economic development of Hubei Province, furthermore, it can supplement the vacancy in relevant research fields and further deepen the understanding of the relationship between capital structure and enterprise performance.

This paper used the annual report data of listed companies of Hubei Province to verify whether the capital structure of the sample listed companies was related to enterprise performance by combining empirical analysis and normative analysis. First, this paper reviewed the empirical research of scholars at home and abroad, studied and analyzed the results of empirical analysis at home and abroad, obtained the preliminary understanding that the academic circles about the relationship

between enterprise performance and capital structure cannot be determined, and preliminarily understood the variables and related indicators that affect the enterprise performance; secondly, this paper carried out empirical research on the capital structure and enterprise value data of 69 listed companies of Hubei Province from 2005 to 2020, built the relevant models, used EXCEL, STATA16.0 and other statistical software for analysis, further understood the relationship between the capital structure and enterprise performance of enterprises of Hubei Province, concluded that there was negative correlation between enterprise performance and capital structure, provided empirical basis for the selection of capital structure of listed companies of Hubei Province, moreover, put forward relevant policy suggestions for the development of listed companies of Hubei Province based on the research conclusions.

## 2. Literature Review

Modigliani and Miller (1958) put forward the M&M theorem, which was the relatively complete theory on capital structure in the early period, and laid the theoretical basis for modern capital structure, they believed that the capital structure had nothing to do with the market value of any enterprise under the hypothesis of the perfect capital market [3]. However, it can be seen from the research results of recent empirical analysis at home and abroad that the academic world has not yet drawn the unified conclusion on the correlation between capital structure and enterprise performance, but it can be roughly divided into two types: first, there is negative correlation between enterprise performance and capital structure, second, there is negative correlation between enterprise performance and capital structure.

Modigliani and Miller (1963) revised the M&M theorem, relaxed the hypothesis without tax, believed that the value of indebted enterprises would exceed the value of enterprises without debt, when the enterprise's debt was close to 100%, the enterprise value reached its maximum, at this time, there was positive correlation between company value ratio and company debt [4]. Jensen and Meckling (1976) believed that when the equity esd 100%, the agency fee of right and interest capital was the highest, the introduction of debt will reduce the agency fee of right and interest capital, but the agency fee of debt capital will increase accordingly, therefore, there was an optimal capital structure to minimize the total agency fee [5]. Ross's signaling theory believed that investors regarded stock issue as the decline signal of enterprise operation situation (1977), regarded debt financing as the good signal of enterprise operation situation, therefore, there was positive correlation between company debt and enterprise value [6]. Some empirical analysis results at home and abroad are consistent with the theoretical basis of capital structure, and believe that there is positive correlation between company's capital structure and enterprise performance. Masulis (1983) confirmed the trade-off theory through empirical research, concluded that when the debt ratio was between 0.23-0.45, there was positive correlation between enterprise debt ratio and enterprise operation performance [7]. Zhao Qiong (2007), used the company fixed effect regression method analyze the data of listed manufacturing companies from 2002 to 2005, and concluded that there was positive correlation between the long-term debt of listed manufacturing companies and enterprise value [8].

However, most results of empirical analysis are inconsistent with the theoretical basis of capital structure, and believe that there is negative correlation between company capital structure and enterprise performance. Titman and Wessels (1988) selected the data of listed manufacturing companies from 1972 to 1982 as the samples, carried out analysis through linear model structure, and concluded that there was significant negative correlation between enterprise performance and enterprise debt ratio [9]. Mohd, Perry and Rimbey (1998) studied the impact of company equity structure on capital structure and concluded that there is negative correlation between company performance and debt ratio [10]. Frank and Goyal (2003) believed that the lack of data would have a greater impact on the empirical results, so they selected a huge database, and the results showed that there was the negative correlation between company performance and the financial leverage ratio of market value [11]. Lu Zhengfei and Xin Yu (1998) were the first to study the relationship between

