



An Empirical Study on Tax Collection and Debt Financing Cost

Based on the Moderating Effect of Accounting Robustness

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Abstract. This paper takes A-share listed companies in Shanghai and Shenzhen stock markets of China from 2018 to 2020 as research samples, collects relevant data and processes them into corresponding panel data through data software, empirically studies the correlation between the debt financing cost and local tax collection intensity, as well as the moderating effect of accounting robustness on the relationship between the two. Further, the heterogeneity of accounting robustness moderating effect under different resource constraints is investigated. The results show that there is a significant negative correlation between debt financing cost and tax collection intensity. At the same time, accounting robustness of enterprises has a positive moderating effect on the relationship between the above two, and the moderating effect of accounting robustness is more obvious in non-state-owned enterprises, but less in state-owned enterprises. The conclusion of this paper provides new directions and suggestions for enterprises to improve their debt financing ability.

Keywords: Debt Financing Cost · Tax Collection Intensity · Accounting Robustness · Resource Constraints · Panel Data Analysis

1 Introduction

In the background of economic globalization and economic market development, the management behaviour of enterprises varies from one to another and economic actions are taken more frequently. In order to maintain or even improve their competitive advantages while steadily expanding the scale, it is no longer enough to rely solely on their own innovation and progress. It is the only way for enterprises to improve their investment and financing capacity. Therefore, it is vital to study the factors affecting corporate financing. Corporate financing methods are generally divided into two categories: debt financing and equity financing. Debt financing has become the main source of external financing for enterprises due to its fewer restrictions, faster funding, lower cost of capital and tax shield effect for the fundraiser. At present, it is widely accepted that the most important criterion to evaluate the reasonableness of external financing strategy and the quality of financing structure of listed companies is the financing cost of them, so the essence of studying debt financing is to study debt financing cost.

According to the principal-agent theory and the theory of information asymmetry, the separation of management and operation rights is very common today due to the needs of enterprise development. Because of the different interest objectives of enterprise operators and managers, information asymmetry and principal-agent problem become increasingly severe. At the same time, such information asymmetry can also occur between creditors and enterprises, raising the supervision cost of creditors and the debt financing cost of enterprises, which is detrimental to the enterprises.

From the external perspective, tax collection and administration, as a significant tool and source of income for national economic macro-control, is mandatory due to the guarantee of government and law, so it can effectively alleviate information asymmetry and principal-agent problems [12]. Strict tax collection enables investors to get a more accurate picture of a company's operation status through its tax information. Choosing a company with good tax status can reduce the supervision cost of investors, which in turn has an impact on the debt financing cost of enterprises.

From the internal perspective, the corporate governance dimension has a great impact on debt financing cost and there have been abundant research results in this area. Within the corporate governance system, the impact of accounting robustness on the debt financing cost is particularly prominent. For creditors, the value of information is better represented by controlling losses than by earning gains [11]. Hence the requirement in accounting robustness that bad news should be disclosed in a timely manner effectively reduces information asymmetry between creditors and enterprises, and thus reducing the debt financing cost of enterprises. However, as an internal factor of an enterprise, there is still relatively little research data on whether accounting robustness has a moderating mechanism for the relationship between debt financing cost and external tax collection, and if such a moderating mechanism exists, whether it is heterogeneous across different types of enterprises.

Based on this, this paper selects the debt financing cost as the explained variable, the tax collection intensity as the explanatory variable, and introduces accounting robustness as the moderating variable. On the basis of the full sample study, this paper explores the heterogeneity of the moderating effect of accounting robustness under different resource constraints.

