

Research on the Impact of Tax Shield Effect on Corporate Capital Structure

—Empirical Analysis Based on A-Share Listed Companies

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How to cite this paper: Lei, L. (2020) Research on the Impact of Tax Shield Effect on Corporate Capital Structure. *Modern Economy*, 11, 126-139.
<https://doi.org/10.4236/me.2020.111012>

Received: December 9, 2019

Accepted: January 14, 2020

Published: January 17, 2020

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Abstract

This paper uses a random-effects model and takes 224 listed companies in China from 2002 to 2017 as a sample to empirically study the relationship between the corporate income tax shield effect and corporate capital structure in China. It is found that the debt tax shield and corporate capital structure are significantly positive. Relatedly, the non-debt tax shield is significantly negatively related to the corporate capital structure. At the same time, the impact of debt tax shields and non-debt tax shields on corporate capital structure varies from industry to industry.

Keywords

Capital Structure, Tax Shield Effect, Corporate Income Tax

1. Introduction

The tax shield effect refers to tools or methods that can reduce the effect of corporate tax burden, including debt tax shields and non-debt tax shields. Robichek & Myers [1], Kraus & Litzenberger [2] and others proposed a trade-off theory on the basis of relaxing the MM theoretical assumptions, arguing that the optimal capital structure of an enterprise is to balance the tax deduction effect of debt interest and the cost of financial distress. Among them, the deduction effect of debt interest is called the debt tax shield. Deangelo & Masulis [3] introduced a non-debt tax shield on the basis of the Miller [4] model, and argued that the tax relief of non-debt tax shields has a crowding effect on the tax deduction effect of interest.

The tax shield effect brought by relevant regulations in China's corporate income tax for enterprises also includes the debt tax shield effect and the non-debt

tax shield effect. The debt tax shield effect refers to the tax saving effect brought by the pre-tax deduction of corporate debt interest expenses. The higher the corporate income tax rate, the greater the tax saving effect brought by the pre-tax deduction. The non-debt tax shield effect refers to the tax-saving effect of expenses other than debt interest, such as investment credits, depreciation of fixed assets, amortization of intangible assets, R&D investment, etc. The tax shield effect of corporate income tax provides the possibility to reduce the corporate income tax burden. Therefore, the choice of corporate capital structure will take into account the role of tax shields. The tax burden and rate in this article are limited to the category of corporate income tax.

This article will classify the tax shield effect of listed companies based on the empirical regression of the entire sample, then analyze the specific performance of tax shield effects of listed companies in China and their causes. Based on this, it puts forward policy suggestions to improve China's tax system and guide listed companies to form a desirable capital structure.

2. Literature Review

2.1. Review of Foreign Studies

The tax shield effect of corporate debt was first proposed by the American economists Modigliani and Miller [5] in the modified MM theory. After this theory was put forward, foreign scholars conducted a lot of empirical researches on the debt tax shield.

Some scholars believe that debt has a tax shield effect. Mackie-Mason [6] found that there is a positive correlation between the corporate tax rate and the asset-liability ratio, that is, the debt tax shield effect, and the higher the tax rate, the greater the benefit of using the company's debt tax deduction, and its capital structure choice tend to increase their liabilities. Doina & Michael [7] conducted a study on the German corporate income tax reform in 2008, and demonstrated that when the reform caused the tax rate to decrease, the corporate debt ratio fell. Heider and Ljungqvist [8] using the changes in the US federal corporate income tax rate and its benchmark forecast, also found that the federal corporate income tax rate increased by 1%, and the company's asset-liability ratio increased by 0.38%.

Different from the above conclusions, some scholars' research found that there is no debt tax shield effect in the choice of corporate capital structure. As Derashid and Zhang [9] found that corporate debt tax shield effect is weak significant or not significant; Fischer & Heinkel & Zechner [10] study found that debt tax shield and business have no correlation between capital structure choice.

