The Influence of Implicit Guarantee on the Yield Spread of China's Quasi-municipal Bond

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Abstract. Local government debts are an important part of the bond market. This paper mainly investigates the risk that the implicit guarantee brings to the market of quasi-municipal bonds. The implicit guarantee comes from local government financing vehicles (LGFVs), which are the finance entities for the local government, issue quasi-municipal bonds. Because people are potentially thought these bonds are guaranteed by the local government, the funding cost of quasi-municipal bonds is lower than other bonds. However, some local government's ability to pay back the investors' money is weak which causes some high-rated quasi-municipal bonds to default and triggers many defaults, which, along with the local government's mounting debt, may make investors more concerned about its capacity to repay the loan in the event of default. Therefore, China's central government then issues some policies to reduce the effectiveness of implicit government guarantees, trying to make the quasi-municipal bonds turn to become more marketize and contain less guarantee. In this paper, the author initially tries to demonstrate that the implicit guarantee reduces the yield spread of quasi-municipal bonds. Then, the author argues that the issue of relevant policies lessens the implicit guarantee and increases the marketability of quasi-municipal corporate bonds. Lastly, the author tries to show that different administrative levels of LGFVs will affect the yield spread of the bond.

Keywords: Implicit government guarantee, Local government financing vehicles, Quasi-municipal corporate bonds, Yield spread.

1. Introduction

China's recent bond market has two segmented markets: the exchange market and the over-the-counter-based interbank market. Over the past twenty years, particularly the last ten years, it has seen a consistent upward trend. In specific, the capitalization over GDP in China's bond market is 35% in 2008 and it grew rapidly to 90% in 2021 [1]. During the period of the financial crisis, China's central state initiated the "four trillion yuan" stimulus plan in 2009, aimed to counteract the recession. This plan triggered the extensive use of financial agencies and instruments. The majority of the shareholders in LGFVs are relative to the local governments' committees which charge of the supervision of the state-owned assets. Before the 1994 Tax Sharing Reform, local governments were allowed to spend the revenue from the tax to any development initiatives, including urban infrastructure [2]. At this time, Chinese local governments began to issue municipal bonds. In the next five years, the development of municipal bonds was very slow, but there is a large issuance volume increase in 2005. At the end of November 20, 2022, the local debts are 44.92 trillion CNY, which is 32% of the overall debt market [1]. Since LGFVs are the issuers of quasi-municipal bonds, they often be regarded as corporate bonds, but they enjoy extra safety because of the implicit government guarantees, and most quasi-municipal bonds are held by China's commercial banks, so they are considered to have a low risk or nearly zero risk weights.

2. Literature Review and Hypotheses

2.1. Implicit guarantee of Chinese municipal bonds

Most countries throughout the world do not have laws requiring governments to guarantee the bonds. However, in the reality, when the bonds face the risk of default, the market and investors often

expect the government will charge the responsibility. Therefore, there are still exist many situations that corporate bonds, such as quasi-municipal bonds may carry implicit government guarantees. Most developed and emerging countries have implicit government guarantees and it is often called as soft budget constraint. It has been created as a term that it is a phenomenon when state-owned companies experiences losses, the government will provide funding and other compensations like cutting taxes [3]. However, the close ties between the government and stated-owned enterprises triggers many potential risks. The government's soft budget constraint provides a powerful incentive for stated-owned enterprises to request assistance. Most SOE managers are blindly expanding, keeping the high leverage ratio, investing in aggressive projects, and expanding their credit scale because they are expected to receive financial assistance from the government and these perceptions bring risk to the financial market and disrupt its normal development of it [3].

Over the past decades, China's rapid economic progress has depended on either explicit or tacit commitments from the Chinese government. Moreover, they find that a fall in implicit government guarantees results in a decrease in investment which indicates that the implicit guarantees have a genuine impact on the financing market [4].

2.2. The yield spread of Chinese quasi-municipal bonds

Yield is calculated by the net realized return as a percentage of the invested amount, and the bond yield can be simplified by using annual interest earned divided by the bond’s face value. The yield includes the price increases and interest earned and the paid-off dividends, therefore investors often use yield to determine the choice of bonds because it is a measure of an investment over a period and higher yields often mean higher income and lower risk. The yield spread is the spread between two bonds' yields, is frequently estimated by using the spread between a bond's yield and the risk-free rate. Yield spread can help investors to determine how cheap or expensive the bond is. The yield spread is often expressed in "basis points", each is one-hundredth of a percentage point, therefore if the spread is one percentage point, then the author can express it as 100 basis points.

