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**The relationship between capital structure and profitability: Evidence from China**

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# The Relationship between Capital Structure and Profitability: Evidence from China

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## **ABSTRACT**

The objective of this study is to investigate whether the capital structure has an impact on profitability in Chinese A-share firms. I employ multiple proxies to measure profitability: (1) Return on Equity, (2) Return on Assets, and (3) Profit Margin. I use three proxies to measure capital structure: (1) Ratio of Short-term Debt to Total Assets, (2) Ratio of Long-term Debt to Total Assets, (3) Ratio of Total Debt to Total Assets. Using a large sample of Chinese A-share companies from 2009 to 2018, this paper finds that a significantly negative relationship exists between capital structure and profitability. I use Pearson Correlation Analysis and Ordinary Least Square Regression to test the effect of short-term debt, long-term debt and total debt on profitability, respectively. These results indicate that Chinese listed companies prefer equity financing to debt financing and help managers to find the optimal capital structure.

**Keywords:** *Capital structure; profitability, Chinese A-share firms, OLS regression*

## I. INTRODUCTION

In this study, I examine the relationship between capital structure and profitability among Chinese A-share companies. Many previous scholars have concerned with the association between capital structure and profitability (e.g. Abor 2005; Gill et al. 2011; Kyereboah-Coleman 2007; Ebaid 2009; Xu 2012; Danis et al. 2014; Shubita and Alsawalhah 2012; Admassu 2016). Shubita and Alsawalhah (2012) demonstrate a negative relationship between capital structure and profitability, which is consistent with the findings of Admassu (2016). These results can be explained by the pecking order theory that profitable companies employ less debt than equity and internal financing. Abor (2005) draws an opposite conclusion on the effect of short-term debt on profitability, suggesting that short-term loans can reduce costs for companies with a lower interest rate. The findings of Gill et al. (2011) also support this conclusion.

According to Hao and Han (2017), Chinese studies about this topic started relatively late, and many Chinese studies have concluded a negative relationship between debt and profitability. Du and Cheng (2017) also state a negative relationship between debt and profitability of real estate companies in the A-stock market in China. Since many previous researchers focused on particular industries and regions, this paper seeks to extend previous studies and examines companies in China over 10 years from 2009 to 2018. This study tends to use the latest data and includes more industries to figure out the overall relationship between capital structure and profitability.

This study is aimed at examining the relationship between capital structure and profitability of A-share Chinese firms listed on SSE and SZSE over ten years from 2009 to 2018.

There are reasons why this study is important based on previous researchers. Companies can choose to rely on debt or equity as a financing option, and they have been trying to figure out an optimal capital structure to maximize their market value. (Abor 2005). As the Chinese market economy develops, companies may need to depend more on external financing, especially borrowing money from banks, while many companies in different industries have a relatively low-profit level and high debts. It is significant to revisit this topic and examine the relationship between capital structure and profitability. (Hao and Han 2017; Zhang 2017).

Moreover, it is important to notice that China has a unique institutional structure from other developed or developing countries. The government has control over those enterprises and has strict restrictions on long-term bank loans, which decreases the probability for companies to suffer from the financial crisis (Huang 2006). According to Chen (2004), Chinese companies have lower leverage, especially much fewer long-term debts than western companies. Therefore, Chinese companies cannot be explained accurately by “pecking order theory” and “trade-off theory”. Chen (2004) mentioned a new “pecking order” existing in the Chinese market. Companies use retained profits first, then employ equity financing, and finally use debt financing (Chen 2004).

However, since economic develops, companies need to rely more on external financing, so it is necessary to examine the relationship between capital structure and profitability, which conforms to the Chinese national condition. Since western models cannot explain this issue

perfectly, it is reasonable to revisit this problem using Chinese data. Furthermore, previous Chinese studies used old data and did not separate the effects of short-term debt and long-term debt. For example, Hao and Han (2017) only test one-year data in 2016, while Du and Cheng (2017) only use the ratio of total debt to total assets as the indicator of capital structure. Therefore, this paper seeks to examine the effect of short-term debt and long-term debt separately, while the overall effect of total debt is also investigated.

