

An Empirical Analysis of Media Coverage and Corporate Debt Maturity Structure of Chinese Listed Companies

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Abstract

Media plays an important role in corporate debt financing decisions. However, no literature investigations the impact of media attention affect debt maturity structure. Based on the theories of asymmetric information and reputation, we use 5988 sample data of firms listed in Shenzhen and Shanghai stock exchanges in the period 2010-2014 and apply Heckman two-stage model to empirically test the impact mechanism of media coverage on debt maturity structure of listed companies. We explore the impact of media coverage on the debt maturity structure under different ownership nature. The results show that, favorable media coverage and debt maturity structure of listed companies are positive related. Favorable media coverage can increase the level of debt maturity structure of a listed company. Furthermore, unfavorable media coverage is negatively related to debt maturity structure. Unfavorable media coverage can decrease the level of corporate debt maturity structure. Media coverage has a different impact on debt maturity structure with different nature of ownership. Specifically, with respect to state-owned enterprises, the impact of favorable media coverage on increasing debt maturity structure is more apparent on non-state-owned enterprises, and the impact of unfavorable media coverage on decreasing debt maturity structure is more apparent on state-owned enterprises.

Keywords: Debt Maturity Structure, Media Coverage, Ownership Nature, Heckman Two-stage Model

1. Introduction

China's debt has become a world proposition, with the rapid rise of China's debt, especially the level of corporate debt¹. Townsend Reuters' latest survey results show that, the debt scale of Chinese corporate is 160% of GDP, has reached more than two times the scale of the U.S. corporate debt. At the present stage, Words such as "capital chain rupture, enterprise bankruptcy, insolvency, boss foot and so on" has been frequently reported on the news media, often to stimulate people's eyes and nervous. With the continuous deepening of the academic research on corporate debt, the research focus has shifted from the capital structure to the details of financing decisions, such as the debt maturity structure. Debt maturity structure is an important part of corporate financing decisions, is also the key content of the debt contract, which can directly affect the cost of financing and credit risk. Thus it can be seen that looking for the influence factors of the corporate debt maturity structure has important theoretical significance and practical value to improve the value of micro enterprises and promote the development of the macro economy.

At present, there are two main factors influencing the debt maturity structure of enterprises (Gonzalez, 2015). First, macro environment: some scholars have discussed the influence factors of debt maturity structure of enterprises revolve around marketization(Sun et al,2005), legal environment(Xiao and Liap,2012), financial crisis(Gonzalez,2015), financial development(Kirch and Terrap,2012) and capital market development(Demirgüç-Kunt and Maksimovic,1999). Second, micro enterprises: some scholars from the growth opportunities(Johnson,2003), free cash flow(Xiao,2005), corporate size(Xiao,2005), corporate governance(Xiao and Liao,2008), agency conflicts(Lopez and Mestre,2015), security(Vig,2013) and other micro enterprise factors to find the influence factors of the debt maturity structure of enterprises. Under the catalysis of the information age, the influence of the media on the management of the listed companies is becoming more and more important. Media spread information to the public through the collection and analysis of processing, which can

reduce the information search costs of information users, and reduce the degree of information asymmetry. At the same time, the media can also conduct supervision of the listed companies, exposure the listed companies' illegal behavior, to help creditors improve their rights to protect their interests. There have been a lot of literature attempts to study the influence of media on the financing cost from the media perspective: Kothari, etc. have found that unfavorable news coverage will lead to an increase in the corporate capital costs and earnings volatility, favorable news will reduce the cost of capital(Kothari et al,2009). However, whether the media coverage can affect the corporate debt maturity structure? Whether the impact of different nature of media coverage on corporate debt maturity structure consistent? Whether the media coverage has a different impact on debt maturity structure with different nature of ownership? The theoretical have not given a clear answer of these problems.

2. Literature review and hypothesis development

In recent years, a large number of academic literatures investigated the impact of the informal system on the company's financial behavior from the perspective of the informal system. For example, Zheng et al(2012)discussed the impact of national culture on the debt maturity structure from the cultural perspective. Cross-country empirical results show that the enterprises under the national culture of high uncertainty avoidance, high collectivism, high power distance and high masculinity prefer to use short-term debt. However, there has been no literature able to investigate the impact of the informal institutional factors on the corporate debt maturity structure from the perspective of media coverage.