Municipal bond yield spreads are driven by credit risk, liquidity risk, and tax [5]. Corporate bond yield spreads are like municipal bond yields that are mainly driven by credit risk and liquidity risk [6]. Bond credit risk is an important variable that needs to be evaluated besides the bond yield. Bond credit risk is evaluated either by credit default swap spread or by credit rating. However, in China, there are only a few companies that have credit default swap spreads, thus credit rating often is used to measure this risk. To mitigate the inflation of the quasi-municipal bonds’ rating, other variables such as firm size, firm profitability, and financial leverage also need to be considered [4]. Moreover, quasi-municipal bonds are special that they are issued as corporate bonds but function as municipal bonds. Because China only has a single tax rate across the whole country, which is different from the US, Chinese municipal bonds are not tax-tempt. Therefore, tax should not be used as the variable to study the municipal bond yield spread [7].

2.3. The yield spread and the implicit guarantee

Because the yield spread represents bonds’ individual risk, in this paper the author tries to find out the relation of the implicit guarantee and the yield spread. As mentioned previously, the author considers Chinese quasi-municipal bonds have an implicit government guarantee. The author sets the implicit guarantees as a dummy variable, it will equal 1 when it is implicit, which is based on the classification of WIND and equal 0 otherwise. Bond risk is an important variable the author needs to evaluate besides the bond yield, so the author will set it as the control variable. Bond credit risk is evaluated either by credit default swap spread or by credit rating. The author states the hypothesis 1 below.

Hypothesis 1: The implicit guarantee reduces the yield spread of quasi-municipal bonds.

2.4. The issuance of Documents 50 and 88 will influence the relation of the implicit guarantee and the yield spread

In 1992, the first Quasi-municipal bond, the Pudong development bond, with a face value of about 500 million CNY, was issued in Shanghai. In late 2008, with the fiscal stimulus, the Chinese municipal bond market dramatically expanded. Compared to 2008, when only 79 bonds were issued, there were 258 in 2009. In 2014, the number of municipal bond issuers reached the amount of 4.95 trillion CNY. The largest issue amount is clustered in five provinces: Jiangsu, Zhejiang, Beijing, Shanghai, and Guangdong [9].

After the first SOE default of Tianwei, several large SOEs immediately defaulted or restructured. The astonishing serial SOEs defaults were serious events for investors because they indicated the "de-leverage" and "de-capacity" attitude of the government and the absence of government guarantees [10]. The abandonment of the Chinese government's traditional practice of bailing out SOEs and following the government's central agenda published in the No. 88 and No.55 Document of the State Council to "deinventory" and "deleverage" industrial firms. Although the Chinese government's original intention of "de-leverage" and "de-capacity" was to eliminate zombie firms gradually in the excessive capacity industries such as mining, steel, and construction, the serious worry caused by the removal of implicit government guarantees spilled over to other industries. China's State Council formally released a series of documents on the restructuring of stated-owned enterprises in 2016, which induce the whole Chinese corporate bond market to cool down [10]. The author states the Hypothesis 2 below.

Hypothesis 2: The launch of No. 88 and No.55 Documents of the State Council decreases the effect of the implicit guarantee on the yield spread.

2.5. The difference in administrative level will influence the relation of the implicit guarantee and the yield spread

Because of the Chinese specific political culture, the government in China strongly involved in the financing activities. [10]. For example, in December 2014, the anti-corruption campaign was launched by the Communist Party of China and charged by China’s Central Commission for Discipline Inspection, this campaign investigated an immense number of officials, from low-ranking "flies" to high-ranking "tigers". Take one of the biggest campaigns, the Bo Xilai political scandal, to indicate the influence of political events on the real estate market. After this scandal, many policies and decisions made earlier by Bo for the Chongqing Municipal government were withdrawn or frozen. Many companies that followed the past policies become stagnant or investigated [11]. These kinds of series of activities will influence the ability of different administrative-level local governments. The author states the hypothesis 3 below.

Hypothesis 3: The higher the administrative level of the issuers of quasi-municipal bonds, the stronger the relationship between the implicit guarantee on the yield spread.

3. Data

The majority data of this article are from the WIND databases, especially from the WIND database-China Bond Database part. This database is one of the most exhaustive databases for China's fixed-income markets. The author collects data of the corporate bonds traded in the public listed on the two stock exchanges- Shanghai and Shenzhen, and the interbank market. The final sample includes 3202 bonds from January 2013 to December 2021. They are listed on the two main Chinese stock exchanges- Shanghai and Shenzhen. Moreover, to find out the relationship between the yield spread and credit ratings, the author obtains the credit ratings of bond issuers from the WIND. In this database, the classification of the credit ratings is AAA, AA+, AA, and AA-.