In this paper, I used the latest ten years data of 673 A-share companies from 2009 to 2018 collected on CSMAR. Data related to the capital structure are collected from financial statements and calculated to the leverage ratio, while profitability ratios were collected from the financial indices section on CSMAR. Pearson Correlation Analysis and Ordinary Least Square Regression are applied and conclude a negative relationship between debt and profitability.

This paper may contribute to the existing literature in several aspects. First, this paper focuses on A-share firms in China and tests the impact of capital structure using the latest data. Second, this study includes all the qualified companies listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange over ten years and only excludes financing and utility industries. So, the results of this paper could be generalized to Chinese companies in most industries. Third, this paper also uses profit margin as the indicator of profitability, which could provide additional understandings of the capital choice of Chinese listed firms.

The remainder of this paper is organized as follows. In the next section, I review previous research for definition and existing conclusions and develop hypotheses. In the third section, I introduce the data and sample collection and explain my research methodology. In the fourth section, I analyze the main empirical results and connect the results to hypotheses. In the fifth section, I discuss those findings, present potential limitations of this research and demonstrate reliability and validity. In the last section, I draw conclusions.

## **II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

### **Capital Structure**

Capital structure influences how a company finances its assets and whether the stakeholders' needs can be met by the company. Based on Brealey et al. (2003), companies are trying to find an optimal capital structure to achieve the maximum market value of the firm. On the contrary, Modigliani and Miller (1958) propose a theory called "capital structure irrelevance", suggesting that financial leverage has no impact on the market value of a firm. However, this theory was challenged. According to Abor (2005), this theory assumes the perfect capital markets with homogenous expectations, and without taxes and transaction costs. These assumptions are untenable because of bankruptcy costs, tax treatments, and agency costs. The more debt a company has, the more probable it goes bankrupt because creditors are afraid that the company cannot pay for those loans and interests. Debts also generate agency costs between creditors and shareholders,

and between managers and shareholders. Referring to previous studies (e.g. Abor 2005; Gill et al. 2011; Ebaid 2009), capital structure is measured by leverage ratios, including SDA, LDA, and DA.

### **Profitability**

Profitability may be measured by different indicators. Taking Abor's (2005) paper as an example, the author used return on equity, which is calculated by earnings before interest and taxes divided by equity. Abor (2005) suggests that ROE indicates the performance of a firm during a particular period and the efficiency of the owner's invested capital. The same ratio was also used by Gill et al. (2011), Yegon et al. (2014), and Shubita and Alsawalhah (2012). However, some other indicators were also applied. For example, Velnampy and Niresh (2012) measure profitability by net profit ratio, return on capital employed, return on equity, and net interest margin. Moreover, Azhagaiah and Gavoury (2011) apply return on assets and return on capital employed to indicate profitability. In Ebaid's study, (2009) gross margin, return on assets and return on equity are employed to measure profitability.

### **Relationship between Capital Structure and Profitability**

Myers and Majluf (1984) advocate "pecking order theory" that companies prefer internal financing to debt and equity. When it has to use external financing, it will prefer using debts to issuing stocks. Holding this theory, some scholars, such as Rajan and Zingales (1995), find that debts and profitability are negatively related. On the other hand, based on the "trade-off theory", the relationship between capital structure and profitability is expected to be positive. Since if a company is profitable, creditors may consider it to be less risky to lend money to this company. So, it is more possible for this company to get loans with lower interests, and it is also easier for it to pay back the interests. (Yegon et al., 2014). Joshua Abor (2005) also supports this theory and further stated that short-term debt is positively related to profitability, while long-term debt and profitability are negatively connected. Further, Danis et al. (2014) suggest that the relationship between leverage and profitability depends on whether it is at an optimum or whether the company has refinancing.