2 Literature Review and Research Hypothesis

2.1 Tax Collection Intensity and Debt Financing Cost

According to the Berle-Means proposition, as the size of the company grows and the managers become unable to take care of all the management's affairs, the separation of ownership and control is common in large public companies. This pattern raises many information asymmetry and principal-agent problems in corporate governance affairs [14]. According to the existing theoretical basis and relevant literature summary [4], there are two typical principal-agent problems in today's enterprises. One is the agency problem between managers and shareholders, in order to consolidate their own position, managers may make some irrational investment and financing behaviours without considering from the perspective of shareholders and enterprise development. Another

mainly happens out of the enterprise, which is the agency problem between shareholders and corporate creditors. When corporate governance and information disclosure do not meet the requirements, such information asymmetry and agency problems are more serious, and creditors cannot grasp the real information of enterprise operation, which will lead to less opportunities for enterprises to obtain debt financing and higher debt financing cost. It can be seen that the debt financing cost studied in this paper is closely related to the second type of principal-agent problem.

Based on the current researches, there are two general mechanisms to mitigate the principal-agent problem in enterprises –internal and external control mechanisms. The internal mechanism focuses on the internal supervision and governance of the company, while the external one mainly comes from the supervision of creditors and external regulatory departments [5]. As an external mechanism that can play an important role, tax collection and administration can effectively promote the standardization of corporate governance, so as to reduce the debt financing cost of enterprises. If the act of taxation is regarded as a legally backed compulsory government share of profits created by the enterprise, then the government is a special “shareholder” of the enterprise [4]. The special role of government will reduce the scope for controlling shareholders to “hollow out” the company and improve the company’s proxy problem by regulating the behaviour of the company’s managers [6], thus reducing the debt financing cost.

Among the existing studies on the relationship between tax collection and management and debt financing cost, Guedhami and Pittman (2008) pointed out that the increase of tax collection intensity can effectively improve the information asymmetry in financing, which is conducive to the expansion of financing scale and the reduction of financing cost; the research results of Ye Kangtao and Liu Xing [14] show that in regions with high intensity of tax collection and administration, whitewashing of corporate financial information entails greater tax costs, so firms will reduce improper whitewashing, information asymmetry between creditors and shareholders is mitigated, and debt financing cost is reduced; Buckwalter et al. (2014) studied from the perspective of external audit of tax departments and found that the greater the audit intensity of external audit, the more effective it is in alleviating the information asymmetry between creditors and enterprises, thus reducing the supervision cost of creditors and enhancing their investment willingness. Based on the above analysis, Hypothesis 1 of this paper is proposed:

H1: There is a significant negative correlation between debt financing cost and tax collection and management intensity. The higher the tax collection and management intensity, the lower the debt financing cost of enterprises.

2.2 Tax Collection Intensity, Accounting Robustness and Debt Financing Cost

The above analysis mainly focuses on the tax collection, as a strong external control mechanism, it can effectively alleviate the principal-agent problem between enterprises and investors and make it easier for enterprises to raise debt financing. However, from earlier times to the present, the impact of internal control mechanisms on debt financing has been more comprehensively studied than external mechanisms. Accounting robustness, a typical internal mechanism of corporate governance, closely influences the debt financing cost. Beatty (Beatty 2008) found that the accounting robustness of enterprises

timely reflects the changes of accounting policies and possible financial risks of enterprises, thus reducing the debt financing cost of enterprises; Ahmed and Stanford (2002) conducted an empirical analysis of the relationship between accounting robustness and financing costs of EU listed firms and found that an increase in accounting robustness can effectively mitigate principal-agent problems and information asymmetry, thereby reducing the cost of debt financing. In conclusion, accounting robustness is also negatively correlated with debt financing cost. As an internal mechanism that plays the same role as tax collection and management, if it is introduced into the research system of debt financing cost and tax collection intensity, it will eventually play the addition effect. Based on the above analysis, Hypothesis 2 of this paper is proposed:

H2: Accounting robustness plays a positive moderating role in the relationship between debt financing cost and tax collection intensity.