The research on the relationship between the non-debt tax shield and the choice of corporate capital structure began as the extension of Deangelo & Masulis [3] to the Miller [4] model. They introduced the non-debt tax shield into the original model. An optimal capital structure model was constructed and the non-debt tax shield was negatively related to the asset-liability ratio. In the con-

struction of corporate capital structure, regarding the research on the “substitution effect” between the non-debt tax shield and the debt tax shield, DeAngelo & Masulis [3] proposed the “substitution effect” hypothesis that the non-debt tax shield would affect the corporate debt tax shield effect of the tax credits that lower corporate debt is being squeezed by NDTs. Hope & Thomas [11] also hold the same view.

2.2. Review of Domestic Studies

In domestic studies on the relationship between the tax shield effect and the construction of corporate capital structure, there are relatively many empirical analyses. From the perspective of debt tax shields, Wu Liansheng and Yue Heng [12] studied the relationship between tax rates and corporate capital structure and found that corporate tax rates increased and their asset-liability ratios also increased. Wang Yuetang [13] used the 2008 corporate income tax reform as the research background and found that after the corporate income tax reform, companies with a reduced tax rate significantly reduced the asset-liability ratio, that is, the income tax rate and the asset-liability ratio were positively correlated. Fan Yong [14] found that the debt tax shield effect of Chinese listed companies is significant.

Regarding the research on the relationship between non-debt tax shields and corporate capital structure selection, Cao Jianxin and Zou Jun [15] obtained a negative correlation between non-debt tax shields and corporate asset-liability ratios through multiple regression analysis. Wang Liangliang and Wang Yuetang [16] regard R & D investment as a special form of non-debt tax shield, and consider that the non-debt tax shield formed by corporate R & D investment is significantly negatively related to the asset-liability ratio. Other scholars have conducted industry analysis on non-debt tax shields. For example, Wu Yi [17] found that there are differences in non-debt tax shield effects in different industries in China, among which are utilities, construction, wholesale and retail, real estate and other industries. The non-debt tax shield is significantly negatively related to the asset-liability ratio. Yue Shumin and Xiao Chunming [18] verified that some industries implementing “business-to-business reform”, such as transportation, modern services, and postal services, etc. Under the effect of the tax shield effect, the lower the income tax burden, the lower the debt level.

2.3. Summary of Studies

From the current domestic and foreign related research, foreign research focuses on the macro level, and basically does not involve industry classification analysis; domestic research also has few industry classifications. However, in reality, different industries have different deduction methods such as actual tax rates, depreciation and other non-debt forms, and different industries have different income tax incentives. Therefore, this article conducts a classification study for different industries to better analyze the tax shield effect.

3. Research Design

3.1. Research Hypothesis

Based on the previous theoretical analysis, in order to verify the relationship between the tax shield effect and the capital structure, the following hypotheses to be tested are proposed:

1) Hypothesis 1: There is a positive correlation between the corporate capital structure and the debt tax shield effect.

According to the “Balance Theory” [2], corporate debt interest has a tax deduction effect. The higher the income tax rate the company faces, the greater the tax deduction effect of the company’s borrowing cost interest deduction, and the more inclined the company is to high debt. Based on this, hypothesis 1 is proposed.

2) Hypothesis 2: There is a negative correlation between the corporate capital structure and the non-debt tax shield effect, and the non-debt tax shield has a substitution effect on the debt tax shield.

According to the analysis by Deangelo & Msulis [3], the non-debt tax shield of an enterprise will affect the benefit of corporate debt interest tax deduction, that is, it has a substitution effect on the debt tax shield. The more non-debt tax shields a company can use, the more companies tend to have low debt. Based on this, Hypothesis 2 is proposed.

3) Hypothesis 3: There is an industry difference between the debt tax shield effect and the non-debt tax shield effect.

Scholars such as Wu Yi [17], Yue Shumin and Xiao Chunming [18] have demonstrated that there are differences in the correlation between non-debt tax shields and capital structure choices among companies in different industries in China. In some special industries, under the effect of the tax shield effect, the debt level is accompanied by a decline in the corporate income tax burden. Based on this, hypothesis 3 is proposed.