### **Hypothesis Development**

Joshua Abor concluded that short-term debt has a significantly positive relationship with profitability. The study also found that companies relied on short-term debt as their financing options, and almost half of the assets are financed by short-term debts. Abor suggested that those companies chose short-term debts maybe because it was difficult to borrow long-term loans from financial institutions, or because there is no well-developed long-term loan market in the country. The positive connection between short-term debt and profitability was supported by Gill et al. (2011). Gill et al (2011) examine both service and manufacturing companies in the United States and indicated a positive association between short-term debt to total assets in both manufacturing and service industries. This conclusion is consistent with the findings of Yegon et al. (2014). However, Shubita and Alsawalhah (2012) finds that profitability is negatively connected with debt and profitable firms used more equity than debt. Admassu (2016) also suggests a negative effect

of debt on both ROA and ROE. Since previous studies have drawn conflict conclusions, this paper set two hypotheses:

H1: There is a positive relationship between short-term debt to total assets and profitability.

H2: There is a negative relationship between short-term debt to total assets and profitability.

According to Abor (2005), long-term debt to total assets has a significantly negative relationship with profitability. The researcher explained that compared with short-term loans, long-term debts were more expensive. When a firm uses a high percentage of long-term loans, it may increase the costs of a firm and then decrease the profit level. This result is consistent with the findings of Shubita and Alsawalhah (2012) and (Yegon et al. 2014). However, based on Gill et al. (2011), in the manufacturing industry of the United States, the relationship between long-term debt and profitability was positive, while in the service industry, there was no significant relationship between long-term debt and profitability. Therefore, the hypotheses are:

H3: There is a positive relationship between long-term debt to total assets and profitability.

H4: There is a negative relationship between long-term debt to total assets and profitability.

Abor (2005) also finds a significantly positive effect of total debt. Moreover, combined with the conclusions of short-term debt and long-term debt, Abor (2005) suggests that Profitable firms in Ghana relied more on debt and a high proportion of debt was short-term. This result supports the findings of Gill et al. (2011). However, the paper of Yegon et al. (2014) reveal that the relationship is significant. Since the positive relationship was not statistically significant, the researchers explained that the positive relationship between short-term debt and profitability canceled out the negative relationship between long-term debt and profitability. (Yegon et al. 2014). Furthermore, Shubita and Alsawalhah (2012) indicate that a negative correlation between total liabilities and profitability was found and equity was more used as the financing option. Considering these conflicts, this paper set hypotheses as below:

H5: There is a positive relationship between total debts to total assets and profitability.

H6: There is a negative relationship between total debts to total assets and profitability.

### **III. RESEARCH METHODOLOGY**

#### **Data and Sample Collection**

This study selects the sample from all A-share firms that have been listed on the SSE and SZSE over ten years (2009-2018). The database of this paper is completely secondary data collected from the financial statements and financial indices of sample firms listed on CSMAR. This paper excludes financing and utility industries. The total number of A-share companies excluding financing and utility industries is 3601. However, some companies have missing values of long-term debt, return on equity and profit margin. After deleting all the missing values, the final sample contains 673 firms.

## Research Method

This paper remains consistent with Abor's (2005) study and follows the measurements of capital structure and profitability. Profitability is the independent variable, indicated by return on equity, return on assets and profit margin. ROE, the abbreviation of return on equity, is calculated by net profit divided by average shareholder's equity. Return on assets, denoted as ROA, is measured by net profit divided by average total assets. Profit margin, denoted as PM, is measured by net income divided by net sales. Capital structure is measured by the ratio of short-term debt to total assets, the ratio of long-term debt to total assets and the ratio of total debt to total assets. Control variables are the firm size and sales growth. Firm size is represented by the natural logarithm of the sales, while sales growth is calculated as the difference between current year sales and previous year sales divided by previous year sales (Gill et al. 2011).