2.3 The Effect of Resource Constraints on Accounting Robustness

Refer to the previous studies [13], the moderating effect of accounting conservatism can produce certain heterogeneity in enterprises with different resource constraint backgrounds. In this paper, different property rights are used to represent different resource constraints faced by enterprises. Generally speaking, state-owned enterprises and some key industries have natural resources and capital advantages under the policy support of the state and the government. With strong guarantee and support, they face less pressure of survival and financing. As for non-state-owned enterprises, they are always facing the risk of being defeated and eliminated in the fierce market competition, bearing severe pressure of survival and having great resource constraints. Therefore, such enterprises need to pay more attention to the improvement of accounting robustness. Based on this, Hypothesis 3 of this paper is proposed:

H3: In non-state-owned enterprises, the moderating effect of accounting robustness is more significant than in state-owned enterprises.

3 Study Design

3.1 Sample Selection and Data Sources

This paper takes A-share listed companies in Shanghai and Shenzhen stock exchanges in 2018–2020 as the research objects, and excludes the following observed values:

- Financial and insurance listed companies;
- Companies with missing or abnormal key financial data;
- Enterprises marked ST, *ST and PT during the selected study period;
- Listed companies in Tibet Autonomous Region of China: According to relevant policies, only national tax is levied in Tibet Autonomous Region and local tax is exempted, while the vast majority of enterprises in the sample have both national tax and local tax. In order to avoid the difference of statistical caliber and reflect the results more accurately, this paper excluded the relevant data of Tibet Autonomous Region;
- Enterprises whose nature of ownership is not clearly defined or is ill-defined.

The main data sources of this paper are CSMAR database, CCER database and the financial annual reports of sample enterprises. The tax revenue information of each region comes from *China Tax Inspection Yearbook*, and the industry classification information comes from the *Guidance on Industry Classification of Listed Companies of China Securities Regulatory Commission 2012*. In terms of data processing, Excel was used to preprocess the original data in the early stage, and SPSS and Stata16.0 were used for data analysis in the later stage. At the same time, Stata.16.0 was used for endogeneity test and 1% and 99% Winsorize tail reduction treatments.

Finally, the relevant information of 2996 sample enterprises was collected, and 8225 valid observations were obtained. Among the sample enterprises, 1,001 were state-owned enterprises and 1,995 were non-state-owned enterprises.

3.2 Variable Selection and Definition

3.2.1 Explained Variable

In this paper, the debt financing cost of enterprises is selected as the explained variable. For the measurement of debt financing cost, referring to the research method of Liu Ying [8], it is defined as the ratio of the interest expense in financial expenses to the average debt of enterprises, denoted by the symbol *CDF*. The specific formula is as follows:

$$CDF = \frac{\text{interest expense}}{\text{the average debt}} \quad (1)$$

3.2.2 Explanatory Variable

In this paper, the tax collection intensity is taken as the explanatory variable. For the measurement of tax collection intensity, this paper refers to the methods of Lotz and Morss (Lotz et al. 1967), Chelliah et al. [2] and Mertens et al. [9], combined with the studies of Zeng Yamin [15] and Ye Kangtao et al. [14], use the tax effort index in public finance to indirectly reflect the tax collection intensity in a region:

First, build a model to estimate the tax burden ratio:

$$\frac{T_{i,t}}{GDP_{i,t}} = \alpha_0 + \alpha_1 \frac{IND1_{i,t}}{GDP_{i,t}} + \alpha_2 \frac{IND2_{i,t}}{GDP_{i,t}} + \alpha_3 \frac{OPEN_{i,t}}{GDP_{i,t}} + \varepsilon_{i,t} \quad (2)$$

Where, $GDP_{i,t}$ represents the GDP of region *i* in period *t*, $T_{i,t}$ and represents the tax revenue of region *i* in period *t*, We use $\frac{T_{i,t}}{GDP_{i,t}}$ as the tax burden ratio for region *i* in period *t*. $IND1_{i,t}$, $IND2_{i,t}$, $OPEN_{i,t}$ represent the total amount the of the primary industry, the total amount of the secondary industry and the total amount of import and export trade in corresponding regions and periods respectively. By substituting relevant data into the model, the predicted value of the tax burden ratio estimated by the model can be obtained.

