

Media Tone, Information Quality and Credit Risk

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Abstract

Based on the research results of the data of A-share listed companies from 2011 to 2020, it shows that media tone is negatively correlated with corporate credit risk, and examines the moderating effect of information quality on the relationship between the two. The study finds that improving the quality of information will strengthen the negative effect of media tone on credit risk. Further research finds that financing constraints plays a significant intermediary role in the impact of media tone on credit risk, that is, media tone will inhibit financing constraints, thereby reducing credit risk.

Keywords

Media Tone; Information Quality; Financing Constraints; Credit Risk.

1. Introduction

With the outbreak of the new crown epidemic, the living environment of listed companies is turbulent, production and operation are forced to be interrupted, financing is difficult, the debt crisis is highlighted, and credit risks spread rapidly in the supply chain, forming a domino effect (Chen et al., 2018). At the same time, credit risk itself is highly contagious (Allegret et al., 2017; Ning et al., 2020), and improper management can easily lead to systemic financial risks (Gu et al., 2022; Zhang et al., 2022). Therefore, it is of great practical significance to discuss the issues that affect the credit risk of enterprises in order to maintain the stable development of our country's economy.

As an important external governance mechanism of a company, the media's reports will not only affect investors' perception of the company, but also affect the company's various decision-making behaviors, and the tone of the media can also reflect the subjective emotions of the media (Zhi and Zhou, 2021). In recent years, scholars at home and abroad have conducted a lot of discussions on media tone in terms of corporate governance (EI et al., 2019; Chang et al., 2020) and capital market pricing (Wang et al., 2015; Kang et al., 2021), and accumulated rich research results. Scholars mainly explore the relationship between media reports and corporate governance from the perspective of reputation mechanism (EI et al., 2019) and effective supervision mechanism (Baloria and Heese, 2018). Corporate governance has a negative effect, which is mainly based on the market pressure hypothesis (Ying et al., 2017; Wang et al., 2022). In terms of capital market pricing, the communication function of the media can improve the visibility of information, reduce the cost of information search, and enable more company-level information to be reflected in stock prices, improve the effectiveness of stock prices, and reduce the synchronicity of stock prices (Huang and Guo, 2014), improving the pricing efficiency of the capital market (Wang et al., 2015).

This paper takes China's A-share listed companies from 2011 to 2020 as a sample, and uses empirical analysis to test whether media tone can play a role in the supervision and governance of corporate credit risk and its impact mechanism. The study found that media tone can significantly reduce corporate credit risk, and improving the quality of information can

strengthen the relationship between the two. Further analysis shows that the financing constraint plays a conducive role in it. The main contributions of this paper are as follows: First, this paper discusses the specific path of the influence of media tone on credit risk from the theoretical and empirical aspects, and further improves the logical line of "external supervision-corporate credit risk". Beneficial extension, and put forward new suggestions for enterprise risk management. Secondly, this paper explores the impact of differences in enterprise information status on the relationship between the two, in order to provide risk management decision-making suggestions for enterprises in different environments.

2. Theoretical Hypothesis

2.1. Media Tone and Credit Risk

The tone of the media may affect corporate credit risk in the following two ways:

From a reputation perspective, the media has the ability to influence reputational capital (EI et al., 2019). Reputation can bring wealth and social status to a business or manager, and reputation damage is a credible punishment for managers and board members. The more positive the tone of media reports, the management will reduce opportunistic behavior to a certain extent for the sake of personal reputation and corporate reputation, thereby curbing corporate credit risk.

Starting from the theory of effective supervision, media reports have the function of exposing (Li et al., 2022), and can quickly transmit positive or negative information of enterprises through the Internet (Quan and Wu, 2012). Active media reports on companies can alleviate the information asymmetry between investors and companies (Bartov et al., 2018; Gao et al., 2022), help reduce the company's external financing costs, ease the financing pressure of companies, and corporate credit risk problems will also decrease accordingly.

Based on the above analysis, this paper puts forward Hypothesis 1:

Hypothesis 1: Media tone is negatively related to credit risk.