Media coverage as an important governance mechanism is a useful supplement to the lack of the system to a certain extent. Myers pointed out that the corporate debt maturity structure can effectively reflect the social contract. The longer of the debt maturity, the more uncertainty and risk will come. So the creditors pay more attention to the appearance of the performance mechanism (Myers, 1977). Media coverage helps creditors know about the performance of the company through information dissemination, reputation and other means. Because of the existence of the information asymmetry, the creditors cannot fully grasp the real information of the enterprise. Fang and Peress (2009) have confirmed the news media can reduce the information friction. Media through itself the function of the dissemination of information, through professional channels and means to collect and collate related information about enterprise, and dissemination of information through the media. It helps creditors to better understand the listed companies' real production and operation of the status quo improve the listed companies' information transparency, reduce the degree of information asymmetry between the listed companies and the creditors in virtually. Favorable media coverage of listed companies can deliver good news to the capital markets. Favorable media coverage can show that the enterprise has a positive social image, which has important significance for the performance of the debt contract. At this time, the creditors facing lower debt contract performance risk, so they prefer to provide long-term debt; on the contrary, if there are a large number of unfavorable media coverage of listed companies, which will deliver the bad news to the creditors. It will bring higher debt default risk to the creditors; the creditor is not willing to provide long-term debt at this time. Therefore, this paper puts forward the following research hypothesis:

Hypothesis 1: favorable media coverage and debt maturity structure of listed companies are positive related. Favorable media coverage can increase the level of debt maturity structure of a listed company.

Hypothesis 2: unfavorable media coverage is negatively related to debt maturity structure. Unfavorable media coverage can decrease the level of corporate debt maturity structure.

In the debt market, the risk of debt default is the key problem of the creditors. When the enterprise's debt default risk is higher, the creditors tend to provide short-term debt, and reduce long-term debt. In the countries of transition economies such as China, investor protection still exist many deficiencies and judicial system of creditor protection is not perfect. At this time, creditors prefer to provide credit funds to the debtor with a good reputation or economic strength. Due to the special "state owned" status of the state-owned listed companies, it provides credit guarantees and implicit financial support for its loans, and reduces debt default probability and non system risk of the debtor. But private enterprises are far greater than the state-owned enterprises in the difficulty of obtaining long-term debt in the debt market because there is no government guarantee. Media coverage can have an important impact on the reputation of the enterprise, favorable media coverage is conducive to the enterprise to establish a good reputation in the community, and unfavorable media coverage will damage the company's reputation. The impact of the media on corporate reputation will eventually be transmitted to the debt market. At this time, with favorable media coverage of the non state-owned listed companies help they get long-term debt due to a good social reputation. But the impact of favorable media

coverage on increasing debt maturity structure is less apparent on state-owned enterprises; the positive marginal impact of the media coverage on the debt maturity structure is smaller. Unfavorable media coverage can damage the reputation of the listed companies; this damage will be amplified due to the existence of the state-owned property. That is to say, the same unfavorable media coverage to damage the reputation of the state-owned listed companies is far greater than that the non-state-owned listed companies. Therefore, the impact of unfavorable media coverage on decreasing debt maturity structure is more apparent on state-owned listed companies than the non-state-owned listed companies. Therefore, this paper puts forward the following research hypothesis:

Hypothesis 3: Favorable media coverage has a different impact on debt maturity structure with different nature of ownership. With respect to state-owned enterprises, the impact of favorable media coverage on increasing debt maturity structure is more apparent on non-state-owned enterprises.

Hypothesis 4: Unfavorable media coverage has a different impact on debt maturity structure with different nature of ownership. With respect to state-owned enterprises, the impact of unfavorable media coverage on decreasing debt maturity structure is more apparent on state-owned enterprises.

3. Sample and research design

3.1 Sample

This paper selects the data of A-share companies listed on Shanghai and Shenzhen stock exchanges in the period 2010-2014 as the research object, in order to ensure the reliability of the results, we conduct the following screening: First, delete the ST or *ST listed companies by SFC; Second, delete financial listed companies; Third, delete missing financial data, corporate governance data of listed companies. The final sample is 5988. The study which relates to the financial data all come from Chinese financial database of Wind, corporate governance data from the sharp financial database, media coverage data mainly collected from China important Newspaper Database.(Hereinafter referred to as CCND)

3.2 Variable definitions and measurement

3.2.1 Dependent variables

Debt maturity structure: in this paper, we use three kinds of measurement methods to choose the proxy variable of the debt maturity structure. First, debt maturity structure for DMS1, reference Sun et al(2005), who defined the debt maturity structure as long-term loans / total loans; second, debt maturity structure for DMS2, reference Datta et al(2005), who defined debt maturity structure as long-term debt / total debt, which long-term debt contains long-term loans, bonds payable, long-term accounts payable, other long-term liabilities, special payable and so on; third, debt maturity structure for DMS3, reference Liu(2012), who defined the debt maturity structure as a long-term loans / total liabilities.