This paper uses Pearson Correlation to examine the relationship between capital structure and profitability first and applies Ordinary Least Square Regression to investigate the impact of each independent variable on the return on equity in detail. (Abor 2005). (Gill et al. 2011).

The relationship between capital structure and profitability is tested by the regression models as following: (Abor 2005), (Gill, et al. 2011).

### Model 1

$$ROE_{i,t} = \beta_0 + \beta_1 SDA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (1)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LDA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (2)$$

$$ROE_{i,t} = \beta_0 + \beta_1 DA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (3)$$

### Model 2

$$ROA_{i,t} = \beta_0 + \beta_1 SDA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (4)$$

$$ROA_{i,t} = \beta_0 + \beta_1 LDA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (5)$$

$$ROA_{i,t} = \beta_0 + \beta_1 DA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (6)$$

### Model 3

$$PM_{i,t} = \beta_0 + \beta_1 SDA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (7)$$

$$PM_{i,t} = \beta_0 + \beta_1 LDA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (8)$$

$$PM_{i,t} = \beta_0 + \beta_1 DA_{i,t} + \beta_2 Size_{i,t} + \beta_3 SGI_{i,t} + ei, \quad (9)$$

Where:

- $ROE_{i,t}$  is net income divided by average shareholders' equity for firm  $i$  in time  $t$ ;
- $ROA_{i,t}$  is net income divided by average total assets for firm  $i$  in time  $t$ ;
- $PM_{i,t}$  is net income divided by sales for firm  $i$  in time  $t$ ;
- $SDA_{i,t}$  is short-term debt divided by total assets for firm  $i$  in time  $t$ ;
- $LDA_{i,t}$  is long-term debt divided by total assets for firm  $i$  in time  $t$ ;
- $DA_{i,t}$  is total debt divided by total assets for firm  $i$  in time  $t$ ;

- $Size_{i,t}$  is natural logarithm of firm's sales for firm  $i$  in time  $t$ ;
- $SG_{i,t}$  is sales growth for firm  $i$  in time  $t$ ;
- $\beta_0$  is the intercept of equation;
- $\beta_1, \beta_2, \beta_3$  are coefficients for independent variables;
- $ei,t$  is the error term

#### IV. EMPIRICAL RESULTS

##### Descriptive Statistics

The summary of descriptive statistics is provided in Table 1. The three independent variables, including SDA, LDA, and DA, were calculated based on balance sheet values. The two control variables were calculated based on the sales on income statements. The three dependent variables including return on equity, return on assets, and profit margin on sales were collected from the financial indices on CSMAR. This table shows the average, median, maximum, minimum, and standard deviation of all variables.

As shown in Table 1, the average value of ROE over ten years is 6.21%, while the average ROA is 3.10%, and the average of PM is 4.80%. The ratio of short-term debt to total assets, SDA for short, reveals an average of 0.416978 and a median of 0.411283, which indicates about 40% of total assets are short-term liabilities. The ratio of long-term debt to total assets presents an average of 0.121985 and a median of 0.096662, while the ratio of total debt to total assets has an average of 0.556585 and a median of 0.567475. The average SDA is 0.294993 larger than that of the LDA ratio. Based on this table, the average size of those selected companies is 22.07524. Moreover, over the latest ten years, the average growth of sales is 42.3635%.

**TABLE 1**  
Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
ROE	0.062101	0.067704	8.715032	-7.091462	0.234223
ROA	0.031066	0.027286	0.477017	-0.521106	0.053046
PM	0.048097	0.048677	9.610557	-26.52624	0.595288
SDA	0.416978	0.411283	1.300135	0.016323	0.169770
LDA	0.121985	0.096662	0.768311	-0.122837	0.110273
DA	0.556585	0.567475	1.351834	0.037253	0.177082
SIZE	22.07524	21.95675	28.68892	14.69292	1.552992
SG	0.423635	0.098078	827.2020	-0.948361	11.16762