Then, the difference between the actual tax burden ratio and the tax burden ratio predicted by the model is used as the tax effort index, so as to measure the value of tax collection intensity, which is represented by *TE*. The specific formula is as follows:

$$TE = \frac{TR_{i,t}}{GDP_{i,t}} - \frac{T_{i,t}}{GDP_{i,t}} \quad (3)$$

Where, $TR_{i,t}$ represents the actual tax revenue of region i in period t .

3.2.3 Moderating Variable

– Accounting Robustness

This paper selects accounting robustness as the moderating variable. Referring to relevant data, it can be seen that there are many models for quantitative analysis of accounting robustness, and Basu model [1], which is widely applicable, can be used here to measure the accounting robustness:

$$\frac{EPS_{i,t}}{P_{i,t}} = \beta_0 + \beta_1 DR_{k,t} + \beta_2 RET_{k,t} + \beta_3 DR_{k,t} \times RET_{k,t} + \xi_{k,t} \quad (4)$$

Where, k in the subscript refers to the enterprise, and t refers to the period. EPS is earnings per share; P represents the closing price of the stock at the end of the current year; RET represents the annual return rate of individual stock considering cash dividend reinvestment, DR is the dummy variable. In the model, β_3 is the main investigation coefficient, indicating the extent to which accounting surplus is more timely recognized for bad news than for good news. When $\beta_3 > 0$, it indicates the existence of expected accounting conservatism.

Substitute the collected data into the model of Formula (4), and the estimated $\beta_3 = 0.0316 > 0$ proves the existence of the expected accounting robustness.

Due to its inherent defects, Basu model cannot specifically measure accounting robustness at the level of a single year and a single enterprise. Therefore, this paper continues to introduce the extended model of Basu model – C-Score model designed by Khan and Watts [7]:

$$G - Score = \beta_2 = \mu_1 + \mu_2 Size + \mu_3 MB + \mu_4 DAR \quad (5)$$

$$C - Score = \beta_3 = \lambda_1 + \lambda_2 Size + \lambda_3 MB + \lambda_4 DAR \quad (6)$$

Where, $Size$ represents the scale of the enterprise, and its value is the natural logarithm of the total assets of the company; MB is the ratio of enterprise's market to account; DAR is the asset-liability ratio of the enterprise. Formula (5) and Formula (6) are substituted into Formula (4) to integrate into a model, substitute data for regression, $G - Score$ and $C - Score$ can be obtained. $G - Score$ is used in this paper to measure accounting robustness, which is symbolized as AC .

– The Effect of Resource Constraints on the Moderating Effect

In order to further study the influence of resource constraints on the moderating effect model in this paper, the property rights of each sample enterprise are selected as indicators to measure the resource constraints of enterprises, which is represented as SOE . In this paper, all sample enterprises are divided into state-owned enterprises and non-state-owned enterprises according to property rights. Set the value 1 for the state-owned enterprise group and 0 for the non-state-owned enterprise group.

3.2.4 Control Variables

Referring to previous research results, this paper selects enterprise size (*Size*), asset-liability ratio (*DAR*), enterprise growth (*CG*) and profitability (*ROE*) as control variables, and sets two dummy variables, year (*Year*) and industry (*Industry*).

3.3 Model Setting

In order to verify the hypotheses above, the main effect validation model and the moderating effect validation model are constructed, and a large amount of panel data is used for empirical analysis.

3.3.1 Main Effect Validation Model (Model 1)

The main effect verification model of this paper is a multiple regression model between debt financing cost (*CDF*) and tax collection and administration intensity (*TE*):

$$CDF = \gamma_0 + \gamma_1 TE + \gamma_2 Size + \gamma_3 DAR + \gamma_4 CG + \gamma_5 ROE + \gamma_6 SOE + \Sigma Year + \Sigma Industry + \sigma_1 \quad (7)$$