The above three hypotheses to be tested indicate the correlation between the tax shield effect and corporate capital structure. The following will use an econometric model to conduct an empirical analysis of the research sample to verify whether the empirical results are consistent with the assumptions.

3.2. Sample Selection

As of December 31, 2017, there were 3563 A-share listed companies in China. On this basis, the exclusion is performed in the following order: 1) 2422 companies whose listing date is after January 1, 2002 (inclusive) are excluded; 2) Financial insurance companies and comprehensive companies are excluded according to the industry classification of the China Securities Regulatory Commission. There are 91 companies in this category; 3) Excluding 188 listed companies whose transaction status is abnormal (including *ST, ST, S*ST, SST, PT, S, etc.); 4) Excluding financial indicators missing or outliers corporate sector total 638. Therefore the study sample in this article is from 2002 to 2017 a total of 16 years, 224 listed companies Panel data, data from the GTA database (CSMAR).

3.3. Models and Variables

1) In order to verify the foregoing assumptions, the following balanced panel model is established:

$$\begin{aligned} \text{DAR} = & \alpha + \beta_1 \text{ETR} + \beta_2 \text{NDTS} + \beta_3 \text{SIZE} + \beta_4 \text{AS} + \beta_5 \text{ROA} \\ & + \beta_6 \text{GROW} + \beta_7 \text{CASH} + \beta_8 \text{CA} + \beta_9 \text{Z} + \beta_i \sum \text{IND}_i \end{aligned} \quad (1)$$

2) Variable definition

The model contains 1 dependent variable, 2 independent variables, and 8 control variables. The specific description of the related variables is shown in **Table 1**.

In **Table 1**, the dependent variable is the asset-liability ratio (DAR), which measures the capital structure of an enterprise, that is, $\text{DAR} = \text{total liabilities}/\text{total assets}$. This indicator is used the most when measuring the level of corporate debt. This ratio not only includes the total debt of all operating activities of the enterprise, but also the most comprehensive indicator for measuring the level of corporate debt.

The independent variables are the effective tax rate (ETR) and the non-debt tax shield (NDTS). The actual tax rate (ETR) is used as a proxy variable for the debt tax shield, which measures the effect of a company's debt tax shield, that is, $\text{ETR} = \text{income tax expense}/\text{total profit before tax}$. From the previous research literatures, the tax variables representing the tax rate are the actual tax rate, the nominal tax rate, and the marginal tax rate. Only the actual tax rate can truly reflect the corporate income tax burden. Therefore, the actual tax rate is selected as the proxy variable for the debt tax shield. The non-debt tax shield (NDTS) measures the company's other expenses in addition to debt interest, such as depreciation, amortization, etc., that is, $\text{NDTS} = \text{depreciation}/\text{total assets}$.

In the analysis of influencing factors of corporate capital structure, in addition

Table 1. Variable description.

Variable properties	Variable name	Variable abbreviation	Variable definitions
Dependent variable	Assets and liabilities	DAR	Total Liabilities/Total
Independent variables	Effective tax rate	ETR	Income tax expense/Pre-tax profit
	Non-debt tax shield	NDTS	Depreciation/Total assets
Control variables	Enterprise size	SIZE	Natural logarithm of total assets at the end of each year
	Asset structure	AS	Total tangible assets/Total assets
	Profitability	ROA	Net profit/Total assets
	Growth	GROW	(End of current period of total assets – Beginning of current period of total assets)/Beginning of current period of total assets
	Cash flow	CASH	Net cash flow/Total assets from operating activities
	Current ratio	CA	Current assets/Current liabilities
	Bankruptcy risk	Z	Total assets/(3.3*Profit before interest and tax + Main business income + 1.4*Retained earnings + 1.2*Working capital)
	Industry	IND	Industry dummy variables

to the current scholars who choose company size, growth, profitability, etc. as control variables, this article selects the industry dummy variable IND to analyze industry tax shield effects.