3.2.2 Explanatory variables

Media coverage MC: This paper use CNKI China important Newspaper Database as newspaper-based media data sources, according to the listed company stock code to collect manual data and judge the nature of the news reports. Favorable newspaper media coverage MCP is the annual number of favorable media coverage plus 1 and takes it the natural logarithm in CNKI China important Newspaper Database. Unfavorable newspaper media coverage MCN is the annual number of unfavorable media coverage plus 1 and takes it the natural logarithm in CNKI China important Newspaper Database.

The nature of ownership: according to the nature of ownership of listed companies, this paper design the ownership of dummy variable PR , when the enterprise is state-owned ownership, PR is equal to 1, or PR is equal to 0. At the same time, this paper also design the cross term $MC \times PR$ between media coverage and the nature of ownership, it is mainly to investigate media coverage has a different impact on debt maturity structure of listed firms with different nature of ownership.

3.2.3 Control variables

Referring to the related research from Huang et al(2016), González(2015)、Ben-Nasr et al(2015), this paper selects the enterprise scale, profitability, cash flow ability, agency cost, the audit institution type, equity concentration, growth ability, the scale of the board of directors, proportion of independent directors and the scale of the board of supervisors, the annual dummy variables and industry dummy variables. The specific variables are defined as shown in table 1.

Table 1. Variable definitions and measures

Types	Variables	Symbols	Definitions and measurement	
Explained variable	Debt maturity structure	<i>DMS1</i>	long-term loans / total loans	
		<i>DMS2</i>	long-term debt / total debt	
		<i>DMS3</i>	long-term loans / total liabilities	
Explanatory variable	Media coverage	<i>MC</i>	Including favorable media coverage <i>MCP</i> and unfavorable media coverage <i>MCN</i>	
	Favorable media coverage	<i>MCP</i>	The annual number of favorable media coverage plus 1 and take it the natural logarithm in CCND	
	Unfavorable media coverage	<i>MCN</i>	The annual number of unfavorable media coverage plus 1 and take it the natural logarithm in CCND	
	Ownership Nature	<i>PR</i>	Dummy variable, when the enterprise is state-owned ownership, <i>PR</i> is equal to 1, or <i>PR</i> is equal to 0	
Control variable	Enterprise scale	<i>Size</i>	the natural logarithm of total assets	
	Profitability	<i>ROE</i>	Return on net assets	
	Cash flow ability	<i>CF</i>	Net operating cash flow / total assets	
	Agency cost	<i>AC</i>	Other receivables / total assets	
	The audit institution type	<i>BIG4</i>	Dummy variable, when the audit institution for the international top four accounting firms, <i>BIG4</i> is equal to 1, or <i>BIG4</i> is equal to 0	
	Equity concentration	<i>EC</i>	The proportion of the first largest shareholder	
	Growth ability	<i>GA</i>	increase rate of business revenue	
	The scale of the board of directors	<i>BD</i>	Natural logarithm of the total number of the board of directors	
	proportion of independent directors	<i>ID</i>	The ratio of independent directors to the total number of the board of directors	
	The scale of the board of supervisors	<i>BS</i>	Natural logarithm of the total number of the board of supervisors	
	Annual variables	dummy	<i>Year</i>	Control the annual macroeconomic impact, set 4 annual dummy variable
	Industry variables	dummy	<i>Industry</i>	Control industry factors, according to the Commission in 2012 the new industry classification guidelines, set 17 industry dummy variables

4. Model and estimation method

In the field of media management, scholars have been plagued by the problem of endogenous. Heckman (1979) proposed the famous two-step estimation method, because its operation simple and does not rely on the normality assumption; it has gradually become the most popular method of solving sample selection bias. Based on the Heckman two-stage model, this paper constructs this model:

The first stage, construct Probit estimation equation of newspaper media monitoring, estimating the inverse Mills ratio IMR. The details are as follows:

$$DMC_{it} = \alpha_0 + \alpha_1 Size_{it} + \alpha_2 ROE_{it} + \alpha_3 Lev_{it} + \alpha_4 Value_{it} + \alpha_5 Q_{it} + \alpha_6 GA_{it} + \alpha_7 EPS_{it} + \alpha_8 DPS_{it} + \alpha_9 AO_{it} + \alpha_{10} BD_{it} + \alpha_{11} ID_{it} + \alpha_{12} BS_{it} + \alpha_{13} EC_{it} + \alpha_{14} Year_{it} + \alpha_{15} Industry_{it} + \varepsilon \quad (1)$$

Among them, *DMC* is two dummy variables of media coverage. When the variable of media coverage (*MCP* or *MCN*) is greater than median, the value is 1, otherwise 0. Control variables include firm size *Size*, profitability *ROE*, asset liability rate *Lev*, the company value *Value*, Tobin's *Q*, growth capability *GA*, dividend per share *EPS*, audit opinion *AO*, the scale of the board of directors *BD*, proportion of independent directors *ID*, the scale of the board of supervisors *BS*, ownership concentration *EC*, the annual dummy variables *Year* and *industry* dummy

variables Industry.

