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BAILOUT EXPECTATION AND DEBT RISKS OF CHINESE LOCAL GOVERNMENTS: AN EVIDENCE BASED STUDY ON QUASI-MUNICIPAL BONDS¹

ABSTRACT

Expectation of bailout by central government distorts the debt pricing mechanism, and as a result local governments run the risk of incurring debts because of the soft budget constraint issues. Thus finding ways to harden budget constraints is crucial, but there is little empirical evidence as to their effects. Since the “No Bailout” signal sent by China’s central government through the new Budget Law provides an ideal quasi-experiment, this study examines its impact on quasi-municipal bonds. Using micro-level data, the authors find that the policies have effectively dispelled expectations of bailout and improved debt

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pricing mechanism, yet implicit guarantees from local governments still exist. Therefore, the authors show that the policy of the Chinese central government has a certain level of credibility, and that policies combining government credibility and market forces can help to resolve debt risks of local governments.

Key words

local government debt; bailout expectation; soft budget constraint

Introduction

There are always concerns about debt risks of local governments. The recession that began in 2007 increased the local government's indebtedness, which in turn may lower the financial capacities of local governments for providing public services and decrease economic stability. For instance, in the European Union countries, local government average debt-GDP ratio increased rapidly over the comparable period, from less than 5% in 2007 to 7.5% in 2015 (Kluza, 2017). These phenomena are generally more pronounced in developing countries, such as the BRIC states, in all of which the incurrence of subnational government total liabilities more than doubled from 2007 to 2015, even if China is excluded². This situation has further exacerbated the concerns about debt risks of local governments. An important aspect of these concerns is how to take appropriate methods of preventing a possible crisis, and the bailout dilemma of the central government is a focus here. For many years, central governments all over the world have been forced to bail out those debt risks ex-post to prevent the systemic crises (Singh & Plekhanov, 2006). However, what follows is that expectation of bailout can lead to local governments imposing a soft budget constraint, which may make the local government insensitive to financing cost, and disrupt the functioning of the pricing mechanism. The failure of the pricing mechanism may lead to severe resource misallocation, which not only takes the form of over-borrowing but also increases regional risks and might be a driving force of systemic crises. This can start a new cycle of the bailout by the central government. This cyclic process makes bailout a main concern for policymakers around the world. Rodden et al. (2003) emphasized that financing decisions of local governments originated from the ex-ante inference about

² BRIC is a grouping acronym that refers to the countries of Brazil, Russia, India and China. The data come from the IMF Government Financial Statistics (GFS).

central government bailout policy. In this way, a soft budget constraint issue is unavoidable if the bailout has been expected, even though the latter bailout is not really enacted. Thus, finding a proper way to minimize bailout expectation is a continuing challenge for central governments worldwide, as this would help improve intergovernmental fiscal relations and reduce systemic risks.

As China is the largest developing country and one that implements the Regional Decentralized Authoritarian System (Xu, 2011)³, the debt risks of local governments are even more problematic there. Chinese local governments have been playing an important role in national economic development, delivering public services and carrying out investments, particularly in infrastructure. The limited revenue and restrictions on local government debt⁴, combined with increased investment efforts, had created high fiscal pressure on local governments, which burdened the latter with numerous debts, particularly implicit debts. Driven by local government debts, the amount of government debts based on official statistics increased to 32.1 trillion RMB in 2017, in which 18.58 trillion RMB was local government debt. The debt-GDP ratio grew significantly, from 19.6% in 2008 to 38.8% in 2017⁵. Although the debt-GDP ratio is less than the critical line of 60%, local governments' debt burdens in fact are much more than the official statistical debts when ambiguous implicit debts are considered. Implicit debts are often expected to get bailouts from the central government because they always enjoy an implicit guarantee from local governments, which would result in the aforesaid soft budget constraint issue. This has been a threat to China's fiscal and financial systems. The Chinese authorities have been highly concerned about the debt risks of local governments and have tried different policies to harden local governments' budget constraints and resolve the risks. The effects of these policies are worth noting, and need more empirical evidence.

³ Xu (2011) proposed the idea of regionally decentralized authoritarian system (RDA system for short) as the key political-economic system to explain the spectacular growth and poverty reduction since the reform and opening up. Under the RDA system, the Chinese central government has control over personnel matters, whereas local governments run the bulk of the economy, and they initiate, negotiate, implement, divert, and resist reforms, policies, rules, and laws. China's reform trajectories have been shaped by regional decentralization. Spectacular performance on the one hand and grave problems on the other are all determined by this governance structure.

⁴ Before the new budget law, local governments themselves in China had not been allowed to issue any forms of bonds.

⁵ The assessment comes from Zhang (2018). See details in "How big is the Chinese Government debt?", *Caijing* magazine (in Chinese), July 29, 2018.

Since 2014, the new Budget Law has been implemented and enforced in China, which has formally ratified the municipal bonds issued by local governments themselves, while prohibiting guarantees for quasi-municipal bonds⁶. The enforcement of this new law provides the authors with an ideal quasi-experiment to identify the effect of central government's hardening budget constraint policy.

In the process of China's urbanization, the quasi-municipal bond issued by the Local Government Financing Vehicle (LGFV thereafter), which has been a major tool of financing infrastructure and public services, was the most important implicit form of municipal bond. At the same time, expectations of the central government's final bailouts of local governments' debts persisted. Correspondingly, such an expectation would result in the price becoming insensitive to default risk, and distort the risk-based pricing mechanism. This means that the cost of financing was so low that there was a possibility that local governments would over-borrow. Following a national negative shock, the central government might serve as the last resort once again. This led to the aggravation of risks incurred by local governments to the central government. Given this, since 2014 the Chinese government has introduced the new Budget Law, including many policies and regulations which have set "No Bailout" clauses and tried to improve the funding structures of local governments, particularly in stripping the government financing function off the LGFVs and promoting Public Private Partnership (PPP thereafter) projects to replace quasi-municipal bonds for public services. It should be noted that, while these policies have been adopted for some years, China's local government debt issues remain severe. Therefore, several important questions need to be clarified and answered. Is the "No Bailout" signal seen as credible by the financial market, and is the adjustment of funding structure believed to be an effective measure? How does the risk pricing mechanism work in local governments' municipal bond market? Is the default risk properly priced? Answering these questions can help us have a better understanding on how to manage the debt risks of local governments, and let us know whether the central government sending the "No Bailout" signal can harden local government budget constraints and prevent systemic risk.

