Journal of Economics and Public Finance
ISSN 2377-1038 (Print) ISSN 2377-1046 (Online)
Vol. 9, No. 2, 2023
www.scholink.org/ojs/index.php/jepf

Original Paper

How Did Local Debt Burden Impact Governors' Financing Decisions in Meeting Development Goals?

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Received: April 26, 2023 Accepted: May 8, 2023 Online Published: May 11, 2023

doi:10.22158/jepf.v9n2p107 URL: http://dx.doi.org/10.22158/jepf.v9n2p107

Abstract

Since the commencement of the New Budget Law in 2015, China provincial governments was given the legal rights to issue Local Government Bonds, which has played a significant role in revealing local indebtedness that was built up over the years. The rapid infrastructure developments have brought up respective debt levels in various levels of governments, and there exist strong concerns on whether provinces with poor development levels are on the edge of financial distress. In addition, it is also unclear on the relationship between local economic development and high debt levels. This research is an attempt to answer that question, and provide observations and analysis based on past local debt data. In summary, this research used provincial LGB data and fiscal income statistics to establish relationships with local debt burden, governors' financing decisions, as well as the LGB issuance limit setting process. Compared to existing research, updated provincial level data will be used (2015-2021).

Keywords

Local government debt, Financial distress, Chinese economy

1. Introduction to China Local Government Bonds

1.1 The Historical Development of China Local Government Bonds

Over the past decades, China's massive infrastructure investments have fueled extraordinary economic growth, which stimulated local productivity growth and largely improved peoples' standard of living. China's Local Government Bond (LGB), the major source of local government financings on these large-scale infrastructure projects, has played a crucial role in China's path to rapid urbanization. By the end of 2021, China's LGB balance has reached 292RMBtn, with around 3 times the size of China's GDP figure in 2021 (114RMBtn). LGB has become an important driver to understand China's public finance and fiscal policy, as well as providing insights on the interactions between the Central

Government and local government within China's economic framework. Thus, it is crucial for us to put a strong emphasis in examining China's LGB market, to gain better understanding on China's financial system today.

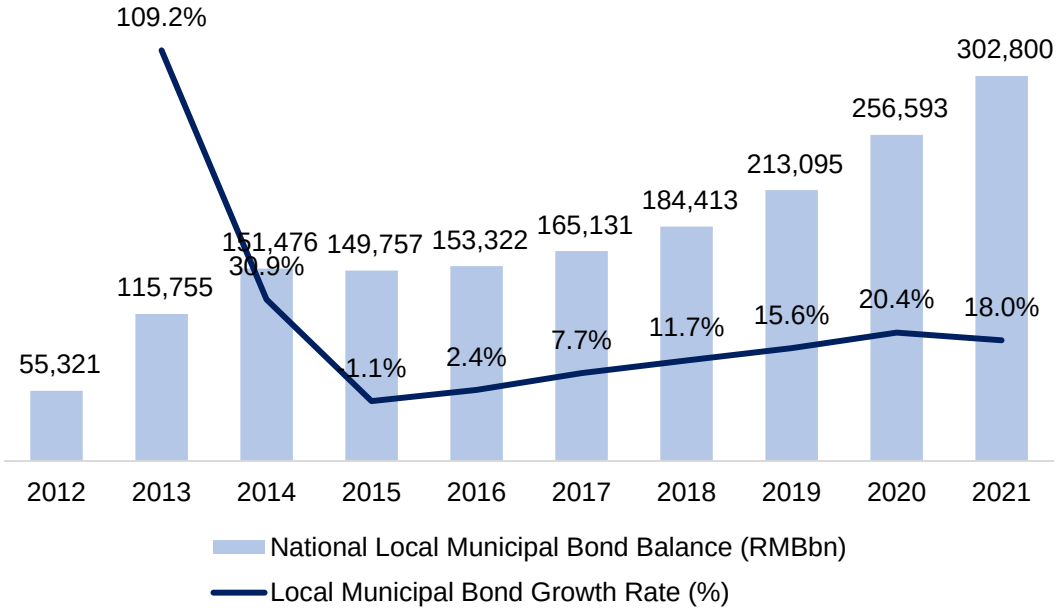

Figure 1. China's LGB Balance (2015-2021)

