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Research on the Issuance Management of China's Local Government Special Bonds

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Abstract. China's local government special bond issuance management has been strictly regulated by the central government in terms of method selection, rulemaking and underwriter qualification. According to the income equivalence theorem, the amount of income that local governments receive for bond issuance depends on the degree of investor participation. By comparing the distribution management experience of the United States and China, we can find that there is still room for further improvement in the management of China's local government special bond issuance in many aspects.

1. Introduction

In 2015, the central government issued local government special bonds for the purpose of further regulating local government financing behavior and broadening local government financing channels. In recent years, the scale of the issuance of special bonds for local governments has gradually increased. The total issued in 2018 exceeded the general bond, which was close to 1.8 trillion yuan. With the expansion of the scale of local government special bond issuance, the current local government special bond issuance management is facing increasing reform pressure. In order to improve the effectiveness of China's local government special bond issuance, this paper uses the independent private valuation model to analyze the bidding process, and based on the principle of income equivalence, combined with the domestic and foreign local government special bond issuance management experience, this paper targets the practical problems in the issue management of the local government special bonds, and puts forward specific improvement suggestions.

2. Game Theory Analysis in the Issuance Management of Local Government Special Bonds

In a relatively mature local government special bond issuance market, the issuer can choose the method of issuance according to its own financing needs and the supply situation of the bond market, so as to effectively reduce the financing cost and improve the financing efficiency[1]. The local government special bond issuance process can be summarized as a static Bayesian game process. The bidders in the game are the players of the game, and the role of the government is to make rules, so it is excluded from the game process.

2.1 Basic assumptions of the game process

The game theory analysis of the issuance of special bonds for local governments in China is based on the four basic assumptions of the independent private valuation model, specifically: (1) symmetry. The value of all bidders follows the same distribution function. The local government special bond for sale has a value of e_i for the bidder i, and e_i is subject to an even distribution on $[0,V]$. (2) Independence. Each bidder only knows its own valuation e_i of local government special bonds, and lacks valid information about other bidders' valuations e_j. What the bidders know is that all valuations e_i and e_j are evenly distributed over the interval of $\left[0,V\right]$. (3) Risk neutrality. All bidders pursue the desired profit maximization, and the bidder with a value of 0 expects to pay 0. (4) Without budget constraints, payment is a function of quotation. Bidder i corresponds to quote b_i. When the bidder evaluates the local government special bond $e_i = 0$, he will give up the quotation; if the higher e_i, the b_i will increase accordingly, but b_i will never be higher than e_i. The functional relationship between the two can be expressed as $b_i = \beta e_i \left(0 < \beta < 1\right)$.

In addition to the above four basic assumptions, according to the existing local government special bond issuance experience, the following assumptions can be made: When the issuance conditions, especially the interest rate interval, are set reasonably, local government special bonds can be fully raised. That is, the ratio λ of the effective bid amount to the planned issue amount is greater than 1.

2.2 Game process analysis

Based on the above assumptions, when the bidder's strategy portfolio $\left[b_1\left(e_1\right),b_2\left(e_2\right),...,b_i\left(e_i\right),b_j\left(e_j\right),...,b_n\left(e_n\right)\right]$ reaches equilibrium:

$$\max\left[U_i\left(b_i\right)\right] = \max\left[\left(e_i - b_i\right)P_i\left(b_i\right)\right] \tag{1}$$

$U_i\left(b_i\right)$ is the expected return when the bidder i offers quoted price b_i;

$\mathrm{P}_i(b_i)$ is the winning probability when the bidder i offers quoted price b_i.

Since the bidder i will maximize the expected return, the relationship between b_i and e_i is:

$$b_i = e_i - \frac{P_i\left(b_i\right)}{\dfrac{dP_i\left(b_i\right)}{db_i}} \tag{2}$$

To determine the relationship between b_i and e_i, the value of $P_i\left(b_i\right)$ is required.