2.2. Media Tone, Information Quality and Credit Risk

First of all, in an environment with higher information quality, the requirements for the quality of information disclosed by enterprises are increased, and the content of enterprise information disclosure can be presented to social media in a more popular and clear form. As the efficiency of media attention is improved, it is easier for them to find effective information and make relatively correct and positive reports when using it, so as to encourage investors to sign contracts with high-quality companies, so as to further prevent and control credit risks in business operations.

Secondly, because the difference in the information environment will affect the role of media supervision, the higher the quality of enterprise information, the better the information asymmetry between investors and enterprises in the process of cooperation can be effectively alleviated, and the time and cost of both parties can be saved, which in turn contributes to Enterprises obtain capital investment at a lower financing cost (Wang et al., 2022), the stronger the supervision effect of the media, the stronger the supervisory effect on the production, operation and behavior decision-making of the enterprise, and it can effectively restrain the opportunistic behavior of the management. Mitigate business risks.

Based on the above analysis, this paper puts forward Hypothesis 2:

Hypothesis 2: Information quality has a significant positive impact on the relationship between media tone and credit risk.

3. Research Design and Model Setting

3.1. Sample Selection and Data Source

Considering the repeated impact of the new crown epidemic on business operations in 2021, this paper selects my country's A-share listed companies from 2011 to 2020 as research samples, and screens and processes the initial samples according to the following steps: (1) Delete listed companies in the financial and insurance industries Sample; (2) Eliminate ST, ST* class samples; (3) Remove samples with missing values. Finally, in order to reduce the influence of extreme values, all continuous variables were tailed at 1% and 99%, and finally 20,416 samples were obtained, and the data came from Guotaian and Wind databases.

3.2. Variable Definition and Model Setting

3.2.1. Variable Definition

1) Explained variable

The modern credit risk measurement model frequently used by domestic and foreign scholars originated from Merton's pioneering research on option pricing theory. In this paper, the enterprise credit risk (DD) variable is measured by the Merton (1974) default distance model, and the key parameters in the Merton DD model are estimated by referring to the NavieDD model calculation method of Bharath and Shumway (2008). The calculation method is as formula (1):

$$DD_{i,t} = \frac{\log\left(\frac{Equity_{i,t} + Debt_{i,t}}{Debt_{i,t}}\right) + \left(r_{i,t-1} - \frac{\sigma_{vi,t}^2}{2}\right) * T_{i,t}}{\sigma_{vi,t} * \sqrt{T_{i,t}}} \quad (1)$$

Among them, $DD_{i,t}$ indicates the default distance, $Equity_{i,t}$ indicates the total market value of the company; $Debt_{i,t}$ is the face value of the company's debt, $r_{i,t-1}$ is the annual rate of return with a lag of one year, obtained from the company's monthly stock rate of return in the previous year; the time parameter $T_{i,t}$ is set to 1 year; $\sigma_{vi,t}$ is the estimated amount of the company's asset volatility, Calculated by using the volatility $\sigma_{Ei,t}$ of the stock interest rate. The calculation process is as formula (2):

$$\sigma_{vi,t} = \frac{Equity_{i,t}}{Equity_{i,t} + Debt_{i,t}} * \sigma_{Ei,t} + \frac{Debt_{i,t}}{Equity_{i,t} + Debt_{i,t}} * (0.05 + 0.25 * \sigma_{Ei,t}) \quad (2)$$

On the basis of formulas (1) and (2), the default distance is obtained as a substitute variable for credit risk (DD). The smaller the value, the smaller the relative distance between the future asset market value of the enterprise and the default point, and the greater the credit risk.

2) Explanatory variables

Media tone (Tone), based on the research of Zhi and Zhou (2021), is measured by (the number of positive media reports on the company - the number of negative reports) / the total number of media reports on the company.

3) Moderating variable

Information Transparency (TRANS) draws on the practice of Xin et al. (2014) to comprehensively measure the information transparency of enterprises from the perspective of earnings quality, information disclosure evaluation index, analyst earnings forecast and auditors.

4) Mediating variable

Financing constraint (KZ) refers to the research of Lamont et al. (2001), expressed by KZ index.

5) Control variable

The control variables consist of enterprise size (Size), asset-liability ratio (Lev), net profit margin on assets (ROA), enterprise growth (Growth), time to market (Age), concurrent employment (Dual), and equity concentration of 3% (Share), industry (Ind), year (Year) dummy variables. See Table 1 for variable names and definitions.