The authors attempt to answer these questions by exploring the quasi-municipal bonds from the price perspective. As the risk-based price, credit spread of quasi-municipal bonds is the most important indicator, which is closely related to the solvency (risk profile) of the borrower and could show the effectiveness of

⁶ The quasi-municipal bond is also translated as urban construction investment bond, municipal corporate bond, or Chengtuo bond in other works.

the new package of policies. Based on those policies, on the one hand, the central government promises no bailout for local governments in crisis on principle. If this is enacted, the credit spread will begin to represent the financial status of local governments and thus the pricing mechanism will start to work. On the other hand, the authorities adjust local governments' funding structure, and particularly promotes models like PPP for local governments to finance new infrastructure constructions. In this context, the PPP model may be inextricably linked to the financial status of local governments, and its ensuing growth in scale would diminish local governments' capacity to guarantee for quasi-municipal bonds. Accordingly, the sensitivity analysis of credit spread with the scale of PPP could also indicate the effects of those policies. Therefore, based on the aforementioned mechanism, the effectiveness of policy changes can be identified by examining whether the risk-based pricing mechanism of quasi-municipal bonds is improved. To be specific, using the regression analysis, the authors identify the effect on quasi-municipal bond spread caused by the changes in the financial status of local governments and the scale of PPP projects before and after the implementation of the new policy.

The estimation results suggest that firstly, bailout expectation has been broken by the new policies. The credit spread of quasi-municipal bond had not been sensitive to the financial status of local government before 2014, when the new policy was implemented. In contrast, after 2014 the spread of quasi-municipal bond has become smaller as the local government financial status has improved. That is to say, the price starts to be priced according to default risk, since the financial status of a local government, which means guarantee capacity, is closely connected with default risk. Secondly, PPP projects are found to compete with quasi-municipal bonds with regard to obtaining local governments' guarantees and bailouts. This indicates that an increased scale of PPP projects could require more financial support and resources from local governments, weaken local governments' capability of servicing quasi-municipal debt due to limited financial resources, and lead to a larger default risk of quasi-municipal bonds. Thirdly, after the policy was implemented, the credit spread of quasi-municipal bonds has become sensitive to the local real estate price. The credit spread gets lower when the real estate price increases. This may be due to the dependency of local governments' financial status on real estate market. In the meantime, the authors take credit rating into account (since credit rating should be used to evaluate default risk) and find that the credit rating can reflect factors such as the financial status of a local government. It was also found to have a negative correlation with the credit spread, which has become even larger after the new policy was

implemented. Realizing that the estimations may suffer from endogeneity issues, the authors resorted to a placebo test to check whether the results were caused by omitted variables or reverse causality. It was finally proved that the estimations were robust. Generally, it is clear that the market actually believes in the commitment of the Chinese government, which helps tighten the budget constraints of local governments. The “No Bailout” signal does let the pricing mechanism of local governments’ bonds work better, increase the effectiveness of the bond market, and enable the spread to reflect the heterogeneous default risk of local governments. All of these factors mean a stronger market constraint on local governments’ behavior.

This study contributes to the literature in the following three aspects. Firstly, many studies point out that the key to resolving the debt risks of Chinese local governments is to harden the budget constraints of local governments. The Chinese authorities have also noticed the problem, and have already implemented many policies. Although it is important to evaluate the effect of these policies, there are very few empirical studies that show whether the policies work or not. In this paper, the authors use the micro-level data and examine the effect of the new Budget Law from the perspective of risk-based pricing mechanism in the quasi-municipal bond market. Secondly, in order to more precisely identify the policy effect, the authors follow the related literature and differentiate the roles played by central and local government in the quasi-municipal bond market. Since the central government does not offer a solid guarantee, it is easy to consider the “No Bailout” signal sent by an authoritative government as credible, and the expectations of the market would change accordingly. However, local governments provide actual protection for LGFVs, so the stripping policies have been instituted but not enforced. This means that local governments actually bear the financing cost of quasi-municipal bonds, which would lower the incentive of local government to over-borrow in the bond market after the introduction of the new budget policies. Thirdly, most of the existing studies on Chinese municipal bond issues focus on the scale of the phenomenon. The authors agree that while the scale is very important, these studies are burdened by poor data quality and inconsistent measurements. For this reason, the authors take a different perspective and study the issue of quasi-municipal bonds from the price perspective. Compared to conventional quantitative variables, the price indicator plays a more fundamental role in helping markets to allocate resources better, and is a more accurate, objective and operational way to demonstrate the effect of the “No Bailout” policy.

The remainder of this article is structured as follows: Section 1 introduces the background and proposes our hypotheses; Section 2 presents the model specification and data; Section 3 presents empirical results and the robustness; The conclusions drawn from this study are included in section 4.