##### Correlation Analysis

Table 2 shows the Pearson Bivariate Correlation analysis result and indicates the relationship between capital structure and profitability. Based on this table, short-term debt and profitability were negatively correlated. As shown in Table 2, the Pearson correlation coefficient between SDA



and ROE is -0.110549, and the relationship between SDA and ROE was significant at the 0.01 level. Similarly, the relationship between SDA and ROA as well as PM was significantly negative. Thus, a significantly negative association existed between short-term debt and profitability. The relationship between LDA and ROE was not significant since the p-value is 0.0697, which is larger than 0.05. There was a significantly negative relationship between LDA and ROA, and the relationship was significant at the 0.01 level. However, this table shows the coefficient regarding the Pearson Correlation between LDA and PM is 0.025993, so the relationship between long-term debt and profit margin on sales was positive. The correlation significant is at the confidence level of 95 percent since the p-value is 0.0330. The relationship between DA and ROE was significantly negative, and the results regarding ROA and PM were consistent with it. Therefore, there was significantly negative relationship between total debt and profitability.

Size as one of the control variables was significantly positively associated with profitability since in Table 2 the p-value are all less than 0.01. The correlation between sales growth and ROE was significantly positive, which was consistent with the relationship between sales growth and ROA. There was no significant relationship between sales growth and profit margin on sales since the p-value is 0.4126, as shown in this table.

## **Regression Analysis**

### ***Model 1***

In this section, the dependent variables were ROE and the relationship between short-term debt, long-term debt as well as total debt and ROE was tested.

Based on the first equation, a significantly negative relationship between SDA and ROE was revealed. As shown in panel A of Table 3, the coefficient of SDA is -0.2719 with a t-value of -8.869 (p-value=0.0000). Table 3 also shows that the relationship between short-term debt and return on equity was significant at the confidence level of 99%. Approximately 20% ( $R^2=0.1951$ ) of the variance in the degree of return on equity can be explained by the degree of SDA, size, and sales growth. As for long-term debt, the coefficient of LDA is -0.1516 with a t-value of -3.559 and a p-value of 0.0004, indicating a significantly negative connection between long-term debt and return on equity. About 18.63% of the variance in profitability can be explained by LDA, size and sales growth. Moreover, a significantly negative impact of DA on ROE was found since the coefficient of DA is -0.3721 and the t-value is -12.228 (p-value=0.0000). The correlation significant is at the 99% confidence level. Table 3 shows that 20% of the variance ( $R^2=0.2043$ ) of the profitability may be explained by DA, size and sales growth. Size and sales growth positively affect the return on equity. In the first and third equations, the relationship between size and ROE was significant while the correlation was not significant in the second equation estimating the effect of long-term debt. The relationship between sales growth and ROE was significant in all three scenarios.

Therefore, taking ROE as a profitability indicator, a significantly negative relationship existed between capital structure and profitability. Hypothesis 1, 3, and 5 were rejected, while hypothesis 2,4, and 6 were accepted.

### ***Model 2***

Table 3 Panel B presents the regression results that use return on assets as the indicator of profitability. In the fourth equation, a significant negative relationship between SDA and ROA was found. This table illustrates that the coefficient of SDA is -0.0891 and the t-value is -15.854 (p-value=0.0000). Around 47% of the variance ( $R^2=0.4724$ ) of ROA can be disclosed by SDA, size, and sales growth. Table 3 also depicts a significantly negative relationship between LDA and ROA with a coefficient of -0.0756 and a t-value of -9.610 (p-value=0.0000). Approximately 46% of the variance ( $R^2=0.4587$ ) of profitability can be illustrated by LDA, size and sales growth. Similarly, DA and ROA were negatively correlated since the coefficient of DA is -0.1330 with a t-value of -24.332 (p-value=0.0000). There are about 50% of the variance ( $R^2=0.4995$ ) in the degree of profitability that can be explained by DA, size and sales growth. As for the two control variables, it was found that size and sales growth had positive effects on profitability, which is consistent with the results of Model 1.