Table 1. Variable Definition Table

Variable type	symbol	name	explanation
Explained variable	DD	credit risk	Bharath and Shumway(2008)
Explanatory variables	Tone	Media tone	(the number of positive media reports on the company - the number of negative reports) / the total number of media reports
Moderating variable	TRANS	information quality	Xin et al. (2014)
Mediating variable	KZ	financing constraints	KZ index
Control variable	Size	Enterprise size	ln(Total assets)
	Lev	Assets and liabilities	Total liability/ Total assets
	ROA	net profit margin	Net profit/ total assets
	Growth	Business growth	Operating income growth rate
	Age	Time to market	ln(listing age)
	Dual	The concurrent position of chairman and general manager	as chairman and general manager takes the value of 1,or 0.
	Share	Ownership concentration	Ownership concentration 3%
	Ind	Industry code	Industry dummy variable
	Year	Year	Year dummy variable

3.2.2. Model Setting

This paper builds model (3) to test the impact of media tone (Tone) on corporate credit risk (DD) in hypothesis 1.

$$DD_{i,t} = \alpha_0 + \alpha_1 Tone_{i,t} + Controls_{i,t} + \delta_i + \mu_t + \varepsilon_{i,t} \quad (3)$$

When the coefficient α_1 is significantly positive, it means that the higher the tone of the media, the greater the distance to default and the smaller the credit risk, that is, Hypothesis 1 is established.

In order to test the mediating effect of information quality in hypothesis 2 on media tone and credit risk, this paper constructs model (4):

$$DD_{i,t} = \beta_0 + \beta_1 Tone_{i,t} + \beta_2 TRANS_{i,t} + \beta_3 Tone_{i,t} \times TRANS_{i,t} + \beta_4 Controls_{i,t} + \mu_{i,t} \quad (4)$$

The media tone (Tone) and information quality (TRANS) in model (4) are all variables after decentralization.

4. Empirical Analysis

4.1. Descriptive Statistics

Table 2 is the descriptive statistics of the main variables. Among them, the average value of credit risk (DD) is 3.074, the median is 3.084, the minimum value is 1.144, and the maximum value is 4.631, indicating that there are large differences in corporate credit risk. The average value of media tone (Tone) is 0.146, the minimum value is -0.480, and the maximum value is 0.587. It can be seen that the numerical distribution of media tone also reflects this feature. The minimum value of information quality (TRANS) is 0.005 and the maximum value is 0.850, indicating that there is a significant difference in the quality of information among enterprises.

Table 2. descriptive statistics

Variable	sample size	mean	median	sd	minimum	maximum
DD	20416	3.074	3.084	0.672	1.144	4.631
Tone	20416	0.146	0.168	0.229	-0.480	0.587
TRANS	20416	0.335	0.330	0.188	0.005	0.850
Size	20416	22.380	22.210	1.269	19.930	26.270
Lev	20416	0.474	0.467	0.199	0.096	0.966
ROA	20416	0.0260	0.030	0.072	-0.365	0.180
Growth	20416	0.427	0.140	1.193	-0.775	8.819
Age	20416	2.279	2.372	0.688	0.766	3.289
Dual	20416	0.749	1.000	0.433	0.000	1.000
Share	20416	51.580	51.290	15.030	19.690	87.100

4.2. Correlation Analysis

Before the regression test, this paper first conducted the VIF test. According to the test, the VIF value of each variable was less than 10, the minimum value was 1.02, the maximum value was 1.56, and the average value was 1.27, indicating that the results were less affected by multicollinearity. According to Table 3, the correlation coefficient between media tone (Tone) and credit risk (DD) is 0.122***, which is consistent with the result of hypothesis H1.

Table 3. correlation analysis

Variable	DD	Tone	Size	Lev	ROA	Growth	Age	Dual	Share
DD	1								
Tone	0.122***	1							
Size	-0.339***	0.148***	1						
Lev	-0.623***	-0.120***	0.396***	1					
ROA	0.293***	0.308***	0.090***	-0.337***	1				
Growth	-0.019***	-0.037***	0.018**	0.089***	0.020***	1			
Age	-0.162***	-0.059***	0.327***	0.297***	-0.103***	0.069***	1		
Dual	-0.059***	0.015**	0.143***	0.097***	0.00600	0.014**	0.211***	1	
Share	0.035***	0.042***	0.248***	-0.00900	0.162***	0.0110	-0.229***	0.023***	1

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels respectively; the t value of the robust standard error is in brackets (the same below).