1. Background and hypothesis

1.1. Background

The dilemma of central government bailout is a typical example of soft budget constraint issue. The idea of soft budget constraint was firstly raised by Kornai (1979, 1980, 1986) and mainly used to describe the special relation between the government and state-owned enterprises in socialist countries during their transitions. This theory argues that state-owned enterprises are actually controlled by the government, and the government is expected to bail out such enterprises in case of trouble, no matter whether the difficulties have been caused by external conditions or the actions of managers. This leads to distortion of resource allocation in socialist countries, considering that the managers of these state-owned enterprises will pursue their own interest regardless of the performance of the said enterprises. Currently, this theory has been applied to other fields, and is widely used to describe the central-local government relationships in transition economies and market economies, particularly in China (Ihori, 2006; Jin & Zou, 2002; Moesen & Van Cauwenberge, 2000; Shen et al., 2012).

The current structure of Chinese governance is characterized by fiscal decentralization, while a unitary political system is maintained. China's local government has shouldered a significant share of the entire public expenditures, but since the tax system reform of 1994 it has been responsible for a relatively low share of tax collection. Under these circumstances, a fiscal deficit in local governments might be made up by a variety of payments of higher-level governments, including bailouts; this could further upset the distribution of financial responsibility and risk. As mentioned, if the central government bailout is expected, over-borrowing by local governments will happen in some cases, causing a form of soft budget constraint for the local government (Besfamille & Lockwood, 2008; Ihori & Itaya, 2004; Persson & Svensson, 1989; Wildasin, 2004). These issues are generally more pronounced in China, particularly with respect to the local government debt. Although China has been one of the few countries which make laws against local government independently borrowing through debts, ironically it is also a country whose local government debt exceeds that

of the central government⁷. Fast-rising debts and the corresponding risks of local governments have drawn attention and initiated international discussions. Meanwhile, the quasi-municipal bond is the most important form of municipal bonds in China, and studying it can provide a good perspective to explore the soft budget constraint issues between the central and local governments.

The quasi-municipal bonds are issued by LGFVs which have close relations to local governments. The form of quasi-municipal bond is categorized as enterprise bond or corporate bond, and claimed to be different from the municipal bond. However, in comparison with the general corporate bond, the quasi-municipal bond is featured as one kind of municipal bonds (Amstad & He, 2018; Bai & Zhou, 2018; Downing & Zhang, 2004). This is due to several reasons. On the one hand, since the tax-sharing reform of 1994, the duties and financial power of local governments are mismatched, which means that local governments are responsible for providing various types of public goods while they do not have enough sources of financing. This asymmetry has resulted in a huge financial gap, but the central government did not allow local governments to issue bonds independently to cover it. On the other hand, in terms of political incentives, the selection and evaluation process for China's political elite focuses on GDP growth as a core indicator, which pushes local governments into investments in infrastructure and public services. Therefore, local governments have established LGFVs and other local financing platforms to issue quasi-municipal bonds in order to raise funds for infrastructure constructions (Chen et al., 2018; Gong et al., 2011; Lu & Sun, 2013; Ru, 2018). In the context of the 2007 financial crisis and the fiscal stimulus plan promoted by the Chinese authorities, the scale of issuing quasi-municipal bonds have increased sharply. Between the end of 2007 and 2013, the debt volume of LGFVs increased from less than RMB 5 trillion to RMB 18 trillion⁸. In 2014, the volume of quasi-municipal bond issued by LGFVs began to exceed that of national bonds. It is apparent that the development of quasi-municipal bond is specific to China, and it carries out important functions of municipal bonds.

⁷ In August 2014, the Standing Committee approved the Draft Amendment of Budget Law, and agreed to entitle local governments to raise debt independently. About the central-local government debt ratio, see the introduction above.

⁸ Cf. the National Governmental Debt Audit Results issued on December 30, 2013, and the No. 32 announcement of National Audit Office of the People's Republic of China in 2013.

As the most important form of municipal bonds, quasi-municipal bonds have become the implicit liability of local governments. They are guaranteed by local governments in various ways, explicitly or implicitly. For example, the assets of LGFVs are either the lands that come from local governments or some kinds of receivables which are also transferred from local governments (Ambrose et al., 2015; Ang et al., 2016). Likewise, the local authorities generally provide various financing conveniences for LGFVs, such as letters of commitment, letters of comfort, and letters of awareness, which are issued by local governments themselves or by other local authorities such as the local people's congress. Additionally, local governments are also willing to commit to including the debts of LGFVs into government budgets. In some cases, the LGFVs get the third-party guarantee and credit enhancement for quasi-municipal bonds from the companies which are actually controlled by local governments (Xu, 2018; Zhang & Barnett, 2014). The key issue in the default risk of Chinese local government debt is that a local government may become caught in a solvency crisis once any default occurs to quasi-municipal bonds, which could result in bailouts from the central government in the context of current Chinese political and economic systems.

Therefore, the guarantees and bailouts from the central government for quasi-municipal bonds of local governments are commonly expected by the market. As a result, the default risk is recognized as almost non-existent, regardless of the financial status of local governments. Accordingly, being a risk-based price indicator, the credit spread might be insensitive to the financial status of a particular local government and could not reflect the heterogeneity of local government default risk (Liu et al., 2017; Zhong et al., 2016). Generally, one function of the financial market is to identify the different risks of financial contracts through a pricing mechanism. If the risk-based pricing mechanism cannot work well in the local government bond market, the oversize of government debt scale and resource misallocation might be inevitable. This in turn may have a profound negative impact on national and local economic development (Conesa & Kehoe, 2014; Roch & Uhlig, 2018).