Even though China's liberalization moves started in 1979, China's Government Bond market remained as a closed market, with the Central Government allocating fiscal resources to each province that was up to the discretion of the Central Government. It was clearly stated under The Budget Law issued in 1994, that "The local governments may not issue local government bonds, except as otherwise prescribed by law or the State Council". This implementation led to large scale off-balance sheet borrowings, through channels such as Local Government Financing Vehicles (LGFVs), implicit guarantees or by issuing a letter of comfort. As Investigated by the National Audit Office in 2011, China's local debt balance has reached 10RMBtn, with over 70% of these debts were raised through channels mentioned above. To better monitor and regulate LGBs, China began to launch pilot schemes in 4 provincial (and municipality) governments, allowing them to issue Municipal bonds directly, while the Ministry of Finance (MOF) remain as the primary entity to make bond repayments. The provinces will make the relevant payments to the MOF through fiscal transfers.

By 2014, China expanded the number of pilot zones to 10 provincial governments, and these provincial governments were legalized to organize their interest payment and principal repayments independently, while they control their borrowings within the bond issuance limits. At the same time, to deal with the large-scale underlying debts among local governments, China introduced a 3-year "Debt Swap Program" in 2015, for local governments to convert their informal debts to formal LGBs. The commencement of

the New Budget Law in 2015 was a major breakthrough on local government financing. In Chapter I Article 35, it specifies that:

> "Partial funds for construction investment indispensable to the budget of a province, autonomous region, or municipality directly under the Central Government as approved by the State Council may be raised by issuing local government bonds and the scale of the debts so raised shall be reported by the State Council to the National People's Congress or its Standing Committee for approval. The debts raised by a province, autonomous region, or municipality directly under the Central Government with the limit issued by the State Council shall be included in the budget adjustment plan at the corresponding level and submitted to the standing committee of the people's congress at the corresponding level for approval. There shall be repayment plan and stable sources of funds for the repayment of the debts so raised and such debts can only be used for capital expenditures for public welfare and cannot be used for current expenditures."

This law amendment provides all provincial level governments rights to seek for financing or development related projects and make relevant repayments independently. From then on, provincial governments began to issue LGBs till today.

1.2 Chengtou Bonds and LGFVs

Chengtou Bonds (or Urban Construction Development Bonds) were a different type of bonds when compared to LGBs, as they were not issued directly by the local government, but through a Special Purpose Vehicle (SPV) which the local government held a significant amount of ownership in this local entity. As discussed previously, local governments obtained large scale off-balance sheet financings through LGFVs before 2011, which mainly comprises of Chengtou Bonds issued by these government-backed LGFVs.

Firstly, an SPV was set up by injecting assets held by the local government, mainly lands, properties, land-use-rights, etc., in exchange for a certain amount of share ownership in this entity. Secondly, this SPV will take up public infrastructure projects from the local government, and conduct fundraising activities through issuing Chengtou Bonds, with these assets acting as collaterals to future repayments. In such ways, the SPVs were effectively performing public infrastructure investment duties on behalf of the local government, while it remained independent from the local government through such ownership structure. In addition, the bonds issued by these SPVs were not reflected on local government balance sheets, even though local governments bear obligations on bond repayments. In general, many SPVs were loss-making, and local governments were near the edge of financial distress even though their financials appear perfectly healthy on paper.

This quickly came into notice by the State Council, which called for tightened measures in LGFVs in mid-2010. In addition, the astonishing results released by NAO further revealed the underlying issues created by LGFVs, and the Central Government immediately called for a halt by imposing restrictions within the same year. The "Notice Regarding the Implementation of the State Council's Measures on Strengthening Control on Local Government Financing Platforms" specifies that:

"No less than 70% of debt repayments should come from company revenues" and "details regarding local government outstanding debt balance and fiscal income should be provided to regulatory authorities in obtaining approval on issuing corporate bonds."

This was followed by more tightened measures in the following years, restricting local governments' involvement in conducting unofficial financing activities that could induce systematic risk. Till today, even though Chengtou Bonds continue to act as an important tool in aiding local governments with infrastructure projects, but now it exists in a more healthy and regulated manner.