First, it is known that $b_i = \beta e_i$ and e_i is evenly distributed over the interval $\left[0,V\right]$. Thus, the probability of $\mathrm{b}_i > b_j$ is:

$$P\left(b_i - b_j\right) = P\left(e_j < \frac{b_i}{\beta}\right) = \int_0^{\frac{b_i}{\beta}} \frac{1}{V} de = \frac{b_i}{\beta V} \tag{3}$$

Then, since b_i rank m obeys the binomial distribution with parameters n-1 and $P\left(b_i > b_j\right)$. Then b_i in all quotes, the probability of ranking in the top n/λ places is:

$$P_i\left(b_i\right) = \sum_{m=1}^{n/\lambda} \subset_{n-1}^{n-m} P\left(b_i > b_j\right)^{n-m} \left\{1 - P\left(b_i > b_j\right)\right\}^{m-1} \tag{4}$$

Finally, substituting Equation 3 into Equation 4 yields:

$$P\left(b_i\right) = \frac{1}{\left(\beta V\right)^{n-1}} \sum_{m-1}^{n/\lambda} \subset_{n-1}^{n-m} b_i^{n-m} \left(\beta V - b_i\right)^{m-1} \tag{5}$$

Substituting the resulting $P_i\left(b_i\right)$ into Equation 2 shows that the functional relationship between b_i and e_i is:

$$b_i = e_i - \frac{\sum_{m-1}^{n/\lambda} \subset_{n-1}^{n-m} b_i^{n-m} \left(\beta V - b_i\right)^{m-1}}{\sum_{m-1}^{n/\lambda} \subset_{n-1}^{n-m} b_i^{n-m-1} \left(\beta V - b_i\right)^{m-2} \left[\left(n-m\right)\beta V + \left(1-n\right)b_i\right]} \tag{6}$$

To simplify the analysis of the problem, we further assume that local government special bonds are sold as a whole. In this way, the result of the bidder's participation in the issuance is only the case of obtaining all local government special bonds alone or losing all local government special bonds. Thus, $\lambda = n$, and the solution of Equation 6 is:

$$b_i = \frac{n-1}{n} e_i \tag{7}$$

Equation 7 shows that each bidder's equilibrium offer is $\frac{n\text{-}1}{n}$ times its valuation. An increase in the number of bidders will result in a reduction in the gap between b_i and e_i. In theory, when n tends to be infinite, $b_i = e_i$. However, when the number of bidders is limited, the bidder's quotation will be lower than his valuation; but when the number of bidders is unlimited, the bidder's quotation is equal to its valuation, and all remaining will be the issuer's income. This conclusion is consistent with the income equivalence theorem found by Vickers, which means that under the four basic assumptions of local government special bond issuance in accordance with the independent private valuation model, the different auction methods bring the average income of the issuer equal[2]. Therefore, for issuers of local government special bonds, the key to obtaining higher returns at a lower cost is to develop distribution management that can attract more bidders.

3. Comparison of the issuance management of special bonds between the US and China

The United States has a large-scale local government bond primary market, and its distribution management is also the most complete. By comparing the similarities and differences in the issuance management of special bonds between local governments in the United States and China, we can better discover the characteristics and defects of the issuance management of special bonds in local governments in China.

3.1 Comparison of the issuance management of special bonds between the US and China

Local governments at all levels in the United States can issue bonds. The types of bonds include income bonds and general liability bonds. The repayment of income bonds follows the matching principle of who benefits and who pays back, which is similar to the principle of repayment of special bonds of local governments in China. The issuing body is the state, city, county or town government and its authorized institutions[3]. For participating in local government income bond bidding, all investors in the United States have equal rights[4].

According to the relevant provisions of the "2015 Local Government Special Bond Budget Management Measures", the provincial governments in China are the repayment obligors in the legal sense of special bonds, that is, the actual issuers. Special bonds are included in the budget management of government funds, repaid by a single government fund, and the provincial government should sign a loan agreement with the lower level government. Although the provincial governments are the subject of issuance, the size and timing of the issuance needs to be approved by the central ministry. It can be seen that there are many differences between the local governments of the United States and China in the management of special bond issuance. See Table 1 for details.