3.3.2 Moderating Effect Validation Model (Model 2)

The moderating effect verification model in this paper is a multiple regression model to study the moderating mechanism of accounting conservatism (*AC*) in the main effect model:

$$CDF = \gamma_0 + \gamma_1 TE + \gamma_2 AC + \gamma_3 AC \times TE + \gamma_4 Size + \gamma_5 DAR + \gamma_6 CG + \gamma_7 ROE + \gamma_8 SOE + \Sigma Year + \Sigma Industry + \sigma_2 \quad (8)$$

In Model 1 and Model 2, γ is the regression coefficient and σ is the residual term. When H3 is tested, the whole sample is divided into state-owned and non-state-owned groups according to property rights and substituted into Model 2 for regression to explore the heterogeneity of moderating effect. There were 2873 observed values in the state-owned enterprise group and 5352 samples in the non-state-owned enterprise group.

4 Empirical Analysis

4.1 Descriptive Statistics

Table 1 lists the descriptive statistical results under the full sample. In all 8225 observation samples, the average of debt financing cost (*CDF*) is 0.0565, indicating that the selected sample enterprises are generally facing serious debt financing pressure; at the same time, the minimum value of (*CDF*) is only 0.0211 and the maximum value is 0.0923, indicating that there is a significant difference between the debt financing cost of different enterprises, which confirms the importance of the debt financing cost to the survival and operation of enterprises. The research content and results of this paper have strong

Table 1. Descriptive statistics with full sample

Variable	N	mean	sd	min	p50	max
CDF	8225	0.0565	7.643	0.0211	0.0682	0.092
TE	8225	0.00315	0.0162	−0.0307	0.00417	0.049
AC	8225	0.00969	0.0812	−0.213	0.0128	0.196
Size	8225	22.49	1.300	20.07	22.31	26.39
DAR	8225	0.446	0.184	0.0683	0.438	0.866
CG	8225	0.121	0.331	−0.590	0.0815	1.844
ROE	8225	0.0460	0.161	−0.895	0.0666	0.316
SOE	8225	0.349	0.477	0	0	1

practical significance for all kinds of enterprises. The average of tax collection intensity (*TE*) is 0.00315, indicating that the tax collection intensity still need to be improved in the current environment. The minimum value of *TE* is −0.0307, and the maximum value is 0.0490, which indicates that the intensity of tax collection and administration varies greatly among different regions in China, and may also imply that enterprises in different regions may have behavioural heterogeneity under the different constraints [10]. The average of accounting robustness (*AC*) is about 0.0097, the minimum value is −0.213, and the maximum value is 0.196, indicating that the degree of data fluctuation is large. Among the control variables, the maximum asset-liability ratio is 0.086, indicating that individual enterprises are prone to financial risks. The average of enterprise growth is 0.121, and the maximum value is 1.844, indicating that the enterprise growth ability is fair. The abnormal maximum value may come from some new high-tech enterprises. The average property right nature is $0.349 < 0.5$, indicating that non-state-owned enterprises are generally more than state-owned enterprises in Shanghai and Shenzhen A-share listed companies.

4.2 Correlation Analysis

Table 2 is the correlation analysis of the main variables. Pearson correlation coefficient command and Spearman correlation coefficient command were used for analysis in this paper. Pearson correlation coefficient results show that the correlation coefficient between debt financing cost (*CDF*) and tax collection intensity (*TE*) is −0.01 and significant at 1% level, indicating a significant negative correlation between the two, which preliminarily verifies H1. Additionally, the correlation coefficient between *CDF* and accounting robustness (*AC*) is −0.08 and significant at 1% level, indicating that the two are significantly negatively correlated. The correlation coefficient between *TE*

Table 2. Correlation Analysis

	CDF	TE	AC	Size	ALR	CG	ROE	SOE
CDF	1	−0.04***	−0.20***	−0.14***	−0.48***	0.09***	0.40***	−0.12***
TE	−0.01***	1	0.08***	0.10***	0.05***	0.01	−0.04***	0.14***
AC	−0.08***	0.08***	1	−0.72***	0.21***	−0.00	−0.22***	−0.24***
Size	−0.07***	0.10***	−0.75***	1	0.47***	0.01	0.15***	0.37***
DAR	−0.21***	0.05***	0.20***	0.49***	1	0.01	−0.08***	0.23***
CG	−0.02**	0.00	−0.00	0.02**	0.02**	1	0.38***	−0.07***
ROE	0.08***	−0.02	−0.26***	0.13***	−0.16***	0.28***	1	−0.07***
SOE	−0.03**	0.13***	−0.25***	0.38***	0.23***	−0.06***	0.01	1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