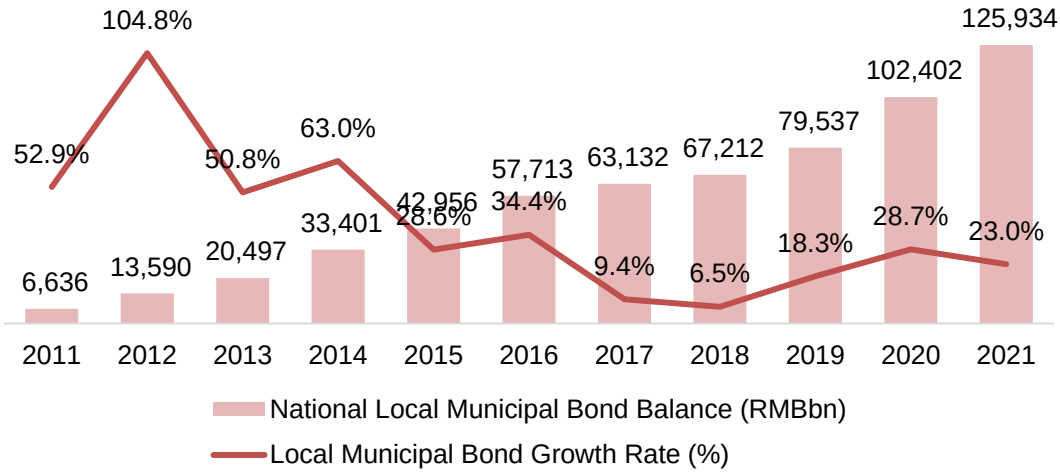

Figure 2. China's Chengtou Bond Balance (2011-2021)

1.3 Different Types of China Local Government Bonds

In the early days, LGBs included both Ordinary Bonds and Special Purpose Bonds, which were bonds served for different purposes. Ordinary Bonds (OB) were bonds issued for non-profit seeking public welfare projects, with general public budget revenue as the primary source to make principal and interest repayments; Special Purpose Bonds (SPB) were bonds issued for public welfare projects with a certain level of expected returns, using the government fund income or special income corresponding to these public welfare projects as the primary source to make principal and interest repayments. Beginning from 2018, Re-Financing Bonds were introduced by the government with the purpose to make principal repayments on LGBs at maturity. By end of 2020, some Re-Financing Bonds were classified as "Special Purpose Re-Financing Bonds", which were used to make repayments on outstanding debt balance and other hidden debts.

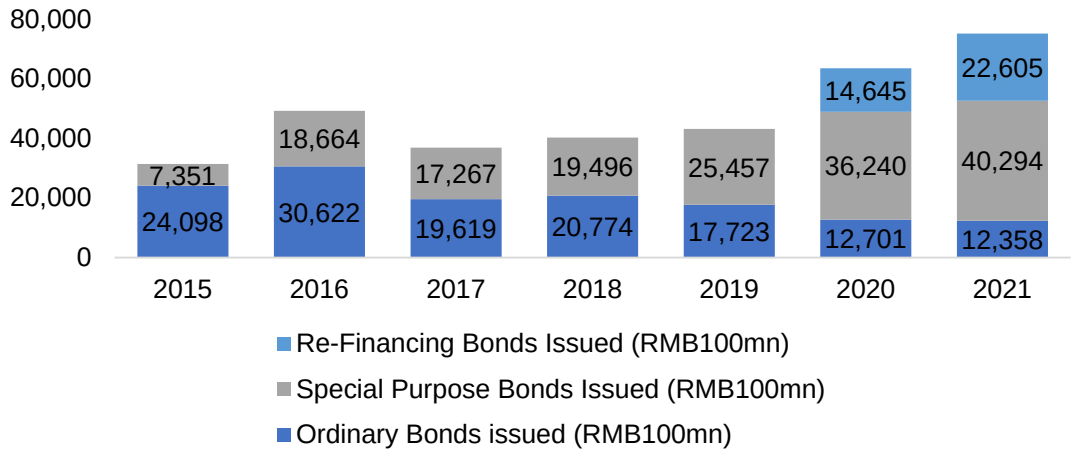

Figure 3. China's LGB Balance by Category (2015-2021)

1.4 Central Government's Control over Issuance Limits

Although local governments were given full ownership on the LGBs issued, the Central Government maintain its administrative power through setting issuance quotas on local governments, restricting the amount of bonds they could issue each year. In both "Measures on Administering Local Government Ordinary Debt" and "Measures on Administering Local Government Special Purpose Debt", it explains the institutional details on the process of LGB issuance. The provincial governments shall, before the end of October each year, submit their respective proposals on issuing local government debts and planned public welfare capital expenditure projects in the next year, to the Ministry of Finance for approval. The Ministry of Finance will then determine the provincial bond issuance limits based on factors such as financial risks, fiscal conditions, and taking into account of national macroeconomic policies and investment demands of the local governments. This will then be disseminated to the provincial governments for execution.