Table 1 Comparison of the issuance management of special bonds between the US and China

Bond name	Issuing approval department	Issuance method	Issuer	Investor composition
US local government Income bond	Local governments at all levels	Bargaining Issuance Auction Issuance Private Issuance	Local governments at all levels	Financial investment institution
Chinese local government Special bond	Central government	Directed Issuance Publicly Issuance	Provincial local government	Financial investment institution

3.2 The Characteristics and Problems of China's Local Government Special Bond Issuance Management

The current management of China's local government special bond issuance arises from the crisis of local debt repayment. The adjustment of its issuance rules has always been under the leadership of the Central Ministry of Finance, and the following three aspects have been derived.

First, the special bond is unclear. The performance of the special bonds is unclear and the issuer's position is unclear. The "Decision of the State Council on Deepening the Reform of the Budget Management System" requires an increase in the coordination of government fund budgets, state-owned capital operating budgets, and general public budgets[5]. However, whether the special bonds with government funds as the source of repayment is included in the overall plan is not clearly stated.

Second, the administrative intervention of the central government is obvious. The debt limit and interest rate management of special bonds are too strict. Debt limit management. In order to control the scale of debts and strictly implement the statutory limit management, the scale of special bonds for the proceeds of the pilot classification and issue projects shall not exceed the provincial quotas issued by the State Council, including the new special debt limit for the year and the portion of the special debt balance below the limit at the end of the previous year.

Third, the credit rating lacks credibility. In terms of credit rating, on the one hand, the issued special bonds use the land transfer fee as the final source of repayment. The results of the credit rating refer more to the credit rating of the local government, and do not combine the specific project conditions, and there is implicit guarantee. On the other hand, the provinces have “crowns” on credit ratings, and the credit ratings of special bonds are all AAA, which makes it difficult to accurately reflect the real risk status of the project. Investors cannot reasonably distinguish bond risks through rating results[6].

4. Perfection of China's local government special bond issuance management

China's local government special bonds are responsible for replacing local financing platforms and regulating local government debt-raising behaviors. Marketization is the basic direction of the issue management reform. According to the institutional needs of investors, necessary improvements should be made to the aspects of approval management, method selection, pricing mechanism, investor structure and secondary market trading rules.

4.1 Clear release of subject responsibility

The issuer should transition from a nominal provincial government to a lower-level government such as a prefecture-level city; from a government agency to a project agency. It is suggested that the provincial government should, in the name of the nominal issuer, perform centralized decision-making, organization, supervision and other functions on the issuance of special bonds, and the specific operational links shall be borne by the actual user units. Among them, the decision-making function refers to the decision-making process initiated by the local government for project planning, selection and financing; the organizational function refers to the local government providing debt distribution plan guidance, operation training, forming underwriting syndicate, standardizing related service agreements, etc. for the project fund-using units.

4.2 Adopt a variety of distribution methods

In the near future, it is recommended to follow the centralized government bond issuance system support. This system can flexibly support multiple methods such as underwriting and bidding, taking into account reducing operational risks and improving distribution efficiency. At the same time, it provides a regional service center model to improve the pertinence and convenience of regional services and shorten the service radius of the issuing support organization. In the medium and long term, the first is to arrange the issuance system within the issuer and directly link with the bookkeeping system of the central government custody agency to improve the convenience of issuing operations and establish corresponding supporting measures. The second is to achieve a diversified distribution venue. In the selection of the issuing place, the regional characteristics of the project can be considered, and it is issued in the counter area of the commercial bank and the regional trading platform, making full use of the advantages of the local investors.

4.3 Give full play to the role of credit rating

First, it is recommended that the government bond professional association choose a rating company to improve the credibility of the rating. At present, in principle, local governments choose credit rating agencies. In actual operation, the issuer exerts influence and the competitive rating business of the bid rating agency is under great pressure, which is not conducive to the clarity of the credit rating. Second, it is recommended to calibrate and evaluate the rating with reference to the rating included in the local debt market valuation. The third is to actively cultivate the rating agencies and rating systems of domestic special bonds to reflect the credit level of special bonds more realistically and objectively, and to improve market transparency.

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