capital structure and enterprise performance in China, they used basic statistical methods to analyze the influencing factors of capital structure in different industries, concluded that there was significant negative correlation between enterprise profitability and capital structure, scale, growth and other factors have no significant impact on the capital structure [12]. Li Yichao and Jiang Zhensheng (2001), used Cross-sectional analysis and TSCS analysis methods, concluded that there is significant negative correlation between enterprise performance indicator and debt to asset ratio [13]. Wang Juan and Yang Fenglin (2002) studied the factors that affect the capital structure ratio, and concluded that there is negative correlation between enterprise profitability and capital structure, and there is negative correlation between company scale and capital structure [14]. Li Jinwang and Zhang Shiqiang (2004) used Cross-sectional data method to carry out empirical research on capital structure, they took enterprise scale as an important factor affecting capital structure, and concluded that there was negatively correlation between debt to asset ratio and enterprise value of listed companies in China's household appliances industry [15]. Chen Zhijuan (2006) adopted various performance indicators to build regression model for debt to asset ratio and comprehensive performance and carried empirical analysis based on industry, concluded that there was negative correlation between the capital structure and enterprise performance of listed companies in China [16]. Yu Jun (2015) took earnings per share as the explained variables, debt structure and equity structure as the explanatory variables, and enterprise scale and operating income growth rate as the control variables, and concluded that there was significant negative correlation between debt-to-asset ratio and earnings per share, there was significant positive correlation between enterprise scale, operating income, and earnings per share [17]. Liu Quanxiu and Li Xinglin (2020) eliminated listed companies with missing data, abnormality, and ST, analyzed the arranged data, and concluded that there was are negatively correlation between debt-to-asset ratio, long-term interest-bearing debt ratio and enterprise value [18].

According to the above domestic and foreign literatures, we can see there is still no accurate conclusion on the correlation between the capital structure and enterprise value of listed companies at home and abroad, but empirical results of most literatures are that there is negative correlation between capital structure and enterprise performance of listed companies. According to the sorting of summary of the research results of the above-mentioned domestic and foreign literatures, we can see that most above-mentioned literatures carried out statistical analysis based on classification of industry factors, and statistical analysis based on regional classification is still rare, this paper adopts the research method of empirical analysis, selects listed companies in various industries in Hubei Province as the research objects for analysis, and considers the influence of industry factors and regional factors on the empirical results. Moreover, the above literatures mostly take 3-5 years of data as sample for analysis, and does not fully consider the impact of time factors on the empirical analysis results, therefore, this paper selects the data of listed companies of Hubei Province from 2005 to 2020, and takes enterprise performance as the explanatory variable, capital structure indicator as explanatory variables, use the statistical analysis software STATA16.0, use the random effects model analyze the relationship between the two, and then explore ways to optimize the capital structure of the enterprise. According to the variable selection condition and empirical results of the above-mentioned literatures at home and abroad, we can see that most literatures selects the debt-to-capital ratio as the capital structure indicator, moreover, the correlation among short-term interest-bearing debt ratio, long-term interest-bearing debt ratio and enterprise performance is often inconsistent, so this paper selects the above three indicators as evaluation indicators of capital structure of explanatory variable. Moreover, the above-mentioned literatures concluded that there is correlation among enterprise scale, development potential and enterprise performance, the enterprise scale and enterprise development potential are set as control variables of empirical analysis to ensure the validity of the experimental results.