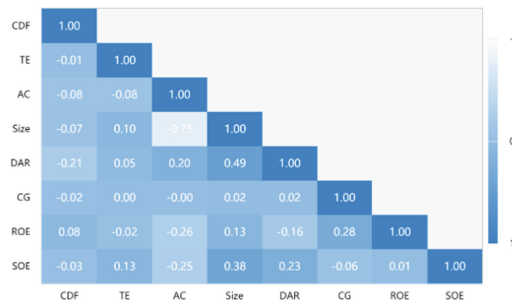


Fig. 1. Pearson correlation coefficient

and AC is 0.08 and significant at 1% level, indicating a significant positive correlation between the two. That is, there is a mutual promotion between them, H2 is indirectly and preliminarily verified. On the whole, the relationship between all explanatory variables, control variables and explained variables has passed the significance test, indicating that model variables are selected appropriately.

Meanwhile, Spearman correlation coefficient analysis also obtained a similar conclusion. In addition, the absolute values of Pearson correlation coefficient and Spearman correlation coefficient of all variables were all less than 0.5, and further calculation of VIF also showed that VIF of all variables is less than 2, which proved that serious multicollinearity problem would not occur among the variables selected in this paper. Figures 1 and 2 show the specific values of the correlation coefficients.

Lower-triangular cells report Pearson's correlation coefficients, upper-triangular cells are Spearman's rank correlation.

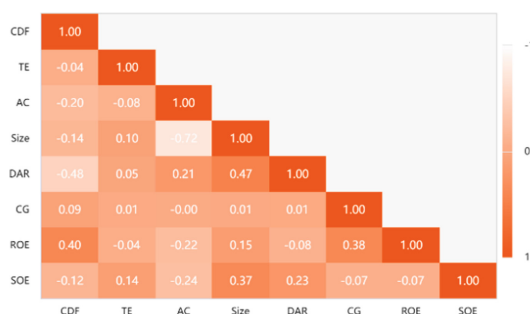


Fig. 2. Spearman correlation coefficient

4.3 Regression Analysis

Table 3 shows the regression results of the main effect model and the moderating effect model.

For the main effect test model, we conducted two regression analyses respectively without and with adding control variables, and the results are shown in columns (1) and (2) of Table 3. Column (1) is the regression result of debt financing cost (*CDF*) and tax collection intensity (*TE*).

The result shows that the regression coefficient of is -5.059 and is significant at the level of 1%, which shows a significant negative correlation. That is, the higher the intensity of tax collection, the lower the debt financing cost of enterprises. After the addition of relevant control variables, as shown in Column (2), the regression result is still significantly negative at the 1% level, the conclusion is consistent with the above. In summary, H1 is fully confirmed.

For the moderating effect test model, we also conducted two regressions, the results are shown in column (3) and (4) of Table 3. Column (3) shows that the relationship between *CDF* and accounting robustness (*AC*) is significantly negative at the level of 1%, the results show that there is a significant negative correlation between *AC* and *CDF*. Moreover, the regression coefficient between the interaction term ($AC \times TE$) and *CDF* is 107.654, which is significant at the level of 5%, *AC* can positively moderate the negative correlation between *CDF* and *TE*. Enterprises with better accounting robustness can assist tax collection and further reduce debt financing cost of enterprises. After the addition of relevant control variables, as is shown in column (4), the regression result is still significant, and the conclusion is consistent with the above, H2 is well confirmed.

Meanwhile, Adj_R^2 of the two models are both more than 0.2, indicating that the models are good in the process of fitting. The *F* values of the overall regression results all passed the significance test at the 1% level, indicating that the model setting is effective and the research results have a certain reliability. In addition, the relationship between *CDF* and all control variables is basically reasonable.