4. Empirical Test and Result Analysis

4.1. Descriptive Statistics

After performing a descriptive statistical analysis of the relevant variables under the full sample, it can be seen from **Table 2**: In the sample data, the average value of the DAR is 47%, and the gap between the maximum and minimum values is large; the average value of ETR is 22%, which is lower than the statutory tax rate of 25%, indicating that the interest deduction of borrowing costs has a debt tax shield effect. The average value of NDTS is 2%, the maximum value is 13.45%, and the minimum value is 0.02%, indicating that there is a large difference in the non-debt tax shield effect of different industries. All other variables are control variables, see **Table 2** for details.

In addition, according to the standards of the China Securities Regulatory Commission, industry dummy variables are classified into 12 major categories, and their sample numbers, enterprises, and percentages are separately counted. See **Table 3** for specific industry classifications.

Table 3 in the first five industry sample accounts for up to ninety percent proportion of the whole sample, so the following takes the five industries as research objects to demonstrate the impact of tax shield effect on the choice of corporate capital structure and industry differences.

4.2. Correlation Analysis

In order to verify the validity of the model and the variables, the correlation between the variables is demonstrated as follows: See the Pearson correlation coefficient matrix in **Table 4** for details.

Table 2. Statistical description of variables.

Variable	Number of samples	Mean	Standard deviation	Min	Max
DAR	3584	0.4727	0.1793	0.0081	0.9354
ETR	3584	0.2226	0.1167	0.0002	0.9482
NDTS	3584	0.0235	0.0165	0.0002	0.1345
SIZE	3584	22.4186	1.2400	19.6552	2.5819
AS	3584	0.9478	0.0810	0.2028	1.0000
ROA	3584	0.0526	0.0447	-0.3485	0.3809
GROW	3584	0.1468	0.2286	-0.6274	3.3659
CASH	3584	0.0618	0.0802	-0.5655	0.4857
CA	3584	1.7196	1.9447	0.0385	55.5407
Z	3584	0.8414	8.1309	-466.8949	108.0058

Table 3. Industry classification.

Industry type	Industry code	Company number	Sample number	Percent
Manufacturing	C	110	1760	49.11
Wholesale and retail trade	F	35	560	15.63
Real estate	K	27	432	12.05
Transportation, warehousing and postal services	G	19	304	8.48
Electricity, heat, gas and water production and supply industry	D	12	192	5.36
mining industry	B	4	64	1.79
Construction industry	E	4	64	1.79
Information Transmission, Software and Information Technology Services	I	4	64	1.79
Leasing and business services	L	4	64	1.79
Accommodation and Catering	H	2	32	0.89
Culture, sports and entertainment	R	2	32	0.89
Water, Environment, and Public Facilities Management	N	1	16	0.45
Total	3584	324	3584	100.00

This paper selects 16 years of panel data, the number of samples = the number of companies × 16.

Table 4. Pearson correlation coefficient matrix.

Var	DAR	ETR	NDTS	SIZE	AS	ROA	GROW	CASH	CA	Z
DAR	1.000									
ETR	0.196***	1.000								
NDTS	-0.197***	-0.058***	1.000							
SIZE	0.392***	-0.014	-0.085***	1.000						
AS	0.029*	-0.015	-0.166***	-0.031*	1.000					
ROA	-0.424***	-0.271***	0.058***	-0.002	0.012	1.000				
GROW	0.174***	-0.053***	-0.169***	0.113***	-0.001	0.079***	1.000			
CASH	-0.221***	-0.069***	0.404***	-0.071***	-0.123***	0.386***	0.386***	1.000		
CA	-0.419***	-0.050***	-0.118***	-0.149***	0.068***	0.142***	-0.045***	-0.056***	1.000	
Z	0.022	-0.002	0.009	0.009	0.016	-0.018	0.011	-0.007	-0.009	1.000

***, **and* indicate significant levels of significance at 1%, 5%, and 10% respectively; the variables are defined in **Table 1**.