# 3. Model Establishment

## 3.1 Construction of the Measurement Model

The data in this paper is characterized by short panel data with more Cross-sectional units (69) and fewer periods (05-20 years). The model of enterprise performance indicator, capital structure indicator, and control variable indicator is constructed as follows:

$$EPS_{it} = \xi_{it} + \mu_i + \beta_1 TDR_{it} + \beta_2 SR_{it} + \beta_3 LR_{it} + \beta_4 ASSET_{it} + \beta_5 OIGR_{it}$$

$\xi_{it}$ : random variable

$\mu_i$ : constant term

$\beta_{1-5}$ : coefficient of independent variable

$EPS_{it}$ : earnings per share of the i-th company in year t

$TDR_{it}$ : debt to asset ratio of the i-th company in year t = total debt/total assets

$SR_{it}$ : short-term interest-bearing debt ratio of the i-th company in year t = (short-term borrowing + long-term borrowing due in one year)/total debt

$LR_{it}$ : long-term interest-bearing debt ratio of the i-th company in year t = (long-term borrowing + bond payable)/total debt

$ASSET_{it}$ : total asset of the i-th company in year t

$OIGR_{it}$ : growth rate of the operating income of the i-th company in year t = the growth rate of this year's operating income / the amount of operating income of the last year

## 3.2 Explanation of Variable Selection

### 3.2.1 Explained Variables

The measurement of enterprise performance indicators mostly adopts return on equity, Tobin's Q value, and earnings per share (EPS). EPS reflects the after-tax profit created per share; it is the ratio of the company's net income this year after deducting preferred stock dividends to the weighted average number of outstanding ordinary shares. Since the data analyzed in this paper is panel data, when analyzing Cross-sectional data, earnings per share (EPS) can analyze and compare individual differences among companies; when analyzing time series, earnings per share (EPS) can analyze and compare change trends of company profitability, so select earnings per share (EPS) is selected as the explained variable of this paper.

### 3.2.2 Core Explanatory Variables

For the research on the capital structure of listed companies in our country, the first issue is to determine the quantitative representation of the capital structure, capital structure represents the relationship between bond and equity, the debt-to-asset ratio is the ratio of a company's total debt to its total assets, and it is an important indicator reflecting the solvency and asset safety of an enterprise. The impact of capital structure on enterprise performance is divided into short-term capital structure and long-term capital structure based on the length of time. Combining the characteristics of China's market and the enterprise operation and management ways, this article adopts debt to asset ratio, short-term interest-bearing debt ratio, and long-term interest-bearing debt ratio as core explanatory variables.

### 3.2.3 Control Variables

In order to ensure the validity of the test results, considering the scale effect brought by the enterprise scale and the influence of the company's development potential on the enterprise performance, the enterprise scale and development potential are taken as control variables, among which the enterprise scale = total assets; development potential = operating income growth rate [18]. The following hypothesis are made for all variables:

**Table 1.** Variable hypothesis

| variable | indicator | correlation hypothesis |
|---|---|---|
| enterprise performance | earnings per share (EPS) | — |
| capital structure | debt to capital ratio(TDR) | negative correlation |
| capital structure | short-term interest-bearing debt ratio (SR) | negative correlation |
| capital structure | long-term interest-bearing debt ratio (LR) | negative correlation |
| enterprise scale | total assets(ASSET) | positive correlation |
| enterprise potential | operating income growth rate (OIGR) | positive correlation |

### 3.2.4 Data Sources

The listed companies of Hubei Province on Straight Flush Software are selected. First, financial companies are excluded, because financial listed companies have their own special aspects, so they are excluded from the samples during the study; secondly, ST companies are excluded, because the financial indicator numbers of these companies are different from other companies, if their data is included in the scope of empirical analysis, more extreme values will be generated, which will have a greater impact on the average indicators of listed companies of Hubei Province; then companies with incomplete financial data will be excluded, because incomplete data will have a greater impact on the accuracy of the whole empirical analysis.

According to the above selection conditions, the financial data from 2005 to 202 of totally 69 listed companies in 9 industries are selected, of which the industry classification is based on the "Guidelines of the Industry Classification of Listed Companies" revised in 2012. The financial data of the empirical research mainly comes from websites such as CSMAR Database and CNINF, the collection, processing and analysis of the data are all completed manually by EXCEL2019 and STATA16.0 software.