The Chinese government is clearly aware of the severity of these issues. In August 2014, China's new Budget Law was implemented, and in September 2014 the State Council issued the "Opinions on Strengthening Management of Local Government Debts" (Document No. 43). The main purposes of these policies include "combining dredging and blockage, building water channels openly and blocking implicit ones". It means that, on the one hand, the new policy grants local governments the right to raise money through issuing their own bonds, and promotes the application of the PPP model to implement constructions of

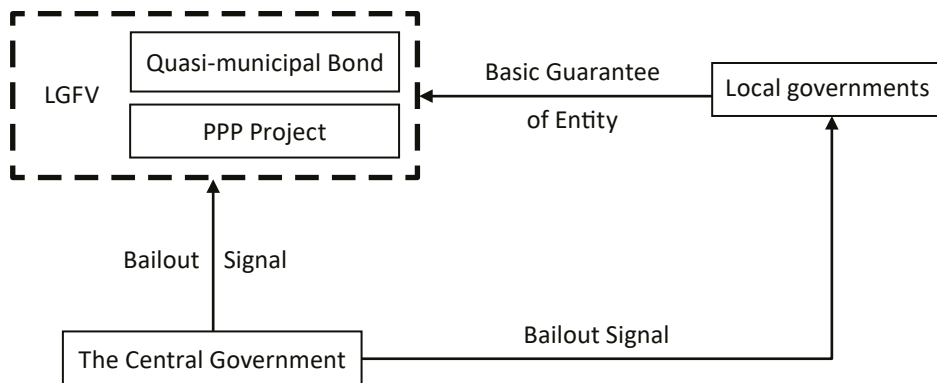
urban infrastructure and provide public services. On the other hand, the new policy explicitly stipulates that since 2015, the newly issued quasi-municipal bonds no longer belong to the debts of local governments. More importantly, local governments are considered liable for their own debts. Local governments have to “establish an emergency management mechanism for handling possible debt risks” and “act practically to resolve debt risks”, and the relevant officials are in particular required to “be responsible for the risks, be investigated and be imposed legal liabilities on”. The central government also emphasizes that the central government will “implement the principle of No Bailout” (“State Council”, 2014).

This indicates that the central government hopes to harden budget constraints by explicitly strengthening the political accountability of local governments for debt risk. This is designed to politically cut off not only the explicit relation between the quasi-municipal bonds and local governments but also the central-local government relationship with regard to debts. Theoretically, it seems to be a feasible approach. However, it is still doubtful whether these policies are effective and whether the soft budget constraint issues of local governments are relieved in the complicated context of the current Chinese political and economic system.

1.2. Hypothesis

The quasi-municipal bond is a market-oriented financing tool, and the credit spread change serves as a good signal for identifying the policies' effect. According to the classic bond valuation theory, credit spread reflects the default risk of a bond, which is closely related to the expected solvency of the bond. Higher expected solvency means lower spread (credit risk premium) (Beck et al., 2017; Duffe & Kan, 1996). As shown in Figure 1, there are two levels of basic guarantee and bailout expectations in the Chinese quasi-municipal bond market, which influence the solvency of quasi-municipal bond and have an impact on the formation of credit spread. They are 1) the bailout signal from the central government; and 2) the implicit basic guarantee of the local government. The former is of primary importance, which might lead the market to believe that the central government would ensure the security and solvency of quasi-municipal bonds in any event. In that case the credit risk of quasi-municipal bond is extremely low. This may make the credit spread insensitive to default risk, which can be observed as no relation between the credit spread and the financial status of local governments.

Figure 1. The bailout guarantees of local government’s implicit liabilities



If the new Budget Law effectively breaks the expectation of bailout by the central government, this may make the credit spread of the quasi-municipal bond sensitive to changes in the financial status of local governments. This is due to the difference in the roles of the central government and local governments. For the central government, its guarantee is ambiguous and there are no substantive links (such as property relations) between the central government and LGFVs. Since the new law has been passed and enforced by the Chinese central government under the current political and economic system, the market may well believe in the “No Bailout” commitment of the central government. Meanwhile, unlike in the case of the central government’s guarantee, the local government has actual connection with the quasi-municipal bond, so its implicit guarantee on the bond is difficult to break.

As mentioned earlier, a LGFV, the issuer of quasi-municipal bonds, is established by a local government or other governmental agencies through fiscal appropriation or injecting assets like land and equity. The LGFV’s operations and personnel arrangement are also influenced by local governments. Therefore, it is very difficult for local governments not to offer guarantees to the LGFV. The effectiveness of a guarantee has to rely on the guarantor’s financial status, which means that the default risk of quasi-municipal bond and the financial status of local government are closely related to each other. It is obvious that if there are issues or insufficiency in the financial status of a local government, it will not be able to provide a strong guarantee when the quasi-municipal bond faces default risks, even if it has the intention to offer guarantee (Irwin, 2007; Luo & Liu, 2016). At the same time, in comparison with a local government in a bad financial status, a local government with a better financial status has more

capacity to provide better guarantees on the quasi-municipal bond issued by its LGVF. This indicates that, as the financial status of a local government improves, the guarantee probability of the government will increase (Varian, 2005).

In conclusion, when the unlimited liability of the central government is broken and the liability of local governments is still hard to cut off, the credit spread of quasi-municipal bonds will start to be influenced by the financial status of local governments. More specifically, as its financial status gets better, local governments' ability to carry out guarantees will increase, the default risk of quasi-municipal bonds will decrease, and thus the credit spread will drop. As a result, the sensitivity of quasi-municipal bond spread to the financial status of local governments can be a vital indicator for measuring whether the new policy works or not. Thereby, the hypothesis 1 of this paper is proposed:

Hypothesis 1: Following the policy changes, the credit spread of quasi-municipal bond gets smaller as the financial status of local governments gets better. Before the new policy, there had been no such relation.