As shown in **Table 4**, the variable DAR has a positive correlation with the variable ETR and a negative correlation with the variable NDTS, which is consistent with the hypotheses 1 and 2 above, and the correlation coefficients are significant at the significance level of 1%. The correlation coefficient between all variables does not exceed 0.5, indicating that there is no collinearity problem between the variables, indicating that the variables and the model are preferable. In order to prevent the existence of multicollinearity, the variance expansion factor of each variable is tested. The results are shown in **Table 5**.

The test results in **Table 5** show that the maximum VIF is 1.47, which is far

Table 5. Variance expansion factor.

Var	VIF	1/VIF
CASH	1.47	0.679364
ROA	1.35	0.741833
NDTS	1.27	0.788402
ETR	1.09	0.919113
CA	1.08	0.924614
GROW	1.07	0.930642
SIZE	1.05	0.954685
AS	1.04	0.961135
Z	1.00	0.998898
Mean VIF	1.16	

less than 10, so there is no multicollinearity problem, indicating that the variables and models are desirable.

4.3. Empirical Results and Analysis

1) Analysis of the impact of tax shield effect on the choice of corporate capital structure

The random effect model is used to conduct empirical analysis on the sample data to test the effect of the tax shield effect on the choice of corporate capital structure. The results are shown in **Table 6**: Among them, regression (1) is the result when the industry dummy variable (IND) is not included. Regression (2) is the result when the industry dummy variable (IND) is controlled.

In **Table 6**, the relationship between the dependent variable and the independent variables were significantly correlated at a significance level of 1%. The degree of fitting of the model was 0.4650, indicating that the degree of fitting of the model was good. After controlling the industry variables, the fitting degree of the model rose from 0.3868 to 0.4650, indicating that industry factors significantly affected the asset-liability ratio.

Specifically, there is a significant positive correlation between the corporate asset-liability ratio and the actual tax rate. Its elasticity coefficient is 0.0317, which validates the hypothesis 1 of this article. The corporate asset-liability ratio and non-debt tax shield are significantly negatively correlated, and its elasticity coefficient is -0.5329 , which validates Hypothesis 2 of this article, that is, the more non-debt tax shields a company can use, the smaller the motivation to use debt tax shields.

2) Analysis of tax shield effects in different industries

After industry classification of the research sample, five industries with a large number of samples, such as the representative manufacturing industry, are analyzed. The industry classification and mean description are shown in **Table 7**.

Table 7 is the industry classification of the sample mean and description, the

Table 6. The tax shield effect on corporate capital structure.

Variable properties	Var abbreviation	(1) RE	(2) RE
Dependent variable	DAR	DAR	DAR
Independent variables	ETR	0.0341*** (2.98)	0.0317*** (2.78)
	NDTS	-0.7653*** (-4.17)	-0.5329*** (-2.88)
Control variables	SIZE	0.0569*** (19.39)	0.0567*** (19.42)
	AS	-0.0189 (-0.65)	-0.0331 (-1.13)
	ROA	-0.5448*** (-15.80)	-0.5389*** (-15.64)
	GROW	0.0218*** (5.40)	0.0233*** (5.76)
	CASH	-0.0066 (-0.49)	-0.0062 (-18.63)
	CA	-0.0161*** (-18.42)	-0.0163*** (-18.63)
	Z	0.0001 (0.87)	0.0001 (0.89)
Constant		-0.7287*** (-9.58)	-0.0163*** (-18.63)
Industry		Not control	Control
Sample		3584	3584
Degree of fit		0.3868	0.4650

***, **, and * indicate significant levels of significance at 1%, 5%, and 10%, respectively; the definitions of the variables are shown in [Table 1](#).

Table 7. Industry samples and their mean descriptions.