Therefore, taking ROA as the indicator of profitability, a significantly negative relationship between capital structure and profitability was found. Hypotheses 1,3,5 were rejected, and hypotheses 2,4,6 were accepted.

### ***Model 3***

Table 3 panel C presents the regression analysis of the relationship between capital structure and profit margin. As shown in Table 3, the coefficient of SDA is -0.5961, and the t-value is -7.926, so there was a significantly negative relationship between SDA and PM. About 25% of the variance ( $R^2=0.2503$ ) of profit margin can be explained by SDA, size and sales growth. A similar result was found between DA and PM. However, the t-value of LDA is -1.168 (p-value=0.2427), which means that no significant relationship between LDA and PM was found. Size and sales growth were positively related to the profit margin. The correlation between control variables and profit margin was significant at the 0.05 level.

Taking PM as the indicator of profitability, the relationship between SDA or DA and profitability was significantly negative, while there was no significant relationship between LDA and profit margin. Therefore, the first, third and fifth hypothesis should be rejected, and the second, fourth and sixth hypothesis should be accepted.

Overall, the relationship between short-term debt, long-term debt, total debt and profitability is significantly negative, which indicates that capital structure is negatively associated with profitability.

**TABLE 2**  
Pearson Correlation Analysis

Correlation Probability		ROE	ROA	PM	SDA	LDA	DA	SIZE	SG
ROE	Pearson Correlation	1.000000							
	Sig. (2-tailed)	-----							
ROA	Pearson Correlation	0.609536**	1.000000						
	Sig. (2-tailed)	0.0000	-----						
PM	Pearson Correlation	0.220116**	0.365862**	1.000000					
	Sig. (2-tailed)	0.0000	0.0000	-----					
SDA	Pearson Correlation	-0.110549**	-0.275024**	-0.114053**	1.000000				
	Sig. (2-tailed)	0.0000	0.0000	0.0000	-----				
LDA	Pearson Correlation	-0.022109	-0.129728**	0.025993*	-0.229754**	1.000000			
	Sig. (2-tailed)	0.0697	0.0000	0.0330	0.0000	-----			
DA	Pearson Correlation	-0.129535**	-0.353081**	-0.095751**	0.793004**	0.394962**	1.000000		
	Sig. (2-tailed)	0.0000	0.0000	0.0000	0.0000	0.0000	-----		
SIZE	Pearson Correlation	0.070649**	0.082751**	0.037482**	0.261373**	0.083378**	0.303858**	1.000000	
	Sig. (2-tailed)	0.0000	0.0000	0.0021	0.0000	0.0000	0.0000	-----	
SG	Pearson Correlation	0.041213**	0.053816**	0.009990	0.011397	0.012988	0.017278	-0.086360**	1.000000
	Sig. (2-tailed)	0.0007	0.0000	0.4126	0.3499	0.2867	0.1564	0.0000	-----

Notes: \*\* Correlation is significant at the 0.01 level (2-tailed); \* Correlation is significant at the 0.05 level (2-tailed).

## V. DISCUSSION

Based on the empirical results, there is a significantly negative relationship between capital structure and profitability, which is consistent with expected results. Taking ROE as the indicator of profitability, SDA, LDA, and DA have negative effects on profitability. This result is supported by previous studies. For example, Shubita and Alsawalhah (2012) concluded the negative effects of short-term debt, long-term debt and total debt on return on equity for industrial companies. It means that an increase in debt may result in a decrease in profitability. However, these results conflict with Abor's (2005) conclusion, which indicates a positive effect of short-term debt and total debt on return on equity and a negative impact of long-term debt. The conclusions about short-term debt and total debt are the opposite. It may be because Chinese companies prefer equity to debt as their financing option.

Taking ROA as the indicator of profitability, a significantly negative relationship is found between SDA, LDA, DA and profitability, which is supported by Admassu's study (2016). However, Negasa (2016) states a positive relationship between the capital structure and profitability. Negasa (2016) used ROA as dependent variables but only used total debt ratio to measure capital structure. Therefore, it is possible that this paper draws a different conclusion based on the analysis of short-term debt and long-term debt.