Table 3. Full Sample Regression Analysis

CDF				
main effect moderating effect				
	(1)	(2)	(3)	(4)
TE	−5.059*** (−0.97)	−6.117*** (−1.20)	−3.748*** (−0.72)	−6.189*** (−1.21)
AC	/	/	−7.733*** (−7.37)	−9.724*** (−1.01)
AC × TE	/	/	107.654** (1.76)	76.405** (1.27)
Size	/	0.180** (2.29)	/	0.874 (1.30)
DAR	/	−8.924*** (−16.73)	/	−12.172*** (−3.82)
CG	/	−0.683*** (−2.61)	/	−0.687*** (−2.62)
ROE	/	2.221*** (3.96)	/	2.173*** (3.87)
SOE	/	0.134 (0.72)	/	0.142 (0.76)
_cons	1.581*** (18.42)	1.449 (0.88)	1.642*** (19.07)	−12.811 (−0.93)
Year	Control			
Industry	Control			
N	8225	8225	8225	8225
Adj_R2	0.44	0.22	0.31	0.28
F	95.01***	67.07***	18.54***	50.64***

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.4 Grouped Regression Analysis

In order to further study whether the positive moderating effect of accounting robustness (AC) exists heterogeneity under different resource constraints, all samples are divided into state-owned enterprise group and non-state-owned enterprise group according to nature of ownership and regression analysis is conducted to explore differences between groups. The results are shown in Table 4.

By comparing the results, it was found that the regression coefficient of *CDF* and *TE* is −0.592 and passed the significance test at 1% level in the state-owned group.

Table 4. Grouped Regressions by Nature of Ownership

CDF		
	state-owned enterprises	non-state-owned enterprises
TE	−0.592***	−10.135***
	(−0.08)	(−1.37)
AC	−9.683**	−28.418**
	(−0.79)	(1.99)
AC × TE	82.353**	95.598
	(1.01)	(1.02)
Size	−0.439	2.152**
	(−0.51)	(2.14)
DAR	−4.743**	−19.021***
	(−1.18)	(−3.99)
CG	−1.036**	−0.533**
	(−2.46)	(−1.61)
ROE	1.660*	2.114***
	(1.65)	(3.06)
_cons	13.684	−38.725*
	(0.78)	(−1.87)
Year	Control	
Industry	Control	
N	2873	5352
Adj_R2	0.34	0.47
F	38.65**	52.70***

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In the non-state-owned group, the regression coefficient is −10.135 and passed the significance test at 1% level. So the negative correlation between *CDF* and *TE* was always valid regardless of the nature of ownership.

The influence of the interaction term ($AC \times TE$) to *CDF* shows obvious inter-group differences. In the state-owned group, the regression coefficient between $AC \times TE$ and *CDF* is 82.353 and significant at the 5% level, but in the non-state-owned group, the regression coefficient is 95.598 and did not pass the significance test. The results show that in non-state-owned enterprises, *AC* plays a stronger positive moderating role due to more stringent resource constraints. However, in state-owned enterprises, thanks to the support of national policies and fixed resources, their resource constraints are weaker, financing pressure is lower, so the moderating effect is relatively weaker. At the same

time, the model has a good fitting result, the F value is significant in the overall regression. In conclusion, H3 has been fully confirmed.

4.5 Robustness Test

In order to test the accuracy and reliability of the model and regression results in this paper, the robustness tests are as follows:

4.5.1 Change the Measurement Indexes of Main Variables

Referring to the research of Cheng Qunrui and Li Wei [3], the ratio of financial expenses to period expenses is adopted to measure debt financing cost. The larger the ratio is, the higher the debt financing cost of an enterprise is. Synchronously, the measurement index of accounting robustness is changed. Referring to the research method of Zhang Yuemei and Zhang Fang [16], the C-Score model is continued to be used, but the value of (G-Score + C-Score) is used to measure accounting robustness.