The second stage, use the inverse Mills ratio IMR as control variable into the specific test mode. Investigate the impact mechanism of the media coverage on the debt maturity structure of listed companies.

This paper builds the following model to test the impact mechanism of favorable media coverage on debt maturity structure of listed companies:

$$DMS_{it} = \beta_0 + \beta_1 MCP_{it} + \beta_2 Size_{it} + \beta_3 ROE_{it} + \beta_4 CF_{it} + \beta_5 AC_{it} + \beta_6 BIG4_{it} + \beta_7 EC_{it} + \beta_8 GA_{it} + \beta_9 BD_{it} + \beta_{10} ID_{it} + \beta_{11} BS_{it} + \beta_{12} IMR_{it} + \beta_{13} Year_{it} + \beta_{14} Industry_{it} + \sigma \quad (2)$$

Among them, the DMS_{it} is the debt maturity structure of i company in t years, which included $DMS1$, $DMS2$ and $DMS3$. MCP_{it} is i company received favorable media coverage in t years.

At the same time, to investigate favorable media coverage has a different impact on the debt maturity structure of listed companies under different ownership nature, this paper also constructs the test model as follows:

$$DMS_{it} = \chi_0 + \chi_1 MCP_{it} + \chi_2 MCP_{it} \times PR_{it} + \chi_3 PR_{it} + \chi_4 Size_{it} + \chi_5 ROE_{it} + \chi_6 CF_{it} + \chi_7 AC_{it} + \chi_8 BIG4_{it} + \chi_9 EC_{it} + \chi_{10} GA_{it} + \chi_{11} BD_{it} + \chi_{12} ID_{it} + \chi_{13} BS_{it} + \chi_{14} IMR_{it} + \chi_{15} Year_{it} + \chi_{16} Industry_{it} + \zeta \quad (3)$$

Among them, $MCP_{it} \times PR_{it}$ is the cross term for favorable media coverage and ownership nature, PR_{it} is the nature of ownership of i company in t years.

This paper builds the following model to test the impact mechanism of unfavorable media coverage on debt maturity structure of listed companies:

$$DMS_{it} = \delta_0 + \delta_1 MCN_{it} + \delta_2 Size_{it} + \delta_3 ROE_{it} + \delta_4 CF_{it} + \delta_5 AC_{it} + \delta_6 BIG4_{it} + \delta_7 EC_{it} + \delta_8 GA_{it} + \delta_9 BD_{it} + \delta_{10} ID_{it} + \delta_{11} BS_{it} + \delta_{12} IMR_{it} + \delta_{13} Year_{it} + \delta_{14} Industry_{it} + \tau \quad (4)$$

Among them, MCN_{it} is i company received unfavorable media coverage in t years.

At the same time, to investigate unfavorable media coverage has a different impact on the debt maturity structure of listed companies under different ownership nature; this paper also constructs the test model as follows:

$$DMS_{it} = \phi_0 + \phi_1 MCN_{it} + \phi_2 MCN_{it} \times PR_{it} + \phi_3 PR_{it} + \phi_4 Size_{it} + \phi_5 ROE_{it} + \phi_6 CF_{it} + \phi_7 AC_{it} + \phi_8 BIG4_{it} + \phi_9 EC_{it} + \phi_{10} GA_{it} + \phi_{11} BD_{it} + \phi_{12} ID_{it} + \phi_{13} BS_{it} + \phi_{14} IMR_{it} + \phi_{15} Year_{it} + \phi_{16} Industry_{it} + v \quad (5)$$

5. Empirical results and analysis

5.1 Summary statistics

From descriptive statistics results in table 2, we can see that average for $DMS1$ is 0.304, while the maximum value is 1, indicating that the enterprise's average long-term loans accounted for about 30% of total loans, but there are also some enterprise's debt financing are all long-term loans. The average value of the favorable media coverage MCP is 0.731, and the average value of the unfavorable media coverage MCN is 0.189. Because media coverage is the annual number of media coverage plus 1 and take it the natural logarithm, so we need to analysis the original data of media coverage to be aware of the condition of media coverage in real economic life. Statistics found that every listed company are reported in the newspaper every year by the number of 14.212 times, the number of favorable media coverage is 3.166, while the number of unfavorable media coverage is only 1.360 in our country.