When taking PM as the indicator of profitability, short-term debt and total debt have significant negative impacts on profitability. However, the relationship between long-term debt and profitability is not significant. There are few previous researchers measuring profitability by profit margin and testing the short-term debt and long-term debt at the same time. Eriotis et al (2002) used debt to equity ratio as the independent variable and concluded a negative relation. Although the indicators of capital structure are different, Eriotis et al (2002) still found a similar conclusion with this paper that debt and profitability are negatively related. Al-Sakran (2001) investigated the same problem by defining capital structure as the dependent variable and testing short-term debt, long-term debt, and total debt. The independent variables include profit margin and return on assets. Al-Sakran (2001) examined this topic based on different firm sizes and industries and concluded a negative relationship between capital structure and profitability. Al-Sakran (2001) also mentioned that the correlation factor between profit margin and the ratio of long-term debt was highly negative. It is somewhat different from the results of this paper maybe because the Chinese market has institutional differences from the Saudi Arabia market.

Since this paper found a negative relationship between capital structure and profitability, it seems that Chinese companies use more equity financing than debt financing. According to Chen (2004), there are several reasons for this phenomenon. The main reason might be that the government restricts banks to lend long-term debt to companies to decrease the risk of suffering from the financial crisis. Therefore, companies might turn to equity finance to get more capital gains and reduce costs. Additionally, China has different tax rules so the tax effects could be different from western countries. If the tax benefit generating from paying interest for loans is lower, it is reasonable for those enterprises to avoid using debt as their financing option.

This paper has several limitations. First, this paper only examines the relationship between capital structure and profitability of A-share companies listed on SZSE and SSE. B-share companies were not included in the test since after deleting all the missing values, there are only five B-share companies left. Therefore, it might be not reliable to use those five companies to conclude the general results for all the B-share companies. If other independent variables such as debt-to-equity ratio were available, the results of B-share firms might have referential value. Second, this paper excludes financing and utility industries. It may be better to conduct additional tests on these two industries and compare the results with that of other industries. According to Hao and Han (2017), the relationship between capital structure and profitability can be distinctive among different industries. Therefore, it might necessary to examine the effect of capital structure separately and make a comparison. Third, except for these variables used in this paper, there are many other ratios to measure capital structure and profitability. Additionally, control variables of this paper are the firm size and sales growth, and it might be better to add some other control variables into the model since profitability and capital structure are influenced by a lot of factors.

### ***Reliability and Validity***

As for reliability, this paper uses secondary data collected from CSMAR, which is a reliable database. Except for financing and utility industries, all the other industries listed on CSAMR are included in the sample.

Validity can be explained in two aspects. First, this topic has been investigated by many previous studies, while there are debates on whether the effect of capital structure on profitability is negative or not. In western countries, the “pecking order theory” advocates that capital structure and profitability are negatively related. Many Chinese researchers also concluded that a negative relationship exists between debt and profitability. Therefore, it is valid to assume that the relationship between capital structure and profitability has already existed and then investigate the exact effect in detail. Second, as for external validity, this paper covers SZSE and SSE listed firms and examines 673 A-share firms with all the required values. So, this paper may be generalized to the companies within the same industries.

### ***Theoretical Contribution***

Compared with previous studies, this paper focuses on the Chinese A-share market and examine the problem using the latest data to figure out how the capital structure may influence profitability in the recent ten years. Moreover, this paper uses different financial ratios to measure the dependent variables. I also examine the effect of short-term debt, long-term debt and total debt on profit margin, while there are few previous studies involving these variables together. This paper may provide more evidence of capital financing preference of Chinese enterprises to existing research and might help future managers to generate more profits.