4.3. Regression Analysis

Through the test, the high-order relationship between media tone (Tone) and credit risk (DD) is excluded, so linear regression is selected. Table 4 shows the regression results of hypothesis 1, where columns (1) and (3) are OLS and panel fixed effect regression without control

variables, columns (2) and (4) are OLS and panel fixed effect regression with control variables. Then the Hausman test was carried out, and the conclusion of rejecting the null hypothesis was obtained, so this paper uses fixed effects for regression. According to column (4), the correlation coefficient between media tone (Tone) and credit risk (DD) is 0.116**. It can be seen that the higher the tone of the media, the greater the distance of corporate default and the smaller the credit risk, that is, the tone of the media can effectively restrain the credit risk of the enterprise. Hypothesis H1 is verified.

Table 4. Benchmark regression results

Variable	(1)	(2)	(3)	(4)
	DD	DD	DD	DD
Tone	0.321***	0.116***	0.319***	0.116***
	(16.59)	(7.16)	(16.45)	(7.17)
Size		-0.098***		-0.099***
		(-28.24)		(-28.83)
Lev		-1.702***		-1.711***
		(-79.10)		(-79.59)
ROA		1.217***		1.222***
		(22.42)		(22.50)
Growth		0.009***		0.009***
		(3.05)		(3.06)
Age		0.103***		0.102***
		(17.25)		(17.35)
Dual		0.016**		0.015*
		(2.08)		(1.92)
Share		0.004***		0.004***
		(16.04)		(16.00)
Constant	3.061***	5.555***	3.027***	5.590***
	(50.72)	(67.32)	(592.65)	(81.41)
ind	yes	yes	yes	yes
year	yes	yes	yes	yes
N	20,416	20,416	20,416	20,416
Adj_R2	0.202	0.515	0.187	0.509

Table 5 shows the regression results of hypothesis 2, in which, media tone (Tone), information quality (TRANS), media tone (Tone) and information quality (TRANS) are all variables after decentralization, column (1) is the moderating effect regression without control variables, and the coefficient of the interproduct item of media tone (Tone) and information quality (TRANS) is 0.246**; column (2) is the moderating effect regression with control variables, media tone (Tone) and information quality (TRANS) have a coefficient of 0.608***, indicating that information quality will positively regulate the relationship between media tone and credit risk, assuming that H2 is established.

Table 5. Moderating effect regression results

Variable	(1)	(2)
	DD	DD
c_Tone	0.176***	0.035**
	(8.25)	(2.12)
c_TRANS	0.508***	0.687***
	(20.62)	(29.71)
Tone_TRANS	0.246**	0.608***
	(2.38)	(7.57)
Size		-0.148***
		(-39.28)
Lev		-1.641***
		(-77.54)
ROA		0.787***
		(14.09)
Growth		0.012***
		(4.29)
Age		0.110***
		(19.13)
Dual		0.015**
		(2.00)
Share		0.004***
		(15.51)
Constant	3.069***	6.663***
	(684.65)	(86.43)
ind	yes	yes
year	yes	yes
N	20,416	20,416
Adj_R2	0.204	0.532

4.4. Robustness Check

Considering the robustness of the conclusion, the explanatory variables and the explained variables were replaced. Among them, the explanatory variable Tone is replaced by total media reports. Column (1) in Table 6 shows the regression results. The correlation coefficient between total media reports and credit risk is 0.080***. The explanatory variable refers to the research of Qin Zhen et al. (2023), and replaces it with the risk of default (EDF). Column (2) is its regression result. The correlation coefficient between Tone and EDF is -0.005***. In addition, column (3) is a one-period lagged regression of media tone. After a series of replacement variables and a lag of one period, the tone of the media still has an inhibitory effect on corporate credit risk, that is, the main conclusion of this paper still holds.