At the same time, in order to ensure that there is no multiple linear problems between the main variables of this paper, this paper also carries out the Pearson correlation test and Spearman correlation test. Test results show that there exists a serious collinearity problem between debt maturity structure variables for $DMS1$, $DMS2$ and $DMS3$, correlation test values are greater than 0.9, but due to the debt maturity structure are the dependent variables and do not occur in the same regression model simultaneously, so it will not affect the conclusions of the paper. Limited space, this paper does not list the correlation test results.

Table 2. Summary statistics

Variables	Mean	Median	S.D.	Min.	Max.
<i>DMS1</i>	0.304	0.168	0.338	0.000	1.000
<i>DMS2</i>	0.271	0.115	0.103	0.000	0.730
<i>DMS3</i>	0.119	0.048	0.160	0.000	0.859
<i>MCP</i>	0.731	0.693	0.782	0.000	4.564
<i>MCN</i>	0.189	0.000	0.404	0.000	2.996
<i>PR</i>	0.660	1.000	0.474	0.000	1.000
<i>Size</i>	22.316	22.185	1.425	13.076	28.509
<i>ROE</i>	0.059	0.072	0.953	-54.809	4.485
<i>CF</i>	0.036	0.038	0.181	-11.056	2.457
<i>AC</i>	0.797	0.643	0.698	0.000	9.689
<i>BIG4</i>	0.087	0.000	0.282	0.000	1.000
<i>EC</i>	0.160	0.117	0.135	0.000	0.799
<i>GA</i>	0.244	0.099	5.097	-1.000	367.532
<i>BD</i>	2.521	2.485	0.306	1.386	3.738
<i>ID</i>	0.347	0.333	0.097	0.000	0.750
<i>BS</i>	1.610	1.609	0.447	0.000	3.045

5.2 Univariate analysis

Table 3 shows the results of univariate analysis. It mainly examines the discrepancy of debt maturity structure among different media coverage samples. This paper mainly takes the average value of media coverage variables as the grouping standard. Take the favorable media coverage as an example, the samples which higher than the average value of the favorable media coverage are classified as the high *MCP* sample group, and the samples which lower than the average value of the sample are classified as low *MCP* sample group. Similarly, the samples which higher than the average value of unfavorable media coverage are high *MCN* sample group, while the samples which lower than the average value of unfavorable media coverage are classified as low *MCN* sample group.

The A column of the table are the results of univariate analysis of favorable media coverage. Take debt maturity structure *DMS1* as an example, the average value of the debt maturity structure of the high *MCP* sample group was higher than that of the low *MCP* sample group which was 0.076, and the T test of the discrepancy was significant at the 0.01 level. The median difference of the two groups of sample was 0.147; Wilcoxon rank sum test was significant at the 0.01 level. These can illustrate that companies which have higher degree of favorable media coverage tend to use long-term debts. The statistical analysis results of *DMS2* and *DMS3* also support the above statement, and then the research hypothesis 1 was confirmed. The A column of the table are the results of univariate analysis of unfavorable media coverage. Take Debt Maturity Structure *DMS1* as an example, the average value of the debt maturity structure of the high *MCN* sample group was higher than that of the low *MCN* sample group, and the difference was -0.077 which was significant at the 0.01 level. Meanwhile, the median difference of the two groups of sample was -0.145, Wilcoxon rank sum test was significant at the 0.01 level. Thus it can be explained that less long-term debts are used by companies which have higher degree of unfavorable media coverage, then the research hypothesis 2 in this paper was confirmed.

5.3 Media coverage and corporate debt maturity structure

Table 4 is the regression results of the Heckman two-stage model of the impact of media coverage on debt maturity structure of listed companies, mainly analyzing the impact mechanism of different kind of media coverage on debt maturity structure. Take the regression results of debt maturity structure *DMS1* as an example, the favorable media coverage *MCP* have a significant positive correlation with debt maturity structure at the level of 0.01, and the influence coefficient is 0.041. It can be illustrated that the favorable media coverage can help companies to get more long-term debt, so, the companies tend to use long-term debt, then the research hypothesis 1 of this paper was confirmed; the unfavorable media coverage *MCN* have a significant negative correlation with debt maturity structure at the level of 0.01, and the influence coefficient is -0.047. It can be illustrated that the unfavorable media coverage is not conducive to get more long-term debt for companies, so the research hypothesis 2 of this paper was confirmed. The regression results of taking *DMS2* and *DMS3* as the debt maturity structure also support the above conclusions, which can be illustrate that the conclusion of the

study is reliable. It is worth noting that the regression coefficient of Inverse Mills Ratios (*IMR*) of all the regression analysis in table 3 are mostly significant, this means that there are some sample self-selection problems in this research. Therefore, the estimate effect of using the Heckman two stage model was effective, using traditional OLS regression will cause biased error.