4. Methodology

To test whether the implicit guarantee indeed exists and will influence the yield spread, the author estimates the following regression:

$$Spread_{i,t} = \alpha + \beta_1 \cdot Implicit_{i,t} + \beta_2 \cdot Rate_{i,t} + \gamma_1 \cdot BondSize_{i,t} + \gamma_2 \cdot ROA_{i,t} + \gamma_3 \cdot CurrentRatio_{i,t} + \gamma_4 \cdot Leverage_{i,t} + \gamma_5 \cdot Collateral_{i,t} + \varepsilon \quad (1)$$

$Spread_{i,t}$ is the yield spread of quasi-municipal bonds. $Implicit_{i,t}$ is a dummy variable used to measure the implicit guarantees. $Rate_{i,t}$ represents the credit ratings. $ROA_{i,t}$ and $Leverage_{i,t}$ are vectors of the firm characteristics. Liquidity ($CurrentRatio_{i,t}$), and Volume ($BondSize_{i,t}$) are used to capture the bond characteristics.

If bond holders anticipate that the implicit guarantee will reduce the risk associated with the securities because the higher risk means higher spread and the lower risk means lower spread, then the author expects that β1 will be negative. Furthermore, the author expects the bonds with a higher default likelihood will benefit more from the implicit government guarantee. Consequently, a positive interaction coefficient of β2 will result. To test the other hypothesis, the author further conducts the DID test to look how policies affect the decline in implicit guarantees.

Table 1. Descriptive Statistics

Variables	Obs	Mean	SD	Min	Median	Max
Spread	3202	4.267	1.143	2.000	3.940	10.000
implicit	3202	0.252	0.434	0.000	0.000	1.000
bond_size	3202	12.340	8.861	0.500	10.000	130.000
rate	3202	3.740	0.513	1.000	4.000	4.000
roa	3202	3.389	3.361	-33.858	2.860	27.829
current_ratio	3202	1.489	1.094	0.144	1.223	14.515
leverage	3202	65.347	12.392	9.278	66.543	96.007
collateral	3202	20.565	16.367	-48.955	18.385	90.206

The descriptive statistics include the observations, mean, standard deviation, minimum, median, and maximum of the main variables of quasi-municipal bonds.

Table 2. The description of variables

Variable	Definition
Spread	The spread between a bond's yield and the risk-free rate
Implicit	Dummy variable 1 - Chengtou bond 0- non-Chengtou bond
ROA	Net income over total assets
Leverage	Total liabilities/ total assets
Collateral	Fixed assets/ total assets
Current_ratio	Current asset/ total current liabilities
Rating	Credit rating of the bond issuer 4-AAA, 3-AA+, 2-AA, and 1-AA-.

Level	4-provincial level 3-provincial and sub-provincial level 2-city level 1-prefecture level

5. Empirical Results

5.1. Main Results

Table 3. OLS regression results

	(1) spread	(2) spread	(3) implicit*spread
implicit	-0.045	-0.484***	-4.162***
	(-0.59)	(-6.91)	(126.28)
bond_size	-0.018***	-0.002	0.001
	(-8.04)	(-1.11)	(1.42)
level	-0.034	0.073**	0.002
	(-1.00)	(2.42)	(0.17)
rate		-1.115***	-0.227***
		(-30.56)	(-13.22)
roa		-0.021***	-0.002
		(-3.72)	(-0.72)
current_ratio		0.015	0.002
		(1.52)	(0.36)
leverage		-0.003	0.000
		(-1.60)	(0.35)
collateral		-0.003*	-0.001
		(-1.85)	(-0.69)
cons	4.520***	8.886***	0.836***
	(122.26)	(39.55)	(7.91)
N	3259	3212	3212
Adj. R^2	0.02	0.24	0.94

The author shows the findings of the OLS regression analysis of the above equation in Table 3 to determine how implicit guarantee affects bond yield spreads and whether the higher the administrative level of the issuers of quasi-municipal bonds, the stronger the relationship between the implicit guarantee on the yield spread.

The columns in this table show that the coefficient β1of *Implicit* is -0.484, which is negative, and it is statistically significant. This outcome shows that the risk of the bond, which is captured by the bond's spread, is around 48.4 percent less than those bonds totally marketize and without any implicit guarantee. Therefore, hypothesis 1 is correct in that the implicit guarantee reduces the yield spread of quasi-municipal bonds. In addition, the table also provides the results that with the declining in the credit rating, the bonds' spread is increasing. Besides, the coefficient of *level* in the third column is 0.002, which is positive. Therefore, the author also can conclude that the hypothesis 3 is correct.