**TABLE 3**  
Ordinary Least Square Regression Analysis

Panel A-Model 1									
Variable	(1)			(2)			(3)		
	Coefficient	t-Statistics	P-value	Coefficient	t-Statistics	P-value	Coefficient	t-Statistics	P-value
SDA	-0.2719**	-8.869	0.0000						
LDA				-0.1516**	-3.559	0.0004			
DA							-0.3721**	-12.228	0.0000
SIZE	0.0149*	2.456	0.0141	0.0095	1.569	0.1168	0.0207**	3.401	0.0007
SG	0.0010**	3.889	0.0001	0.0009**	3.688	0.0002	0.0011**	4.310	0.0000
Constant	-0.1547	-1.160	0.2460	-0.1303	-0.972	0.3310	-0.1882	-1.419	0.1560
R <sup>2</sup>	0.1951			0.1863			0.2043		
Adjusted R <sup>2</sup>	0.1040			0.0942			0.1142		
F-statistics	2.1417			2.0233			2.2687		
Prob.	0.0000			0.0000			0.0000		

Panel B-Model 2									
Variable	(4)			(5)			(6)		
	Coefficient	t-Statistics	P-value	Coefficient	t-Statistics	P-value	Coefficient	t-Statistics	P-value
SDA	-0.0891**	-15.854	0.0000						
LDA				-0.0756**	-9.610	0.0000			
DA							-0.1330**	-24.332	0.0000
SIZE	0.0035**	3.173	0.0015	0.0020	1.768	0.0772	0.0058**	5.310	0.0000
SG	0.0003**	6.345	0.0000	0.0002**	6.052	0.0000	0.0003**	7.358	0.0000
Constant	-0.0100	-0.409	0.6823	-0.0036	-0.148	0.8827	-0.0230	-0.965	0.3346
R <sup>2</sup>	0.4724			0.4587			0.4995		
Adjusted R <sup>2</sup>	0.4127			0.3974			0.4428		
F-statistics	7.9120			7.4890			8.8183		
Prob.	0.0000			0.0000			0.0000		

**TABLE 3**  
Ordinary Least Square Regression Analysis (Continue)

Panel C-Model 3									
	(7)			(8)			(9)		
Variable	Coefficient	t-Statistics	P-value	Coefficient	t-Statistics	P-value	Coefficient	t-Statistics	P-value
SDA	-0.5961**	-7.926	0.0000						
LDA				-0.1220	-1.168	0.2427			
DA							-0.5884**	-7.839	0.0000
SIZE	-0.0202	-1.355	0.1754	-0.0338*	-2.270	0.0233	-0.0152	-1.012	0.3120
SG	0.0004	0.644	0.5197	0.0003	0.415	0.6784	0.0005	0.828	0.4080
Constant	0.7428*	2.271	0.0232	0.8096*	2.464	0.0138	0.7106*	2.171	0.0299
R <sup>2</sup>	0.2503			0.2427			0.2502		
Adjusted R <sup>2</sup>	0.1655			0.1570			0.1653		
F-statistics	2.9512			2.8326			2.9486		
Prob.	0.0000			0.0000			0.0000		

Notes: \*\* Correlation is significant at the 0.01 level (2-tailed); \* Correlation is significant at the 0.05 level (2-tailed)

## VII. CONCLUSION

This paper examines the relationship between capital structure and profitability of A-share companies listed on SZSE and SSE over ten years from 2009 to 2018. This paper uses ROE, ROA and profit margin as independent variables and SDA, LDA and DA as independent variables, while firm size and sales growth are control variables. Pearson Correlation Analysis and Ordinary Least Square Regression are used as methodology. This paper finds a significantly negative relationship between debt and profitability, suggesting that debt may decrease the profits of companies. It also supports that Chinese listed firms use less debt than equity and internal financing. However, this paper has limitations, such as only focusing on A-share firms and excluding financing and utility industries. Therefore, future research may investigate each industry separately and compare industrial results. Moreover, it is also good to examine the effect of capital structure on profit margin further and explore other proper independent variables.

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