Table 3. Result of univariate analysis

A:Favorable media coverage <i>MCP</i>								
Variables	High <i>MCP</i>		Low <i>MCP</i>		T test		Wilcoxon rank sum test	
	Mean	Median	Mean	Median	Mean difference	T value	Median difference	Z value
<i>DMS1</i>	0.354	0.267	0.278	0.120	0.076	8.325***	0.147	82.721***
<i>DMS2</i>	0.083	0.040	0.065	0.015	0.018	6.425***	0.035	64.042***
<i>DMS3</i>	0.137	0.073	0.110	0.032	0.027	6.143***	0.041	58.068***
B:Unfavorable media coverage <i>MCN</i>								
Variables	High <i>MCN</i>		Low <i>MCN</i>		T test		Wilcoxon rank sum test	
	Mean	Median	Mean	Median	Mean difference	T value	Median difference	Z value
<i>DMS1</i>	0.287	0.135	0.364	0.280	-0.077	-7.159***	-0.145	-60.125***
<i>DMS2</i>	0.068	0.020	0.083	0.041	-0.015	-4.435***	-0.021	-32.816***
<i>DMS3</i>	0.115	0.039	0.135	0.074	-0.020	-4.043***	-0.035	-33.545***

Note: ***, **, *, means significance at 1%, 5% and 10% level respectively, two-tailed test.

5.4 Media coverage, ownership nature and debt maturity structure

Table 5 investigate the impact of media coverage on the debt maturity structure of listed companies under different ownership nature, due to the limited space, here this paper mainly took the regression results of debt maturity structure *DMS1* as the example. One aspect is the impact difference of favorable media coverage on the debt maturity structure of listed companies under different ownership nature. The favorable media coverage *MCP* has a significant positive correlation with debt maturity structure of listed companies at the level of 0.01. This is consistent with the previous analysis results. The cross term of favorable media coverage *MCP* and ownership nature (*MC*×*NO*) have a significant negative correlation with debt maturity structure at the level of 0.01. Comprehensively speaking, the influential effect of favorable media coverage on the debt maturity structure of the listed companies which ownership nature is non-state-owned was 0.03. However, the influential effect of favorable media coverage on the debt maturity structure of the state-owned listed companies was 0.016(0.03-0.014). This shows that compared with the state-owned listed companies, the impact of favorable media coverage on non-state-owned listed companies' debt maturity structure is bigger, the research hypothesis 3 of this paper can be verified. Another aspect is the impact difference of unfavorable media coverage on the debt maturity structure of listed companies under different ownership nature. The unfavorable media coverage *MCN* has a significant negative correlation with debt maturity structure of listed companies at the level of 0.01, and the influence coefficient was -0.031. The cross term of unfavorable media coverage *MCP* and ownership nature (*MC*×*NO*) have a significant negative correlation with debt maturity structure at the level of 0.01 and the influence coefficient was -0.022. This means that influential effect of unfavorable media coverage on the debt maturity structure of the listed companies which ownership nature is non-state-owned was -0.031. However, the influential effect of unfavorable media coverage on the debt maturity structure of the state-owned listed companies was -0.053(0.031-0.022). It shows that the impact of unfavorable media coverage on state-owned listed company's debt maturity structure is bigger than non-state-owned listed companies, so the research hypothesis 4 of this paper can be verified. Meanwhile, the regression results of debt maturity structure *DMS2* and *DMS3* are consistent with the above, which shows that the research conclusion of this paper is robust.