At the same time, the Chinese local governments promote the PPP model by applying it to the fields of urban infrastructure constructions and other public services. These fields are also the ones that are served by quasi-municipal bond, which shows the similarity between the main purpose of a PPP project and that of a quasi-municipal bond. Meanwhile, the financial sources of PPP projects include local government funds (Takashima et al., 2010; Queiroz et al., 2013; Wang et al., 2018). If the responsibilities and obligations of a local government in the PPP model are ambiguous or misunderstood by the market, the aforesaid form of government support is likely to be treated as a signal of a guarantee. This may let the PPP project become a form of implicit government liabilities, and the local government with better financial status can sustain a larger scale of PPP projects (Soumare & Lai, 2016). Therefore, in the circumstances of limited financial resources of local government, different forms of implicit liabilities may compete with each other to obtain limited (financial) resources. The growth of the PPP scale will definitely weaken the solvency of local governments in repaying quasi-municipal bonds and further increase the credit spread of the bonds. However, no such impact should have been observed before the new policy due to the unlimited guarantee from the central government. Based on the above argument, the hypothesis 2 of this paper is proposed:

Hypothesis 2: Following the policy changes, the credit spread of quasi-municipal bond increases as the PPP scale grows. Before the new policy, there had been no such relation.

2. Data and measurement

2.1. Data

The data on quasi-municipal bonds and the financial information for LGFVs all come from the Wind database. Some observations were removed due to repetition or missing information, and there are 4,884 quasi-municipal bonds left. These bonds have been issued by nearly 270 cities and mainly used to raise money for urban infrastructure construction. The data for prefecture cities come from the series of China City Statistical Yearbook, China Land and Resources Statistical Yearbook, and Provincial Statistical Yearbooks. The source of PPP project data is the PPP Integrated Information Platform of Project Management Library which is operated by the Ministry of Finance. Since the volume of PPP projects before 2012 was very low, the time period of interest for this study is from 2012 to 2017. PPP projects have been launched by 338 local governments of different levels nationwide, and there have been 11,260 PPP projects in total.

2.2. Variable Measurement

The dependent variable is the credit spread of quasi-municipal bond issued by the LGFV, which is defined in this paper as the difference between the yield to maturity of each bond and that of same-term Treasury bond. The financial status of a local government is measured by its per capita fiscal revenue, and the investment of all PPP projects of a certain prefecture city within a year is summed up to serve as that city's annual investment in PPP projects.

The first group of control variables are bond-level variables, including issuance scale, maturity and coupon rate. The second group of control variables are at LGFV-level ones, including earnings before interest and tax (EBIT thereafter), asset-liability ratio and total assets. The third is the control variable for local economic development, with GDP per capita used as the proxy. Table 1 shows the summary statistics for all these variables.

Table 1. Descriptive statistics of major variables

Variable name	Mean	Standard deviation	Minimum	Maximum
Spread (%)	1.85	1.29	-7.7	6.76
Issuance scale (100 million yuan)	10.79	6.91	0.25	100
Maturity (year)	5.73	2.26	0.25	23
Coupon rate (%)	5.81	1.28	2.86	10.5

Table 1.

Variable name	Mean	Standard deviation	Minimum	Maximum
EBIT (%)	1.8	1.46	-12.98	20.74
Asset-liability ratio (%)	55.32	13.35	1.11	99.36
Total assets	1011.96	541.49	1	1971
PPP scale (100 million yuan)	219.29	288.59	0.13	1997.21
GDP per capita (yuan)	70392.97	31769.31	12556	207163
Total fiscal revenue (100 million yuan)	784.39	1018	12.38	6406.13
Real estate price (yuan/m ²)	7311.14	4114.8	2414.18	27497.74

3. Baseline model and OLS estimations

3.1. Baseline model

The empirical part of this paper mainly examines the effects of a local government's financial status and PPP investment scale on the credit spread of a quasi-municipal bond by the LGFV in a prefecture city before and after the introduction of the new Budget Law and other supporting policies. The baseline models are specified as follows, and equation 1 and equation 2 are respectively applied to test hypotheses 1 and 2.

$$y_{ijt} = \alpha_0 + \alpha_1 FI_{jt} + \alpha_2 FI_{jt} \times D_t + X_{ijt} \beta + \theta_j + \sigma_t + \varepsilon_{ijt} \quad (1)$$

$$y_{ijt} = \alpha_0 + \alpha_1 FI_{jt} + \alpha_2 FI_{jt} \times D_t + \alpha_3 PPP_{jt} + \alpha_4 PPP_{jt} \times D_t + X_{ijt} \beta + \theta_j + \sigma_t + \varepsilon_{ijt} \quad (2)$$

Where y_{ijt} is the credit spread of quasi-municipal bond i which is issued by prefecture city j 's LGFV in year t . The two core explanatory variables are the financial status of a local government (FI) and the scale of the PPP projects (PPP). D_t is a dummy variable and represents the exogenous policy variable – the new Budget Law and supporting policies which were enacted by the central government in 2014. If the quasi-municipal bond was issued in 2014 or earlier, then D_t equals 0, otherwise D_t equals 1. The coefficients of the two abovementioned explanatory variables and interactions between each of them and the exogenous policy variable are the main focus, so as to identify whether the sensitivity of quasi-municipal bond spread to the financial status of local government or to the PPP project scale has changed or not after the new policy was implemented. Vector X_{ijt} represents other control variables: per-capita GDP of prefecture cities;

the issuance scale, maturity and coupon rate of bonds; and EBIT, asset-liability ratio and asset scale of LGFV. In addition, the authors also control the fixed effect of prefecture city (θ_j) and the fixed effect of year (σ_t) in the model. θ_j is used to capture some city-specific features which may affect the spread and the independent variables. σ_t is controlled for capturing year-specific policies⁹.