Serial number	Industry code	Company number	Sample number	Mean DAR	Mean ETR	Mean NDTS
1	C	110	1760	0.4619	0.1999	0.0257
2	D	12	192	0.4395	0.2005	0.0355
3	F	35	560	0.5134	0.2683	0.0167
4	G	19	304	0.3312	0.1897	0.0352
5	K	27	432	0.5871	0.2905	0.0077
Five industry samples		203	3248	0.4666	0.2298	0.0242

This paper selects 16 years of panel data, the number of samples = the number of companies × 16; Industry code are shown in [Table 3](#).

number of samples of the five industries accounted for 90.63% of the full sample (203/224). [Table 7](#) shows that the average asset-liability ratio, average effective tax rate, and average non-debt tax shield effect of each industry are different.

Among them, the asset-liability ratio of the real estate, wholesale and retail industries is higher than the average level, which is related to higher actual tax rates and lower non-debt tax shields. It is consistent with the previous assumptions 1 and 2. It explains the asset-liability is positively correlated with debt tax shield while asset-liability ratio is negatively related to non-debt tax shield; the asset-liability ratios of the other three industries are lower than the industry-wide average, and their actual tax rates are low, and there are more non-debt tax shields, consistent with the previous hypothesis 3. It shows that the impact of the same type of tax shield effect on the capital structure of different industries is different.

In order to accurately analyze the differences in the tax shield effect in different industries, this article conducts an empirical analysis on the samples of the above five industries, and controls the industry dummy variables in the model. The industry regression results are shown in **Table 8**.

Table 8 is the empirical analysis results of the five sample industries. Except for the transportation, warehousing, and postal industries, the asset-liability ratio of the remaining four industries is positively related to the actual tax rate, and the asset-liability ratio is negatively related to the non-debt tax shield, but the degree of impact and significance are different.

Specifically, the asset-liability ratio of the real estate industry and the debt tax shield are significantly positively correlated. In the research sample, the real estate industry has the highest average effective tax rate, the tax shield effect brought by debt is also large, and there are fewer non-debt tax shields available in the industry. The debt tax shield has become the main tool for the industry to reduce the tax burden, so the asset-liability ratio is high. The asset-liability ratio of the manufacturing industry is significantly negatively related to the non-debt

Table 8. Industry classification regression.

Var	Industry C Coefficient	Industry D Coefficient	Industry F Coefficient	Industry G Coefficient	Industry K Coefficient
ERT	0.0099	0.0585	0.0341	-0.1060	0.0521**
NDTS	-0.7781***	-0.1429	-0.8024	1.1575**	-3.8401***
SIZE	0.0412***	0.0789***	0.0603***	0.0616***	0.0603***
AS	0.1202**	-0.1498	-0.0146	-0.0599	0.0056
ROA	-0.4254***	-0.7689***	-0.5039***	-0.6572***	-0.7955***
GROW	0.0101*	0.0961***	0.0521***	0.1477***	-0.0096
CASH	-0.0068	-0.0281	0.0063	0.0098	-0.0052
CA	-0.0392***	-0.0093***	-0.0109***	-0.0102***	-0.0081***
Z	0.0011***	0.0082	0.0197*	0.0253***	-0.0047
C	-0.4787***	-0.6721***	-0.7902***	-0.9944***	-0.7331***

***, **, and * indicate significant levels of significance at 1%, 5%, and 10%, respectively; Industry code are shown in **Table 3**.

tax shield. In general, the manufacturing industry has more fixed assets, such as machinery and equipment plants, so more non-debt tax shields can be used. The tax shield effect of the power, heat, gas and water production and supply industry, wholesale and retail industry is not significant. The above verification validates that the foregoing hypothesis 3 holds.

4.4. Robustness Test

In order to verify the reliability of the above conclusions, this paper uses two methods of fixed effect model and OLS regression to perform the robustness test.