2. Research Background

2.1 Research Goal

The COVID-19 outbreak has created a new wave of financial needs for local governments, as they struggle to stabilize their economies amidst weak domestic consumption and nationwide tax relief for businesses and individuals. Within just two years, starting from 2019, the balance of China's Local Government Bonds has increased by 37%, totaling an increase of 7.9RMBtn. As of the end of 2021, China's Local Government Bond balance has surged to over 29.3RMBtn, a staggering 429% increase compared to figures from 2012. This growth is a cause for concern for China's economic development, as a significant portion of the borrowed funds were used to finance large-scale public infrastructure projects, raising doubts about their repayment abilities, particularly in provinces with weaker economic development. This research aims to explore the considerations taken by both local governments and the Central Government on issuing LGBs, as well as the factors that drive LGB growth. The first part of

the research will attempt to identify the key indicators that the Central Government look for when setting provincial LGB issuance limits. Next, we will find out how local budgeted income determines the amount of bonds issued on a provincial level. Lastly, we will explore how local governors make their financing decisions based on local financing needs.

2.2 Literature Reviews

Existing literature mainly targeted the impacts of growing local government bonds, especially on their implications to other financing channels and economic developments. Research have revealed that high level of local government bonds has led to growth in Local Government Investment Funds, which emerged as a new financing channel for local governments (Wang, 2016). On the other hand, Variation on local debt balance and economic development could also lead to differences in local debt stress (Mao, 2018), and growing local debt balance could induce hidden debts among local governments (Guan, 2020).

Other research focused on the reasons leading to high local government bond balance, with discussions on China's soft budget constraint creating intermediary effect on debt balance (Zhang, 2018). Under China's centralized fiscal system, research revealed that transfer payments could impact local debt balance (Liu, 2020), and certain form of local government debt such as Chengtou Bond exist a clear policy-led nature (Xu, 2020). In addition, local governors also played an important role in managing local debt levels, as research confirmed that psychological impact of local governors could stimulate local debt expansion (Ma, 2019). There was also research about governors' choice when making defaults, where it's more likely for governors to default on commercial bank loans instead of policy bank loans, as policy bank are more important for local politician's career advancement. Even though these literatures provided an all-rounded view on the causes and implications of high local debt levels, there exist no literature aimed at discussing how borrowing limits imposed by the Central Government are determined, as well as their respective implications on local government financing strategies.

3. Research Design and Data Analysis

3.1 Data Collection

This research was based on data collected from various governmental data sources to ensure data consistency and credibility. LGB data are collected from China Local Government Bond Market Database, which we filter out government bonds issued by each province from the name of the bonds. Afterwards, we categorized each LGB into various bond types, based on the name of the bond and information disclosed within each prospectus. Issuance Limit of provincial governments after 2017 were extracted from yearly financial statistics released by the Ministry of Finance, while data within 2015-2016 were collected individually from the annual working report of each provincial governments. Other data such as GDP and Unemployment data were tabulated based on statistics released in the China Statistical Yearbook and compiled on a provincial basis (of 31 provinces and municipalities).

3.2 Research Variables

Table 1. Key Research Variables

	Variable Name	Symbol	Definition
Key Variables (Part 1)	LGB Issuance Limit	*Limit*	LGB issuance limit set by the local government
	Growth Rate of LGB Issued	*Issue_GR*	The growth rate of LGB Issued compared to previous year
	Weighted Yearly LGB Yield	*LGB_Yield*	The weighted average yield of LGB issued
	Excess Borrowings	*Excess_Borr*	The additional amount borrowed in addition to the increase in issuance limit divided by actual amount of LGB issued in the previous year
Key Variables (Part 2)	Local Government Debt Ratio	*Debt_Ratio*	Outstanding LGB balance divided by local GDP
	General Public Revenues	*Public_Rev*	The natural log value of local government general public revenues, mainly local tax revenues
	General Public Expenses	*Public_Exp*	The natural log value of local government general public expenses, mainly expenses related to public services
	Governmental Funds Revenues	*Funds_Rev*	The natural log value of local government funds revenues, mainly land sales revenues collected by the local government
	Governmental Funds Expenses	*Funds_Exp*	The natural log value of local government funds expenses, mainly expenses that corresponds to funds revenue
Key Variables (Part 3)	Chengtou Bonds Issued	*Chengtou_Issue*	The natural log value of Chengtou Bonds issued
	Chengtou Bonds Yield	*Chengtou_Yield*	The weighted average yield of Chengtou Bonds issued
	Ordinary Bonds Issued	*Ordinary_Issue*	The natural log value of Ordinary Bonds issued
	Special Purpose Bonds Issued	*SPB_Issue*	The natural log value of Special Purpose Bonds issued
	Re-Financing Bonds Issued	*RFB_Issue*	The natural log value of Re-Financing Bonds issued