3.2. OLS Estimations

The first two columns of Table 2 present OLS estimations for the baseline model. The first column corresponds to Equation 1, which is used to test Hypothesis 1. The signs of coefficients for the financial status of local government (α_1) and interaction between the local government's financial status and the policy variable (α_2) are core estimations. From column 1, it can be found that $\widehat{\alpha}_1$ is insignificant, which means that the spread of quasi-municipal bond was insensitive to the financial status of local government before the new policy. Meanwhile, $\widehat{\alpha}_2$ is significantly negative, meaning that the spread has begun to be sensitive to the financial status of local governments after the new policy was implemented. It shows that after the introduction of the new policy the market has started to consider the financial status of local governments and regards the quasi-municipal bond as having lower risk when the fiscal status of local government improves. These results are consistent with Hypothesis 1. The second column of Table 2 corresponds to Equation 2, and this equation is used to test Hypothesis 2. The signs of coefficients for PPP ($\widehat{\alpha}_3$) and interaction between PPP and policy variable ($\widehat{\alpha}_4$) are the core estimations. The empirical results show that $\widehat{\alpha}_3$ is not significant, while $\widehat{\alpha}_4$ is significantly positive. It can be concluded that the scale of the PPP project had no significant impact on the credit spread of quasi-municipal bond before the new policy. However, following the policy change, the PPP project scale has a significant positive effect on the credit spread of quasi-municipal bond, which means the risk of quasi-municipal bonds increases as the PPP project investment scale grows. These estimations confirm Hypothesis 2. In addition to this, after adding variables of PPP project investment scale, the estimations of $\widehat{\alpha}_1$ and $\widehat{\alpha}_2$ are similar to those in the first column, showing the robustness of Hypothesis 1. The regression results of baseline models indicate that the "No Bailout" signal effectively changes the market expectations and there is a tendency to reasonable pricing of risk in the market. This also shows that quasi-municipal bond still has the properties of municipal bond, and the objective of

⁹ Since the authors controlled the year fixed effect in the regression, the policy variable D_t itself is not listed in the regression equation.

breaking the local government-LGFV relation has not been effectively achieved. Apart from the financial status of local governments and PPP scale, some other variables influencing the spread of bonds are also controlled. The results in Table 2 show that the scale and the maturity of a bond have a significantly negative impact on the spread. The coupon rate, EBIT and asset-liability ratio have a significantly negative impact, while the total asset and per capita GDP have no significant impact.

Table 2. OLS estimations for the baseline model

	(1)	(2)	(3)	(4)
Government financial status (in logarithm)	-0.179	-0.204	-0.216	-0.209
	(0.197)	(0.197)	(0.177)	(0.222)
Government financial status (in logarithm) * Policy variable	-0.098**	-0.121**	-0.048	-0.048
	(0.041)	(0.049)	(0.045)	(0.050)
		(0.025)	(0.027)	(0.022)
PPP scale(in logarithm) * Policy variable		0.076**	0.078*	0.077**
		(0.036)	(0.040)	(0.033)
Real estate price(in logarithm)			-0.095	-0.121
			(0.258)	(0.264)
Real estate price (in logarithm) * Policy variable			-0.267**	-0.224
			(0.135)	(0.138)
Credit ratings				-0.886***
				(0.173)
Credit ratings * Policy variable				-0.253**
				(0.110)
Issuance scale (in logarithm)	-0.080**	-0.080**	-0.077**	-0.057*
	(0.035)	(0.035)	(0.038)	(0.034)
Maturity	-0.080***	-0.080***	-0.083***	-0.087***
	(0.011)	(0.011)	(0.012)	(0.011)
Coupon rate	0.522***	0.523***	0.492***	0.476***
	(0.025)	(0.025)	(0.033)	(0.025)

Table 2.

	(1)	(2)	(3)	(4)
EBIT	0.034**	0.035**	0.035**	0.036***
	(0.015)	(0.015)	(0.017)	(0.013)
Asset-liability ratio	0.004***	0.004***	0.004**	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)
Total assets (in logarithm)	-0.005	-0.004	0.000	-0.000
	(0.026)	(0.026)	(0.030)	(0.022)
GDP per capital (in logarithm)	0.105	0.048	-0.311	-0.365
	(0.285)	(0.303)	(0.290)	(0.300)
Constant term	-1.468	-0.326	4.260	5.706
	(3.235)	(3.531)	(3.606)	(3.668)
Sample size	4,884	4,884	4,068	4,068
City fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
R-squared	0.243	0.244	0.235	0.243

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors, reported in parentheses, are clustered at prefecture city level.

4. Model extension and robustness

4.1. Model extension

In China, all the lands for urban real estate by law are sold by local governments, and land transfer fees are an important part of local government revenue. When the real estate prices are higher, the price of land under buildings is higher as well, which means that the revenue of a local government from the land is larger. Meanwhile, the most significant guarantee of the LGFV, which issues quasi-municipal bond, is the urban land for construction. Since the real estate sector is one of the most important financial sources for local governments, changes in real estate prices have a non-negligible influence on the fiscal revenue of a local government. Therefore, it would be necessary to see if the real estate price, which is closely linked to the financial status of a local government, had a different impact on the credit spread of quasi-municipal bonds before and after the implementation of the new policy. The third column of Table 2 presents

the estimations where the real estate price and its interaction with the policy variable is controlled. The results in the third column indicate that the credit spread of quasi-municipal bonds became sensitive to the real estate price after the policy changes, for the spread tends to decrease as the real estate price increases. This can be explained as the market's perception that the real estate market with a rising price enhances the financial strength of local governments, and further strengthens local governments' ability to guarantee quasi-municipal bonds so as to significantly lower the cost of bond issuance. It should be pointed out that the government's fiscal revenue is no longer significant after adding the real estate price. This may reflect the close relation between real estate price and the fiscal revenue of local governments.

In the meantime, the credit rating by rating agencies helps reduce information asymmetry issue in the bond market, and is an important indicator for the default risk of the issuer. Therefore, the authors further control credit rating for the bond issuer (LGFVs) and its interaction with the policy variable. Table 3 presents the distribution of credit rating of quasi-municipal bond.