## 3.3 Data Description

### 3.3.1 Statistical Description

After collecting and analyzing data, the data of 69 listed companies in Hubei Province from 2005 to 2020 are collected, and the results of statistical analysis are shown in Table 2. First, the difference range in EPS of listed companies of Hubei Province is large, among which the highest is 4.2873, the lowest is -6.8599, the average is 0.3122, and the standard deviation is only 0.6536; second, in the TDR, SR, and LR indicators, the biggest difference range is TDR, the highest is 12.2384, the lowest is 0.0244, and the average is 0.5762, the range and dispersion of SR and LR are both small, which is related to the small base, we can see that the capital structure of listed companies of Hubei Province is not stable enough and fluctuates up and down; third, in the ASSET and OIGR indicators, the range and dispersion of ASSET are small, while the range and dispersion of OIGR are very large, the maximum value of OIGR is 62.1819, the minimum value is -4.6185, the average is only 0.7108, and the standard deviation is 3.8238. The concrete data is shown in Table 2.

**Table 2.** Statistical description

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| EPS | 1,007 | 0.3122404 | 0.65359 | -6.8599 | 4.2873 |
| TDR | 1,007 | 0.5761938 | 0.8348133 | 0.0244 | 12.2384 |
| SR | 1,008 | 0.2315604 | 0.1799319 | 0 | 0.8366 |
| LR | 1,008 | 0.173495 | 0.216377 | 0 | 1.0312 |
| ASSET | 1,008 | 9250000000 | 19500000000 | 0 | 259000000000 |
| OIGR | 992 | 0.7108238 | 3.823762 | -4.6185 | 62.1819 |

Correlation test is carried out between two variables, and the conclusion is shown in Table 3. The control variable OIGR failed the correlation test, it suggests that there is no significant correlation between OIGR and EPS.

**Table 3.** Correlation test

| | EPS | TDR | SR | LR | ASSET | OIGR |
|---|---|---|---|---|---|---|
| EPS | 1.0000 | | | | | |
| TDR | -0.2291* | 1.0000 | | | | |
| SR | -0.1978* | 0.0439 | 1.0000 | | | |
| LR | 0.1142* | -0.0007 | -0.0216 | 1.0000 | | |
| ASSET | 0.2162* | 0.0178 | -0.0679* | 0.2754* | 1.0000 | |
| OIGR | 0.0204 | 0.0229 | -0.0013 | 0.0141 | 0.7362 | 1.0000 |

Note: * in the table means significant at the 95% confidence level

# 4. Empirical Analysis

## 4.1 Model Analysis and Selection

Assuming the fitting models of all companies have the same part, namely, the slope terms of each company are the same, but also have different parts, namely, the intercept terms are different. The classic Hausman test model is used to determine individual effects. H0 hypothesis of the classic Hausman test is that the fixed effects model is consistent with the random effects model, but the random effects are more effective at this moment. Therefore, if the test is passed, the random effect model should be selected; if the test is not passed, the random effect model is inconsistent with the null hypothesis, and the fixed effect model should be selected at this time. The test results obtained by using STATA statistical analysis software are shown in Table 4, p value of Hausman test is 0.0355<0.05, so the null hypothesis is rejected at the 95% confidence level, so the fixed effects model is selected.

**Table 4.** Test results of classic Hausman

| | (1) | (2) |
|---|---|---|
| VARIABLES | FE | RE |
| | | |
| TDR | -0.1890*** | -0.1833*** |
| | (0.0242) | (0.0233) |
| SR | -0.9695*** | -0.8228*** |
| | (0.1300) | (0.1184) |
| LR | -0.1198 | 0.0459 |
| | (0.1347) | (0.1127) |
| ASSET | 0.0000*** | 0.0000*** |
| | (0.0000) | (0.0000) |
| OIGR | 0.0066 | 0.0062 |
| | (0.0050) | (0.0049) |
| Constant | 0.6078*** | 0.5281*** |
| | (0.0494) | (0.0521) |
| | | |
| Observations | 991 | 991 |
| Number of _company | 69 | 69 |
| Hausman | | 10.31 |
| p-value | | 0.0355 |