5.2. Additional Results

Table 4. Difference-in-difference Regression result

Variables	(1) Documents 88	(2) Documents 50
Implicit	-0.988***	-1.142
	(0.0920)	(0.987)
Rate	0.0104***	-1.101***
	(0.00338)	(0.0363)
did_Implicit_Post88	1.003***	
	(0.0943)	
did_Implicit_Post50		0.891***
		(0.229)
Bond_size	-0.00154***	-0.00293
	(0.000191)	(0.00205)
Level	-0.00127	0.0680**
	(0.00280)	(0.0300)
Maturity	0.00256***	-0.0608***
	(0.000855)	(0.00917)
ROA	-0.00124	-0.00745
	(0.000756)	(0.00810)
ROE	0.000485**	-0.00581***
	(0.000200)	(0.00214)
Current_ratio	0.00338	-0.0147
	(0.00279)	(0.0299)
Quick_ratio	-0.000816	0.00464
	(0.00316)	(0.0339)
Leverage	-0.000384*	-0.00210
	(0.000207)	(0.00222)
Collateral	-0.000304**	-0.00129
	(0.000148)	(0.00159)
Constant	0.992***	8.879***
	(0.0214)	(0.230)
Observations	3,202	3,202
R-squared	0.064	0.260

The author performs a difference-in-difference estimation to test the effects of an exogenous factor, specifically the effects of numerous significant documents released by China's central government to restrict any types of implicit guarantees. The effect of documents 88 and 50 are shown in Table 5. *did_Implicit_Post88* and *did_Implicit_Post50*, two interaction terms, are positive (1.003 and 0.891) and both of them are statistically significant, which shows that hypothesis 2 is correct that the launch of No. 88 and No.55 Documents of the State Council decrease the implicit government guarantee.

5.3. Robustness Checks

Table 5. Treasury bonds

	(1)	(2)	(3)
Bond_size	-0.000***		-0.000***
	(-18.95)		(-15.02)
Maturity		0.024***	0.014***
		(13.74)	(9.19)
cons	4.090***	3.199***	3.788***
	(107.05)	(93.64)	(78.88)
N	435	434	434
R^2	0.453	0.304	0.543
Adj. R^2	0.45	0.30	0.54

Because the interest income from bonds issued by the financing vehicles of local government is taxed, while Treasury bonds are exempt, there may be an implicit tax rate problem. To ensure the robustness of the empirical results and avoid the problem of "implicit tax rate", we use the interest rate of national open bonds with the same maturity to match. The relevant data on the yield to maturity of China's open bonds are from China Bond Information Network, and the regression results are shown above. As can be seen from the table, measures from two aspects of the government's recessive guarantee variable to return coefficient were significant under the 5% level. Comparing the results with the front regression result, the coefficient symbol does not change, and the coefficient of size range is not big, so we can conclude that the result in Table 4 has robustness.

6. Conclusions

In this paper, the author investigates the influence of the implicit guarantee of the Chinese quasi-municipal bonds. The author initially assumes that the implicit guarantee reduces the yield spread of the quasi-municipal bonds, which are issued by the financing vehicles of the local governments. The author discovers compelling evidence that the implicit government guarantee does, in fact, lower the funding cost of the local government financing vehicles by analyzing the yield spread of the quasi-municipal bonds.

After a number of highly rated bonds went into default, The central government of China instituted several policies to lessen the effectiveness of the implicit guarantee. The author mainly studies State Council's No. 88 and No. 55 documents. The author conducts the difference-in-differences analyses of the release of documents 88 and 50 in order to investigate the effectiveness of these documents on reducing the implicit guarantee. From the literature review, the author finds that the first issue of Document 43 did not change investors' opinions that the investors still chase the implicit government guarantee because they continue to assume that the quasi-municipal corporate bonds have an implicit guarantee. In this paper, the author finds that the issuance of Documents 88 and 50, which are issued after Documents 43 to reinforce the decrease of the LGFVs' debt financing activities further, indeed declines the gap between the yield spread and other corporate bonds. This finding indicates the increasing marketization of these quasi-municipal bonds and the trend of China's corporate bond markets, so it is reasonable to anticipate that the risks associated with quasi-municipal bonds will be priced more accurately using market forces.

Finally, the author assumes that the higher the administrative level of the issuers of quasi-municipal bonds, the stronger the relation of the implicit guarantee and the yield spread. From the data collected, the author concludes that with the decreasing level of LGFVs, from the prefectural level to the county level, the degree of implicit guarantee is decreasing as well, which shows the hypothesis is correct.

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