



# Debt Rating, Information Disclosure Quality, and Bond Financing Costs

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**Abstract.** With the gradual diversification of bond financing methods, financing costs are receiving increasing attention from scholars. Higher financing costs will limit the financing ability of enterprises, affecting their business performance and future development process. Therefore, studying the cost of bond financing has strong practical value.

**Keywords:** debt rating; Quality of information disclosure; Bond financing costs

## 1 Introduction

Bond financing, as a direct financing method, can not only reduce the budget soft constraints generated by corporate bank loans, play a role in financial leverage and tax shield, but also prevent dilution of control compared to equity financing. Therefore, bond financing has become increasingly popular among enterprises in recent years. This article studies the impact of debt rating and information disclosure quality on bond financing costs, which helps bond issuing companies understand the relationship between various variables, identify effective financing channels, improve financing structure, provide theoretical reference for reducing financing costs, and provide ideas for enterprises to use bond financing as a long-term source of funding. At the same time, it can help investors and creditors identify risks and opportunities<sup>[2]</sup>.

## 2 Assumption proposal

Under the condition that rating agencies have credibility and are recognized by society, a high credit rating means lower investment risk, higher trust of investors, and therefore a corresponding lower risk return rate[1]. According to economic principles, when the supply of bonds in the bond market is less than demand, the cost of bond financing will be lower[4]. Therefore, hypothesis 1 is proposed:

H1: With *Ceteris paribus*, the higher the debt rating, the lower the bond financing cost.

High quality information disclosure can make market information more transparent, alleviate information problems between enterprises and investors, reduce investors'

information purchase costs and investment risks, enable investors to predict the future returns of enterprises more accurately, and thus affect the required necessary return rate and financing cost<sup>[5]</sup>. Therefore, based on the mechanism of the relationship between the quality of information disclosure and financing costs, Hypothesis 2 is proposed:

H2: With *Ceteris paribus*, the higher the quality of information disclosure, the lower the bond financing cost.

This article believes that enterprises can reduce financing costs by improving their corporate governance structure. The higher the level of corporate governance, the higher the quality of information disclosure, which can transmit enterprise value information. Rating agencies can more accurately, objectively, and fairly evaluate the credit status of enterprises, thereby affecting the cost of funds for enterprises<sup>[3]</sup>. That is to say, the quality of information disclosure may have an impact on the relationship between debt ratings and bond financing costs. Therefore, hypothesis 3 of this article is proposed:

H3: With *Ceteris paribus*, the improvement of the quality of information disclosure will promote the relationship between debt rating and bond financing costs.

### **3 Research Design**

#### **3.1 Sample selection and data sources**

This article selects the data of corporate bonds issued by listed companies on the Shenzhen Stock Exchange in China as the research object. The data mainly comes from wind database, [cninfo.com.cn](http://cninfo.com.cn), China Bond Information Network, etc. On the basis of collecting and sorting out the data, this paper mainly carries out the following processing: (1) According to the issuance announcement date and bond maturity matching to the treasury bond issued on the same day, find the corresponding Yield to maturity of treasury bond, and calculate the credit spread. (2) Combine corporate bond data with accounting information disclosure quality data according to the listed company code corresponding to corporate bonds. (3) Exclude corporate bonds issued by non listed companies. (4) Exclude corporate bonds issued by listed companies with missing data. (5) Exclude corporate bonds with inconsistent rating standards from international rating agencies.

#### **3.2 Definition of Key Variables**

##### **3.2.1 Bond financing costs.**

Bond financing cost is an important part of debt financing cost. Bond financing cost is the cost of interest and issuance fees that the issuer needs to pay to the fund provider. It is the minimum return on capital required by investors according to the quality of corporate credit risk and expected solvency, that is, the Yield to maturity of bonds. This paper uses credit spread to measure the cost of bond financing, and uses the difference between the nominal interest rate at the time of issuance of corporate bonds and the Yield to maturity of treasury bond bonds with the same maturity on the issuance date to express the credit spread, which is calculated as follows:

COST=RATE-M

Among them, COST is the bond financing cost, RATE is the coupon rate at the time of bond issuance, and M is the Yield to maturity of treasury bond bonds of the same maturity that is the same as the announcement date of bond issuance.

**3.2.2Debt rating**

This article selects debt rating as the research object. This article adopts Jiang's (2008) approach of assigning ratings. The larger the value, the higher the rating it represents. Long term bond ratings are divided into three classes and nine levels, but because the filtered data in this article only includes five rating levels: AAA, AA+, AA, AA -, and A+, and most of them are AA or above, with a very small number of A+, A+and AA - are classified as the same level. The assignment results are as follows: AAA=4, AA+=3, AA=2, AA - and A+=1.

**3.2.3Quality of Information Disclosure.**

This article uses the annual information disclosure ratings of listed companies published by the Shenzhen Stock Exchange to measure the quality of information disclosure, represented by Index. For the convenience of empirical research, the following assignments are made: A (excellent)=4, B (good)=3, C (pass)=2, and D (fail)=1.

In addition, based on the literature review, this article selected redeemability, salability, asset liability ratio, asset viability, growth, and corporate nature as control variables. The specific variable definitions and calculations are shown in Table 1.