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

However, if there are serial autocorrelation and heteroscedasticity problems in the panel data, the classic Hausman test will have larger horizontal distortion, and it is easy to get wrong conclusion, the

stable Hausman test is needed. Therefore, it is necessary to carry out serial correlation test and autocorrelation test on the results of the fixed effect model, the results are shown in Table 5, the p value of the serial autocorrelation test is 0.0029<0.05, so under the 95% confidence level, the data in this paper has the problem of serial autocorrelation; the p value of the heteroscedasticity test is 0.0000<0.05, so under the 95% confidence level, the data in this paper has the problem of heteroscedasticity.

**Table 5.** Serial autocorrelation and heteroscedasticity test results of the fixed effect model

| VARIABLES | Value |
|---|---|
| p-value1 | 0.0029 |
| p-value2 | 0.0000 |

In summary, it is necessary to use the robust Hausman test judge which model the data in this paper is more suitable for again, the results of the robust Hausman test are shown in Table 6, the p value of the robust Hausman test result is 0.3715>0.05, accept the H0 hypothesis, therefore, the data in this paper is more suitable for using random effect model.

**Table 6.** Test results of Robust Hausman

| VARIABLES | Value |
|---|---|
| Hausman | 5.378 |
| p-value | 0.3715 |

**Table 7.** Test results of random effects model

| | (1) |
|---|---|
| VARIABLES | RE |
| | |
| TDR | -0.1833*** |
| | (0.0000) |
| SR | -0.8228*** |
| | (0.0000) |
| LR | 0.0459 |
| | (0.6838) |
| ASSET | 0.0000*** |
| | (0.0000) |
| OIGR | 0.0062 |
| | (0.1998) |
| Constant | 0.5281*** |
| | (0.0000) |
| | |
| Observations | 991 |
| Number of _company | 69 |
| p-value | 0.0000 |

z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

STATA statistical software is used to test the random effect model, the results are shown in Table 7, the p value of the test result is 0.0000<0.05, so the null hypothesis H0 is rejected at the 95% confidence level, namely, reject the hypothesis that the coefficient of all explanatory variables is 0, so there must be explanatory variables whose coefficients are not 0, we can see that random effect model is suitable for the analysis of the data in this paper. Among them, the p values of TDR, SR, and ASSET are all 0.000, the coefficients of the above three explanatory variables passed the test, while the p values of LR and OIGR are 0.684 and 0.200 and fail the coefficient test. Failure may be caused by serial autocorrelation, heteroscedasticity, and Cross-sectional dependence, it may also be

that the selected explanatory variable itself has no significant linear relationship with the independent variable.

### 4.2 Model Test

#### 4.2.1 Sequence Autocorrelation Test

STATA statistical analysis software is used to carry out the serial autocorrelation test of the data in this paper, the results are shown in Table 8, the p value is 0.0000<0.05, so the null hypothesis H0 is rejected, therefore, the data in this paper has the problem of serial autocorrelation.

#### 4.2.2 Heteroscedasticity Test

Because this paper adopts the random effects model, uses the GLS model for estimation, the random effects model itself has considered the heteroscedasticity problem to a large extent, which is mainly reflected in sigma_u^2, so the problem of heteroscedasticity test can be ignored.

#### 4.2.3 Cross-section Dependency Test

STATA statistical analysis software is used to test the Cross-sectional dependence of the data in this paper, the results are shown in Table 8. The p value is 0.0000<0.05, so the null hypothesis H0 is rejected. Therefore, the data in this paper has the problem of Cross-sectional dependence.