Table 4. Regression results of Heckman model

Variables	DMS1		DMS2		DMS3	
	MCP	MCN	MCP	MCN	MCP	MCN
<i>Constant</i>	-1.156 ^{***} (-4.777)	-1.184 ^{***} (-4.880)	-0.800 ^{***} (-10.457)	-0.812 ^{***} (-10.563)	-0.859 ^{***} (-7.364)	-0.878 ^{***} (-7.492)
<i>MC</i>	0.041 ^{***} (4.671)	-0.047 ^{***} (-4.138)	0.018 ^{***} (6.507)	-0.020 ^{***} (-5.772)	0.026 ^{***} (6.261)	-0.031 ^{***} (-5.612)
<i>Size</i>	0.073 ^{***} (7.686)	0.073 ^{***} (7.625)	0.038 ^{***} (12.726)	0.038 ^{***} (12.612)	0.045 ^{***} (9.709)	0.044 ^{***} (9.621)
<i>ROE</i>	0.027 (0.785)	0.027 (0.797)	-0.026 ^{**} (-2.465)	-0.026 ^{**} (-2.438)	-0.023 (-1.416)	-0.023 (-1.390)
<i>CF</i>	-0.013 ^{***} (-3.183)	-0.014 ^{***} (-3.191)	-0.069 ^{***} (-3.007)	-0.069 ^{***} (-3.008)	-0.098 ^{***} (-2.795)	-0.098 ^{***} (-2.798)
<i>AC</i>	-0.064 ^{***} (-7.001)	-0.064 ^{***} (-7.036)	-0.024 ^{***} (-8.675)	-0.024 ^{***} (-8.717)	-0.044 ^{***} (-10.052)	-0.044 ^{***} (-10.093)
<i>BIG4</i>	-0.011 ^{***} (-2.594)	-0.011 ^{***} (-2.639)	-0.032 ^{***} (-5.734)	-0.032 ^{***} (-5.780)	-0.037 ^{***} (-4.350)	-0.038 ^{***} (-4.398)
<i>EC</i>	-0.089 [*] (-1.929)	-0.088 [*] (-1.914)	-0.045 ^{***} (-3.065)	-0.044 ^{***} (-3.036)	-0.028 (-1.262)	-0.028 (-1.239)
<i>GA</i>	-0.007 (-0.922)	-0.007 (-0.964)	-0.003 (-1.359)	-0.003 (-1.418)	-0.006 [*] (-1.647)	-0.006 [*] (-1.692)
<i>BD</i>	-0.026 (-1.306)	-0.026 (-1.267)	0.003 (0.532)	0.004 (0.581)	0.001 (0.079)	0.001 (0.132)
<i>ID</i>	-0.063 (-1.103)	-0.065 (-1.134)	-0.001 (-0.063)	-0.002 (-0.105)	0.013 (0.451)	0.011 (0.410)
<i>BS</i>	0.020 (1.559)	0.020 (1.578)	0.005 (1.236)	0.005 (1.258)	0.005 (0.851)	0.005 (0.874)
<i>IMR</i>	0.009 (0.265)	0.012 (0.362)	0.045 ^{***} (4.330)	0.046 ^{***} (4.454)	0.044 ^{***} (2.778)	0.046 ^{***} (2.898)
<i>Year/Industry</i>	Control	Control	Control	Control	Control	Control
<i>Wald Chi2</i>	1109.68 ^{***}	1102.98 ^{***}	1469.20 ^{***}	1450.38 ^{***}	1345.14 ^{***}	1330.91 ^{***}
<i>N</i>	5988	5988	5988	5988	5988	5988

Note: ^{***}, ^{**}, ^{*} indicate significance at 1%, 5%, 10%, respectively; T value are shown in brackets; in order to save space, the first stage estimation results of the Probit model are not listed in this paper, but interested readers can email me for the details.