**Table 1. Variable Definition**

Variable		Formula
Explained Variable	Bond financing costs	COST = Coupon rate - Yield to maturity of treasury bond bonds of the same maturity
	CreditQ	AAA=4, AA+=3, AA=2, AA- and A+=1
explanatory variable	Index	Excellent A=4, Good B=3, Pass C=2, Fail D=1
	Nature	When the actual controller of the company is state-owned, take 1; otherwise, take 0
control variable	CALL	If redemption terms are included=1, no=0
	PUT	If including a resale clause=1, no=0
	CZX	(Total assets at the end of this year-Total assets at the end of the previous year) /Total assets at the end of the previous year
	PPE	(Fixed assets+inventory) /total assets
	LEV	total liabilities/ total assets

## 4 Result analysis

### 4.1 Descriptive analysis

Table 2 provides a descriptive analysis of the variables, from which it can be seen that the average cost of bond financing is 2.7603, the maximum value is 5.8549, and the minimum value is 0.3452. This indicates that there is a significant difference in the cost of financing through corporate bonds for Chinese enterprises.

**Table 2.** Descriptive Statistics

Variable	sample size	MIN	MAX	AGE	median	standard deviation
COST	813	0.3452	5.8549	2.7603	2.6692	1.2812
CreditQ	813	1	4	2.6728	2	0.8603
Index	813	1	4	3.1562	3	0.6688
Nature	813	0	1	0.3272	0	0.4695
CALL	813	0	1	0.0467	0	0.2112
PUT	813	0	1	0.8782	1	0.3272
CZX	813	-0.2638	23.8168	0.3273	0.1998	1.204
PPE	813	0	0.9337	0.4036	0.4004	0.1973
LEV	813	7.9713	95.1838	59.8797	61.6608	17.3099

### 4.2 Hypothesis test results

Model (1) in Table 3 shows the regression results with only control variables added, while Model (2) shows the regression results with debt ratings added to Model (1). From the table, it can be seen that the regression coefficients and significance of the control variables in model (2) are basically consistent with model (1).

The Adj R-squared values of models (1) and (2) are 0.2541 and 0.3982, respectively, indicating that the regression equation of model (2) has a better explanatory effect than model (1). In model (2), the regression coefficient between debt rating and bond financing cost is -0.5987, which is significant at the 1% significance level, consistent with the previous correlation analysis results. This indicates that debt rating has a good explanatory effect on bond default risk and has credibility. Hypothesis 1 of this article is verified.

**Table 3.** Debt Ratings and Bond Financing Costs

	(1)	(2)
	COST	COST
CreditQ		-0.5987*** (-13.93)

control variable		
F	47.10	77.74
P	0.0000	0.0000
Adj-R2	0.2541	0.3982
N	813	813

Secondly, the regression coefficient between the quality of information disclosure and the cost of bond financing in Table 4 is -0.5634, which is significantly negatively correlated at the level of 1%, consistent with the previous correlation analysis results. This indicates that the improvement of the quality of enterprise information disclosure is conducive to the transparency of market information, reducing the information barriers between investors. That is, under the same Ceteris paribus, the higher the quality of information disclosure, the lower the cost of bond financing, which can verify hypothesis 2.

**Table 4.** Quality of Information Disclosure and Bond Financing Costs

COST	coefficient	standard deviation	T
Index	-0.5634***	0.0557	-10.12
control variable			
	F(10,802) = 60.08	R-squared= 0.3432	
	Prob>F = 0.0000	Adj R-squared = 0.3375	

Finally, as shown in Table 5, the debt credit rating, information disclosure quality, and bond financing cost in model (3) are significantly higher than 1%. In model (4), the regression coefficient between debt credit rating and bond financing cost is -0.3474, which is significant at the 1% significance level. The regression coefficient of the interaction term between debt rating and information disclosure quality is -0.0886, which is significant at 1%. Moreover, after adding the multiplication term, the absolute values of the regression coefficients between debt rating and information disclosure quality both decrease. Further combining models (1) and (2) in Table 4, it can be seen that companies with good corporate governance status attach importance to information communication with the market, and the quality of information disclosure is higher. Therefore, when issuing bonds, third-party rating agencies can refer to more information. Hypothesis 3 is verified. In addition, we further analyzed the R-squared changes of models (3) and (4) in Table 6. Model (4) adjusted R-squared 0.4597 to be greater than model (3), with R-squared changes of 0.020 and Sig. F changes of 0.000, less than 0.05. This further demonstrates the validity of hypothesis 3.

**Table 5.** Debt Ratings, Information Disclosure Quality, and Bond Financing Costs

	(3)	(4)
	COST1	COST1
CreditQ	-0.5210*** (-12.23)	-0.3474*** (-6.59)
Index	-0.4145*** (-7.88)	-0.1539** (-2.18)

CreditQ*Index		-0.0886***
		(-5.42)
control variable		
F	80.95	77.76
P	0.0000	0.0000
Adj-R2	0.4406	0.4597
N	813	813

**Table 6.** Changes in Model R Square

model	R	R2	Adj R2	Error in stand-ard estimation	R2change	Change Statistics			
						F change	df1	df2	Sig. F change
(3)	0.668a	0.4461	0.4406	0.953001	0.446	80.952	8	804	0.0000
(4)	0.682b	0.4657	0.4597	0.9418311	0.020	29.364	1	803	0.0000

## 5 Conclusion

In order to better respond to information asymmetry in the securities market and diversify credit risks, rating agencies should keep up with the pace of the times, explore models that are conducive to the healthy development of the market, improve business quality and level, and leverage their value in the bond market; Bond issuing enterprises should further improve their corporate governance mechanisms, optimize the information disclosure quality evaluation system and system; The government should improve relevant laws and regulations, establish quality standards for enterprise information disclosure and a unified bond market supervision system, and stimulate the endogenous motivation of enterprises.

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