**Table 8.** Test results of sequence autocorrelation and Cross-sectional dependence of random effects model

| VARIABLES | Value |
|---|---|
| p-value1 | 0.0000 |
| p-value2 | 0.0000 |

#### 4.2.4 Model Regression Results

This paper adopts measures to change the fitting method of data, corrects the problems of serial autocorrelation and Cross-section dependency in the data in this paper. Because the data in this paper are short-panel data, STATA statistical analysis software is used, the independent variable is regarded as the AR first-order model, that is, the data of the next year is only affected by the data of the last year, and the problems in the model are corrected, the comparison between the corrected result and the original RE model result is shown in Table 9.

**Table 9.** Analysis and comparison of model regression results

| | (1) | (2) |
|---|---|---|
| VARIABLES | RE | XTPCSE |
| | | |
| TDR | -0.1833*** | -0.2101*** |
| | (-7.8766) | (-4.1872) |
| SR | -0.8228*** | -0.5719*** |
| | (-6.9515) | (-3.4367) |
| LR | 0.0459 | -0.0726 |
| | (0.4073) | (-0.3659) |
| ASSET | 0.0000*** | 0.0000*** |
| | (5.0460) | (3.3577) |
| OIGR | 0.0062 | 0.0057** |
| | (1.2822) | (2.0509) |
| Constant | 0.5281*** | 0.4064*** |
| | (10.1269) | (4.6240) |
| | | |
| Observations | 991 | 991 |
| R-squared | | 0.112 |
| Number of _company | 69 | 69 |

z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

### 4.3 Empirical Results

According to the regression results, we can see that the regression equation of the relationship between enterprise performance and capital structure of listed companies of Hubei Province is:

$$EPS=-0.2101TDR-0.5719SR+0.0000ASSET+0.0057OIGR+0.4064$$

We can see from the regression analysis results of listed companies of Hubei Province in Table 9:

1. The correlation among most explained variables is significant at 5% significance level; the correlation between LR and EPS fails the test, so there is no significant linear correlation between EPS and LR.
2. TDR and EPS show significant negative correlation, pass the t-test at 1% significance level, and the coefficient of TDR is 0.2101, whenever TDR changes one unit, EPS can change 0.2101 unit with its negative direction.
3. SR and EPS show significant negative correlation, pass the t test at 1% significance level, the coefficient of SR is 0.5719, whenever SR changes one unit, EPS can change 0.5719 units with its negative direction.
4. ASSET and EPS show significant positive correlation, pass the t test at 1% significance level, and the coefficient of ASSET is 0.0000, whenever ASSET change one unit, EPS can change the corresponding unit with its positive direction.
5. OIGR and EPS show significant positive correlation, pass the t test at 5% significance level, and the coefficient of OIGR is 0.0057, whenever OIGR changes one unit, EPS can change 0.0057 unit with its positive direction.
6. The constant term is 0.4064, it suggests that even if all explanatory variables are 0, EPS can still be maintained at about 0.4064.
7. R-squared value is $0.112<0.5$, it suggests that the fitting degree of the data in this paper is not high during the fitting analysis.

### 4.4 Result Analysis

Capital structure TDR and SR are negatively correlated with enterprise performance indicator EPS. It is well known that internal financing is the best financing method, and most enterprises will not choose to expand external financing when the business is in good condition. When the enterprise's own operating profit level cannot meet the enterprise's operating needs, the enterprise will use external financing to alleviate the pressure on the enterprise's capital flow, and the enterprise's debt level is relatively high at this time [18]. Therefore, a high level of debt will cause negative impact on the enterprise, which is consistent with the empirical results. Moreover, according to the analysis results, we can see that TDR and SR have relatively large impact on EPS, therefore, operators of listed companies need to focus on the impact of the size of the two indicators on enterprise performance when making financing strategies.