Table 6. robustness check

Variable	replace the explanatory variables	replace the explained variable	Lag one period
	(1)	(2)	(3)
	DD	EDF	DD
Tone		-0.005***	
		(-4.43)	
WGAB6	0.080***		
	(18.75)		
L.Tone			0.172***
			(9.67)
Size	-0.129***	0.002***	-0.097***
	(-33.78)	(6.26)	(-25.21)
Lev	-1.732***	0.018***	-1.715***
	(-81.18)	(11.18)	(-70.63)
ROA	1.314***	-0.024***	1.153***
	(25.33)	(-6.14)	(20.10)
Growth	0.009***	0.000	0.010***
	(2.93)	(0.49)	(3.06)
Age	0.107***	-0.001*	0.102***
	(18.20)	(-1.81)	(13.96)
Dual	0.023***	-0.001**	0.015*
	(2.91)	(-1.99)	(1.72)
Share	0.004***	-0.000**	0.004***
	(16.64)	(-2.03)	(15.38)
Constant	5.833***	-0.035***	5.539***
	(83.85)	(-6.95)	(71.17)
ind	yes	yes	yes
year	yes	yes	yes
N	20,416	20,416	16,159
Adj_R2	0.516	0.035	0.512

4.5. Further Analysis

This paper chooses financing constraints (KZ) as an intermediary variable. Column (1) of Table 7 shows that the coefficient of media tone (Tone) and financing constraints (KZ) is -0.301^{***} , indicating that media tone can disperse the constraint of an enterprise's financing. The regression coefficients of media tone (Tone) and financing constraints (KZ) on credit risk (DD) in column (2) are 0.095^{***} and -0.038^{***} respectively. The comprehensive results show that media tone is concentrated through decentralized financing constraints, thereby restraining the credit risk of the enterprise.

Table 7. Media Tone, financing constraints and Credit Risk

Variable	(1)	(2)
	KZ	DD
Tone	-0.301***	0.095***
	(-5.89)	(5.73)
KZ		-0.038***
		(-16.46)
Size	-0.351***	-0.096***
	(-32.29)	(-26.50)
Lev	6.389***	-1.556***
	(91.97)	(-57.67)
ROA	-8.156***	0.941***
	(-45.94)	(15.54)
Growth	0.013	0.008**
	(1.31)	(2.52)
Age	0.223***	0.103***
	(12.22)	(17.37)
Dual	0.030	0.017**
	(1.24)	(2.09)
Share	-0.009***	0.004***
	(-11.23)	(14.47)
Constant	6.506***	5.533***
	(29.99)	(76.97)
ind	yes	yes
year	yes	yes
N	20,416	20,416
Adj_R2	0.577	0.526

5. Conclusion and Policy Recommendations

5.1. Conclusion

Based on the data samples of Shanghai and Shenzhen A-share listed companies from 2011 to 2020, this paper empirically tests the impact and mechanism of media tone on corporate credit risk, and draws the following research conclusions. First, the tone of the media can significantly inhibit the credit risk of the enterprise. The higher the tone of the media, the lower the credit risk of the enterprise. This conclusion still holds after a series of robustness tests such as replacing the core explanatory variables and explained variables. Second, information quality can significantly adjust the relationship between media tone and credit risk, and improving information quality will strengthen the relationship between the two. Third, further analysis found that the tone of the media will reduce the financing constraints, thereby inhibiting the credit risk of listed companies.

5.2. Policy Recommendations

Based on the conclusions, the following suggestions are put forward: First, from the perspective of supervision, it is necessary to further improve the regulations related to media governance in relevant laws and regulations such as the Securities Law and the Company Law, so as to provide external investors with in-depth supervision of listed companies. Good legal support. In addition, the regulatory authorities should also strengthen the construction of external investor education teams, carry out media education work in a targeted manner, and create a

healthy and favorable environment for the development of my country's capital market. Secondly, from the perspective of listed companies, it is necessary to strengthen the company's information disclosure more likely, to ensure the authenticity and reliability of publicly disclosed information, and to minimize information asymmetry with investors, so that external investors can more conveniently, Get company information quickly and easily. Finally, As the information transmitter and external supervisor of corporate activities, the news media should ensure a good environment for information transmission and supervise the daily risk activities of enterprises. For many small and medium-sized enterprises, they face high financing risks and resource limitations. Establish and improve the corporate financing system and provide loan measures for enterprises with poor financing environments.

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