4.5.2 Solving Endogenous Problems

Using data of the same period will inevitably lead to endogenous problems, that is, the explained variable *CDF* will in turn affect the explanatory variables and control variables. In an attempt to improve it, we substitute the relevant data of *CDF* into the multiple regression model after one period lag, and adopt the current data for other variables.

We used the above two methods to carry out the robustness test. Due to space limit, the result presentation is omitted here. Finally, it is found that the regression analysis results and research conclusions are consistent with this paper, which fully proves that the research model and results of this paper have certain robustness.

5 Conclusions, Advices and Research Outlook

5.1 Conclusions

In line with the attitude of broadening the research perspectives, jumping out of the perspective of corporate financial characteristics, this paper takes A-share listed companies in Shanghai and Shenzhen stock markets of China from 2018 to 2020 as research samples, empirically studies the relationship and influence mechanism between the tax collection intensity and the debt financing cost of enterprises, also explores whether accounting robustness has a moderating effect on the relationship between them. Further, we study this moderating effect deeply and compare whether there is heterogeneity in the moderating effect of accounting robustness when in the enterprises subject to different resource constraints. Through empirical analysis, the following main conclusions are drawn:

- The tax collection intensity has a significant negative correlation with debt financing cost. In the regions with strong tax collection and administration, strict supervision

will make enterprises more cautious and standardized in the processing and disclosure of financial information, thus effectively relieve the two rights separation problem and information asymmetry, reduce the supervision cost of creditors, eventually the enterprises will get more financing opportunities, so debt financing cost gets down.

- Accounting robustness plays a positive moderating role between tax collection intensity and debt financing cost. Enterprises with better accounting robustness treat the disclosure of corporate financial information more honestly and prudently, consciously improve the company's internal governance ability, combined with effective external tax control, to form internal and external synergy, so as to further establish a good corporate image and reduce debt financing cost.
- The moderating effect of accounting robustness is more obvious in non-state-owned enterprises, but not in state-owned enterprises. Compared with state-owned enterprises, non-state-owned enterprises have less policy support and effective resources, so they are facing more pressure of survival and financing. Therefore, it is more important for non-state-owned enterprises to enhance the robustness of accounting information in the eyes of tax authorities and investors to accumulate good corporate reputation.

5.2 Advices

In view of the above research conclusions, the following suggestions are put forward:

- Tax collection departments and enterprises should aware the importance of tax collection. Tax collection and management departments should be stricter in improving policies and implementing supervision, so as to build a good investment and financing order. Enterprises themselves should also realize that reducing debt financing cost not only requires the efforts of internal governance, but also needs to pay more attention to the influence of external factors.
- Enterprises should continue to attach more importance to improving accounting robustness. The continuous improvement of corporate governance is an eternal topic for enterprises. As the core factor of corporate governance, the importance of accounting conservatism cannot be underestimated. Both accounting robustness itself and its moderating effect have significant effect on reducing debt financing cost. According to the in-depth research results of this paper, especially non-state-owned enterprises need to actively improve accounting robustness in order to obtain more debt financing opportunities.

5.3 Research Outlook

In the research process of this paper, there are still many unsolved issues, which need to be explored and improved in the future research:

- The selected samples and measurement indicators in this paper has some limitations. This paper only selected some Chinese listed companies and some commonly used measurement indicators for research. In the future, other indicators or third-party evaluation institutions can be introduced to conduct the researches, so that the conclusions will be more reliable.

- When studying the heterogeneity of accounting robustness moderating effect, the directions are not comprehensive enough. According to relevant studies, [13] the moderating effect of accounting robustness also presents heterogeneity when enterprises face different industry competitive pressures. Entropy index (EI) can be used to quantify the industry competitive pressures.
- The intermediate mechanisms between debt financing cost and tax collection intensity may not be fully explored. This paper verifies the positive moderating effect of accounting robustness between the two, but whether there is an intermediary effect or other mechanism between the two is unknown and needs further research.

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