Considering the influence or interference of other factors except for explanatory variables in this paper on the explained variables, and alleviating the influence of internal problems on the experimental results, therefore, we choose to set ASSET and OIGR as the control variables of this paper, they are significantly correlated with EPS at the 95% confidence level, it suggests that EPS changes with changes of ASSET and OIGR. Enterprise scale ASSET and development potential OIGR as control variables are positively related to enterprise performance, enterprise scale is the important factor affecting enterprise production capacity, the larger the enterprise scale, the easier it is to achieve diversified business strategy, which will inevitably bring about the increase of economic benefits and improve the enterprise performance, the development potential measures the sustainable development of the enterprise in the future, and the profitability of the enterprises with high development potential will continue to increase relatively, thereby improving the enterprise performance.

Different variables have different effects on enterprise performance, therefore, in order to improve enterprise performance, we not only need to consider the capital structure of the enterprise, but also the influence of the enterprise scale, development potential and other variables. Managers need to select the capital structure suitable for the enterprise development and the matching relationship among different influencing factors based on the development strategy of the enterprise, make decisions on the production and operation strategy, thereby improving the performance of the company.

## 5. Conclusion

This paper takes 69 listed companies of Hubei Province as the research objects, collects financial data from 2005 to 2020 for empirical analysis, studies the correlation between the capital structure and profitability of listed companies of Hubei Province, and provide references for optimizing the capital structure and improving corporate performance of listed companies of Hubei Province. On the basis of reviewing literatures at home and abroad and related theories, combining the capital structure and profitability state of listed companies of Hubei Province, this paper selects profitability as the explained variable, capital structure as the explanatory variable, and operating income growth rate and enterprise scale as control variables, moreover, selects debt to asset ratio, long-term interest-bearing debt ratio and short-term interest-bearing debt ratio as indicators of capital structure, and selects earnings per share as the indicator of enterprise profitability. This paper uses the statistical analysis software STATA16.0 for analysis, uses the random effect model and adopts the multiple regression analysis method, concludes that there is negative correlation between enterprise capital structure and profitability. The concrete conclusions are as follows: EPS has negative correlation with TDR and SR; EPS has no correlation with LR; EPS has positive correlation with OIGR and ASSET.

This paper studies listed companies of Hubei Province by region, makes up for the gaps in related research fields, the research results basically achieve the expected purpose, concludes that the capital structure is negatively correlated with profitability of listed companies of Hubei Province, it is helpful to make suggestions for promoting the optimization of the capital structure of listed companies of Hubei Province and the economic development of Hubei Province. However, this paper also has the following shortcomings: the data selected in this paper are data from 2005 to 2020 for empirical analysis, but changes of the macroeconomic environment will affect the selected sample data, for example, the global financial crisis in 2008 and the impact of the COVID-19 in 2020, which may cause extreme values in some years, the empirical analysis of this paper does not exclude extreme values, which may affect the final empirical results; moreover, this paper excludes all ST and ST* companies, although the impact of outliers can be avoided, it also ignores the impact of such companies on the final empirical results; when testing and correcting model, it is impossible to determine which lag model to use for correction, this paper chooses to regard the independent variable as AR first-order model, namely, the data of the next year is only affected by the data of the last year, which may affect the accuracy of the correction results, and then affect the final empirical results.

This paper concludes that the capital structure is negatively correlated with enterprise profitability of listed companies of Hubei Province, this is consistent with the conclusions of Yang Yuanxia and Yi Bingna on the empirical analysis of Hunan Province and Wang Changjiang and Lin Chen on the empirical analysis of Jiangsu Province. This paper concludes that the correlation coefficient between the capital structure and the enterprise profitability of listed companies in Hubei Province is R^2=0.1117, it suggest that there is correlation between the independent variable and the dependent variable, but the explanation degree is not high, we can see that the independent variable of the research is not the main influencing factor of the dependent variable of the research, we hope we can further explore the main dependent variable that affects EPS in the future; we can subsequently use STATA16.0 eliminate data with extreme values, eliminate the impact of data limitations on the empirical results, and carry out empirical analysis on the processed data again to draw conclusions.

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