Table 5. Regression results of Heckman model

Variables	DMS1		DMS2		DMS3	
	MCP	MCN	MCP	MCN	MCP	MCN
<i>Constant</i>	-1.180 ^{***} (-4.842)	-1.201 ^{***} (-4.937)	-0.810 ^{***} (-10.522)	-0.817 ^{***} (-10.599)	-0.872 ^{***} (-7.424)	-0.884 ^{***} (-7.530)
<i>MC</i>	0.030 ^{***} (2.801)	-0.031 ^{**} (-2.416)	0.011 ^{**} (-2.109)	-0.012 ^{***} (-2.743)	0.019 ^{**} (2.378)	-0.022 ^{**} (-2.077)
<i>MC×PR</i>	-0.014 ^{***} (-2.740)	-0.022 ^{**} (-2.276)	-0.009 [*] (-1.829)	-0.012 ^{**} (-2.542)	-0.009 [*] (-1.745)	-0.012 (-1.025)
<i>PR</i>	0.011 ^{**} (2.431)	0.002 ^{**} (2.106)	0.017 ^{**} (2.072)	0.010 ^{**} (2.199)	0.014 [*] (1.893)	0.006 (0.914)
<i>Size</i>	0.074 ^{***} (7.722)	0.073 ^{***} (7.666)	0.038 ^{***} (12.710)	0.038 ^{***} (12.600)	0.045 ^{***} (9.721)	0.044 ^{***} (9.632)
<i>ROE</i>	0.025 (0.741)	0.026 (0.762)	-0.025 ^{**} (-2.384)	-0.025 ^{**} (-2.338)	-0.023 (-1.405)	-0.022 (-1.365)
<i>CF</i>	-0.012 ^{***} (-3.159)	-0.012 ^{***} (-3.161)	-0.067 ^{***} (-2.956)	-0.068 ^{***} (-2.954)	-0.097 ^{***} (-2.760)	-0.097 ^{***} (-2.761)
<i>AC</i>	-0.064 ^{***} (-7.013)	-0.064 ^{***} (-7.057)	-0.025 ^{**} (-2.384)	-0.025 ^{***} (-8.819)	-0.044 ^{***} (-10.095)	-0.044 ^{***} (-10.138)
<i>BIG4</i>	-0.010 ^{**} (-2.569)	-0.011 ^{***} (-2.614)	-0.032 ^{***} (-5.756)	-0.032 ^{***} (-5.805)	-0.037 ^{***} (-4.344)	-0.038 ^{***} (-4.395)
<i>EC</i>	-0.085 [*] (-1.846)	-0.085 [*] (-1.842)	-0.045 ^{***} (-3.070)	-0.045 ^{**} (-3.070)	-0.027 (-1.222)	-0.027 (-1.222)
<i>GA</i>	-0.007 (-0.918)	-0.007 (-0.958)	-0.003 (-1.332)	-0.003 (-1.391)	-0.006 (-1.623)	-0.006 [*] (-1.679)
<i>BD</i>	-0.025 (-1.261)	-0.025 (-1.230)	0.003 (0.473)	0.003 (0.507)	0.001 (0.078)	0.001 (0.119)
<i>ID</i>	-0.062 (-1.080)	-0.064 (-1.109)	-0.001 (-0.074)	-0.002 (-0.116)	0.013 (0.459)	0.012 (0.417)
<i>BS</i>	0.020 (1.587)	0.020 (1.604)	0.004 (1.037)	0.004 (1.063)	0.005 (0.786)	0.005 (0.809)
<i>IMR</i>	0.009 (0.268)	0.012 (0.367)	0.045 ^{***} (4.378)	0.047 ^{***} (4.498)	0.045 ^{***} (2.799)	0.046 ^{***} (2.917)
<i>Year/Industry</i>	Control	Control	Control	Control	Control	Control
<i>Wald Chi2</i>	1110.76 ^{***}	1104.29 ^{***}	1474.06 ^{***}	1455.76 ^{***}	1346.35 ^{***}	1332.17 ^{***}
<i>N</i>	5988	5988	5988	5988	5988	5988

Note: *, **, *** indicate significance at 1%, 5%, 10%, respectively; T value are shown in brackets; in order to save space, the first stage estimation results of the Probit model are not listed in this paper, but interested readers can email me for the details.

5.5 Sensitivity analysis

This article mainly take the following two methods of robustness test: On the one hand, we select other

measurement method of media coverage. According to CNKI Chinese important newspaper full text database, we take the eight important Finance and economics newspapers which are "China Securities News", "Securities Daily", "Securities Times", "Shanghai Securities News", "the 21st century economy report", "Chinese business newspaper", "economy observes a newspaper", "Financial Times" as the resources of the data of media attention and then we collected and summarized the listed companies' news reports; On the other hand, we remove the noise in the data of media coverage. In the data collection of media coverage, there may be some listed companies did not have the media reports, and then the media coverage variable is 0. The paper has the test again after deleting the samples which media coverage variable is 0. Results from the robustness tests show no significant difference from our previous findings.

6. Conclusion

The paper use 5988 sample data of firms listed in Shenzhen and Shanghai stock exchanges in the period 2010-2014 and apply Heckman two-stage model to empirically test the impact mechanism of media coverage on debt maturity structure of listed companies, and explore the impact of media coverage on the debt maturity structure under different ownership nature. The analysis results of this paper show that: Firstly, favorable media coverage and debt maturity structure of listed companies are positive related. That is favorable media coverage can increase the level of debt maturity structure of a listed company. Secondly, unfavorable media coverage is negatively related to debt maturity structure of listed companies. Unfavorable media coverage can decrease the level of corporate debt maturity structure. Thirdly, favorable media coverage has a different impact on debt maturity structure with different nature of ownership. Specifically, with respect to state-owned enterprises, the impact of favorable media coverage on increasing debt maturity structure is more apparent on non-state-owned enterprise. Fourthly, unfavorable media coverage has a different impact on debt maturity structure with different nature of ownership. Specifically, compared with the non-state-owned enterprises, the impact of unfavorable media coverage on decreasing debt maturity structure is more apparent on state-owned enterprises. Future research could focus on the impact of media on debt financing costs. This is an interesting research topic; it can help companies find effective ways to reduce the cost of debt financing.

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Notes

Note1: Reference on New China official homepage: <http://www.xinhuanet.com/english/newchina/index.htm>
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