Table 3. Distribution of credit rating of quasi-municipal bonds

Credit ratings	Amount of quasi-municipal bonds (per)	Proportion (%)
A-, A and A+	119	2.44
AA-	1076	22.08
AA	2904	59.58
AA+	670	13.75
AAA	105	2.15

As shown in Table 3, the credit ratings among the municipal bonds selected for this paper are mainly AA- and AA, accounting for almost 80% of the sample. AA- and lower ratings were set at value 0, and AA and ratings above at value 1. The results in Table 2 show that an increase in credit ratings will lead to a significant decrease in the bond spread. This indicates that the credit ratings by rating agencies on the risk of quasi-municipal bonds are accepted by the market. At the same time, the coefficient of interaction term between the policy variable and the rating variable is significantly negative, indicating that the sensitivity of quasi-municipal bond to the credit rating has further increased after the policy change. This also indirectly shows that the bailout expectation towards the central

government has been broken, and there is a higher degree of risk pricing marketization. Besides, when the third and the fourth column in Table 2 are compared, the coefficients of government financial status and real estate price are not significant after including the credit rating variable. This indicates that rating agencies may fully consider the status of local real estate market and government finances in rating quasi-municipal bonds, and thus the rating information is highly referable. However, the data on the scale of PPP project investment is not captured by rating agencies, and the coefficient of PPP and interaction term has not changed much.

Moreover, the PPP project which is promoted by the Chinese central government is a more marketized financing model for urban infrastructure construction. Its payment modes can be divided into three types based on the expenditure responsibilities, including user payment, government payment and viability gap funding. All these modes are based on the benefit sharing mechanisms between the public and private partners, and differ from each other in terms of the expenditure responsibility of a local government. User payment refers to the mode where final consumers directly pay to purchase public products and services without any expenditure responsibility of a local government. Government payment means that the government directly pays to purchase public products and services with clear expenditure responsibility of a local government. As for viability gap funding, the expenditure responsibility of the government is relatively indistinct, and a local government will invest only when the user payment cannot cover the cost.

Table 4. Distribution of PPP project payment modes

Payment mode	Quantity	Percentage (%)
User payment	1452	29.73
Government payment	1918	39.27
Viability gap funding	1514	31.00

Table 4 shows that the three payment modes have even distribution. It is interesting that when the authors summed up the projects by three modes for different cities to investigate the proportion of each mode in different cities, there was always one mode accounting for over 70% of payments in almost all cities. As mentioned earlier, the financial burden for a local government is very different depending on the payment mode, and the government payment mode requires

a higher financial status of a local government. In order to investigate whether the differences in payment modes affect the judgment of the market regarding the financial status of local governments, dummy variables were introduced, which indicate whether the dominant PPP mode in a specific prefecture city belongs to one of the three types. Three dummy variables – government payment, viability gap funding and user payment – were set, where the variable value equals 1 when most PPP projects of a prefecture city are of the corresponding mode; otherwise it is set at 0. Table 5 presents the estimations which separately include the interaction terms of payment mode¹⁰ and PPP investment scale of the model. The results show that the interaction term of government payment mode and PPP investment amount is significantly negative. The reason may be that widespread adoption of this mode shows that the financial status of a local government is good, and the market considers that there is a higher probability that a local government will pay the debts, and then the credit spread becomes smaller. The interaction term of the viability gap funding mode and PPP investment amount is significantly positive, probably because the widespread use of this mode indicates that the financial standing of a local government may be rather poor. As a result, the increase of this type of PPP project will further aggravate the default risk of quasi-municipal bonds. The interaction term of user payment mode and PPP investment amount is not significant, probably because this type of mode has fewer relevancies for local governments' financial status, thereby having no significant impact on the spread. In addition, the regression results of the main explanatory variables do not differ significantly from the fourth column of Table 2.

Table 5. Comparison of the three modes

	(1)	(2)	(3)
Government financial status (in logarithm)	-0.234	-0.22	-0.283
	(0.222)	(0.219)	(0.218)
Government financial status (in logarithm) * Policy variable	-0.057	-0.061	-0.037
	(0.052)	(0.051)	(0.051)
PPP scale (in logarithm)	-0.019	-0.031	-0.038

¹⁰ The dummy itself is not controlled because we already have controlled the prefecture city fixed effect.

Table 5.

	(1)	(2)	(3)
	(0.023)	(0.022)	(0.024)
PPP scale (in logarithm) * Policy variable	0.069**	0.078**	0.088***
	(0.034)	(0.033)	(0.034)
Real estate price (in logarithm)	-0.082	-0.034	-0.049
	(0.262)	(0.263)	(0.263)
Real estate price (in logarithm) * Policy variable	-0.155	-0.138	-0.204
	(0.139)	(0.134)	(0.134)
Credit ratings	-0.872***	-0.859***	-0.865***
	(0.173)	(0.173)	(0.173)
Credit ratings * Policy variable	-0.261**	-0.260**	-0.255**
	(0.110)	(0.109)	(0.109)
User payment * PPP scale (in logarithm)	0.041		
	(0.068)		
Government payment * PPP scale (in logarithm)		-0.118**	
		(0.054)	
Viability gap funding * PPP scale (in logarithm)			0.097*
			(0.056)
Government financial status (in logarithm)	-0.234	-0.22	-0.283
	(0.222)	(0.219)	(0.218)
Government financial status (in logarithm) * Policy variable	-0.057	-0.061	-0.037
	(0.052)	(0.051)	(0.051)
Issuance scale (in logarithm)	-0.056	-0.057*	-0.057*
	(0.034)	(0.034)	(0.034)
Maturity	-0.087***	-0.087***	-0.087***
	(0.011)	(0.011)	(0.011)
Coupon rate	0.475***	0.476***	0.476***

Table 5.