Table 9 shows the results of the robustness test of the sample data. Among them, regression (3) is a regression using a fixed effect model, and regression (4) is an OLS regression. The results show that the relationship between the variables and their significance levels are consistent with **Table 6**, that is, the regression results are robust, which proves that the previous research conclusions are reliable.

Table 9. Robustness test.

Variable properties	Var abbreviation	(3) FE	(4) OLS
Dependent variable	DAR	DAR	DAR
Independent variables	ETR	0.0259** (2.27)	0.1317*** (6.85)
	NDTS	-0.5906*** (-2.88)	-1.7445*** (-11.91)
Control variables	SIZE	0.0584*** (12.66)	0.0459*** (25.82)
	AS	-0.0283 (-0.91)	0.0943*** (3.48)
	ROA	-0.4944*** (-14.41)	-1.4498*** (-25.95)
	GROW	0.0191*** (4.68)	0.1029*** (10.55)
	CASH	-0.0075 (-0.57)	0.0397 (1.22)
	CA	-0.0144*** (-16.10)	-0.0305*** (-26.50)
	Z	0.0001 (0.81)	0.0002 (0.83)
Constant		-0.7640*** (-27.23)	-0.5219*** (-10.54)
Industry		Not control	Not control
Degree of fit		0.3662	0.4839

***, **, and * indicate significant levels of significance at 1%, 5%, and 10%, respectively; the definitions of the variables are shown in **Table 1**.

5. Conclusions and Recommendations

5.1. Research Conclusions

The empirical analysis in this paper draws the following conclusions:

1) The capital structure of Chinese enterprises is significantly positively related to the debt tax shield effect. The companies with a larger debt tax shield effect tend to have higher liabilities. For each unit of effect, the asset-liability ratio increases by 0.0317.

2) China's corporate capital structure is significantly negatively related to the non-debt tax shield effect, which indicates that the more non-debt tax shields an enterprise can use, the lower the incentive for the company to use the debt tax shield, and the non-debt tax shield has a crowding effect on the debt tax shield. Its elasticity coefficient is -0.5329 , which means that for each additional unit of non-debt tax shield available to an enterprise, the asset-liability ratio decreases by 0.5329.

3) There are differences in the tax shield effect between industries. According to the research in this article, only the debt tax shield of the real estate industry is significant and more than the non-debt tax shield, forming a high level of debt in the real estate industry; in the other four industries, the debt tax shield effect is not significant, and the non-debt tax shield effect is different.

5.2. Policy Recommendations

A reasonable tax system is beneficial to guide enterprises to form a reasonable capital structure. Therefore, based on the above research conclusions, this article makes the following suggestions:

1) Relax the restrictions on deduction of interest expenses before taxes. Because the debt interest tax deduction can bring the debt tax shield effect, but the strict limitation of the interest tax deduction weakens the debt tax shield effect. The state can relax the pre-tax deduction rules for interest expenses according to specific circumstances, such as introducing relevant deduction rules for different industries, to guide companies to form a capital structure that is more conducive to their own development vision.

2) Improve depreciation, amortization, and additional deduction policies. In view of the significant non-debt tax shield effect of listed companies in China, for key industries encouraged by the state, the restrictions on pre-income tax deduction items with non-debt tax shield effects can be appropriately relaxed to reduce the actual tax burden of enterprises. It could encourage companies to build a desirable capital structure by improving non-debt tax shield tools.

5.3. Deficiencies and Prospects

Due to the limitations of my knowledge and research data, this article has certain limitations:

1) In the sample listed companies selected in this paper, due to the large time span and 16 years of data, there are too few samples in individual industries

when returning by industry, which will inevitably cause errors in the research conclusions. In order to reach more satisfactory and stable conclusions, it is necessary to increase the sample size of the industry for further research.

2) The capital structure is affected by many factors. Starting from the length of the text, this article only analyzes the relationship between the corporate income tax shield effect and the capital structure from the perspective of taxation, and uses other factors affecting the capital structure as control variables. In the subsequent research, the influencing factors of capital structure can be explored from other perspectives.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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