	(1)	(2)	(3)
	(0.025)	(0.025)	(0.025)
EBIT	0.036***	0.035***	0.035***
	(0.013)	(0.013)	(0.013)
Asset-liability ratio	0.005***	0.005***	0.005***
	(0.002)	(0.002)	(0.002)
Total assets (in logarithm)	-0.000	-0.001	-0.001
	(0.022)	(0.022)	(0.022)
GDP per capita (in logarithm)	1.584	1.640	2.130
	(1.853)	(1.813)	(1.821)
City fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant term	4,068	4,068	4,068
R-squared	0.243	0.243	0.243

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors, reported in parentheses, are clustered at prefecture city level.

4.2. Robustness

For an empirical study, it is premature to make strong claims that the significant relationship is that of cause and effect without considering the endogeneity issues. Although the authors have controlled correlated variables that may influence the spread of quasi-municipal bonds and the fixed effects of prefecture city and year in the above specifications, some variables that have relations with the policy and can directly affect the spread of quasi-municipal bond may still have been omitted. If such variables are indeed missing, the estimations may be biased. Finding proper instrument variables is often applied in order to resolve endogeneity issues. However, for this study it was very difficult to find a proper instrumental variable that is related to the policy variable and affects the spread of quasi-municipal bond only through the policy variable. To alleviate endogeneity issues as much as possible, the authors resorted to the placebo test, which is widely applied in fields like labor economics and regional economics. The basic idea of this test is that if the estimations are driven by other uncontrolled policies which happened around 2014, it can be directly assumed that the policies

were implemented before 2014¹¹ to see whether the significant impacts still exist. Therefore, the authors’ sample is restricted to the data from 2012–2013 for regression, and they re-define $D_t=0$ when $t=2012$ and $D_t=1$ when $t=2013$. In other words, they presume the policy was introduced in 2013 to see whether it has any significant impact on the spread of quasi-municipal bond. The estimations are in the first and second columns of Table 6. The results show that when it is assumed that the policy was implemented one year earlier, the coefficients of government financial status, the PPP project scale and their interaction terms with policy variable are no longer significant. This confirms that the significant impact after the new policy in 2014 is not driven by other uncontrolled policies.

Furthermore, quasi-municipal bonds can be issued at the inter-bank market and the exchange market. The main participants of the inter-bank market are banks, which inherently receive government guarantees due to the externalities of risks if they are in trouble. Since banks consider themselves eligible for bailouts from the central government, they may care less about the “No Bailout” signal, which would make quasi-municipal bond spread of the inter-bank market insensitive to policy changes. However, the participants in the exchange market are more diverse and may be more sensitive to policy signals. In other words, the significant effect that was found may be simply caused by the exchange market. Therefore, the authors further investigated the robustness of estimations by using the subsample of the inter-bank market. The regression results are in the third and fourth columns of Table 6. They show that the “No Bailout” signal is still effective in the inter-bank market. This further proves the robustness of the authors’ estimations and confirms that the significant effect of a new policy is universal instead of being relevant only for some participants.

Table 6. Robustness Test Results

Variable name	Placebo test		Subsample test	
	(1)	(2)	(3)	(4)
PPP scale (in logarithm)		-0.006 (0.124)		-0.007 (0.020)
PPP scale (in logarithm) * Policy variable		-0.237 (0.186)		0.091*** (0.028)

¹¹ The authors also used the data of 2015–2017 and assumed the policy was implemented in 2015. Estimation shows that the impact is insignificant, which confirms the study findings.

Table 6.

Variable name	Placebo test		Subsample test	
	(1)	(2)	(3)	(4)
Fiscal revenue	4.906 (3.685)	5.535 (3.778)	-0.182 (0.214)	-0.217 (0.214)
Fiscal revenue * Policy variable	-0.137 (0.211)	-0.197 (0.217)	-0.062* (0.035)	-0.080** (0.037)
Other control variables	Yes	Yes	Yes	Yes
The sample size	420	420	3,041	3,041
R-squared	0.222	0.226	0.269	0.273
City fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors, reported in parentheses, are clustered at prefecture city level.

Conclusion

The bailout dilemma of the central government is a challenge to the authorities of all countries. Central government bailouts of local governments can help maintain the stability of the economy, but the expectation of such help can cause soft budget constraint issues, distort the risk pricing mechanism of local government debts, lead to resource misallocation and increase the possibility of systemic risk. In recent years, the default risks of Chinese local government debts have drawn international attention, and the central government has been trying to lower the debt risk by changing the bailout expectations. Thus evaluating the effect of the related policies is crucial. Based on this idea, this paper studied the effects of some “No Bailout” policies which aim to change the expectation of central government bailout. By exploring the information on quasi-municipal bonds, which is mainly represented by the credit spread, the text attempted to elucidate whether the policy is effective in improving the risk-based pricing mechanism of local government debts.

The authors found that since the “No Bailout” signal was sent out, the pricing sensitivity in the financial system has increased. More specifically, the credit spread is negatively correlated with the financial status of local governments, but positively correlated with the scale of PPP investments which are promoted by the new policies as an alternative to the quasi-municipal bond for urban

constructions. These findings suggest that the Chinese central government has a certain degree of policy credibility, and the “No Bailout” signal from the central government has effectively revised the market expectations, and thus has alleviated the soft budget constraint problems. However, due to market forces local governments still have a large number of implicit liabilities with regard to quasi-municipal bonds and PPP projects. Furthermore, this study strengthens the notion that hardening budget constraint is the key to resolve the local government debt risk, and it is achieved not only by practical and stable commitments from the state authorities but also by developing a risk governance model where the behavior of local governments is constrained by market forces. When a local government starts to bear costs related to risk, its behavior will naturally change and the systemic risks may be successfully prevented. In sum, to resolve the debt risks of local government more effectively, it is essential to maintain the government’s credibility and to stress the role of the market.

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