Macro Control Variables	GDP Growth Rate Unemployment Rate Secondary and Tertiary Industry GDP Contribution Ratio	*GDP_GR* *Unemployment* *GDP_Contribution*	Local GDP Growth Rate Local Unemployment Rate Proportion of GDP contributed by the secondary and tertiary industry in the local area
Year Control Variables	Year	Year	The corresponding calendar year
Province Control Variables	Province	Province	The corresponding provincial level

3.3 Research Set-Up and Research Outcome

3.3.1 Impact of Local Government Financing Strategies on Local LGB Issuance Limit (Part 1)

In part 1 of the research, we constructed a linear regression model to measure the impact of local government financing strategies on the Central Government when setting LGB issuance limits:

$$Limit_{y1} = \varepsilon Issue\_GR_{y0} + \beta LGB\_Yield_{y0} + \delta Excess\_Borr_{y0} + \partial X_{y0} + uMacro_{y0}\ v_{Province} + t_{year} + c$$

In this model, province and year are control variables that represent the year and province effect on LGB issuance limits. Limit is the logarithmic value of LGB issuance limits, which varies depending on the year and the province. For Issue_GR, LGB_Yield and Excess_Borr we used the previous year (year 0) data, as the limits were imposed after reviewing local performance in the previous year. X refers to fiscal income data such as public revenue, public expenses, funds revenues, funds expenses. Macro refers to GDP growth rate, unemployment rate and Industry GDP Contribution Ratio. Lastly, c refers to the residual value.

The selection of these variables was based on the "Notice on the Implementation of Limit Management of Local Government Debt by the Ministry of Finance" which came in effect in 2015. According to the notice, the borrowing limits were determined by the State Council, in which "based on factors such as financial risks, fiscal conditions, and taking into account of national macroeconomic policies and investment demands of the local government". This will then be disseminated to the provincial governments for execution. Part (1) of Table 2 reported the OLS regression results.

Table 2. OLS Regression Results

Dependent Variable	LGB Issuance Limit	Local Government Debt Ratio	Chengtou Bonds Issued
	(1)	(2)	(3)
Growth Rate of LGB Issued	-0.2563	**0.0346***	
	[0.157]	[0.021]	
Weighted Yearly LGB Yield	**18.7195***	**4.0235****	
	[10.378]	[1.771]	
Excess Borrowings	0.4117		
	[0.251]		
General Public Revenues	**-0.546****	0.0225	**1.5260*****
	[0.225]	[0.038]	[0.372]
General Public Expenses	**1.5404*****	**-0.1539***	**-1.9074****
	[0.517]	[0.088]	[0.896]
Governmental Funds Revenues	0.2300	**-0.0543****	0.0391
	[0.142]	[0.024]	[0.238]
Governmental Funds Expenses	-0.0072	**0.0468*****	-0.1116
	[0.097]	[0.016]	[0.166]
GDP Growth Rate	**-0.7966****	-0.0726	**-0.9690***
	[0.337]	[0.057]	[0.540]
Unemployment Rate	10.4845	-1.5375	2.7126
	[7.519]	[1.273]	[12.513]
Secondary and Tertiary Industry GDP Contribution Ratio	**6.2345*****	-1.5447	**16.5588*****
	[2.155]	[0.368]	[3.645]
Chengtou Bonds Yield			**31.3067***
			[15.896]
Ordinary Bonds Issued			**0.4295*****
			[0.100]
Special-Purpose Bonds Issued			**0.1658****
			[0.072]
Re-Financing Bonds Issued			-0.0043
			[0.031]
Control on Year Characteristics	Yes	Yes	Yes
Control on Province Characteristics	Yes	Yes	Yes
Observations	186	186	186
Adjusted R-squared	0.92	0.91	0.95

Note. Robust standard errors in parenthesies; *,**,*** refer to data significance at 10%,5%,and 1% levels (two-sided tests)

From part (1) of Table 2, we could see that the weighted yearly LGB yield has a significant impact on the LGB issuance limit, while impact was not significant on the growth rate of LGB and excess borrowings. There are a few implications we could derive from these results. Firstly, the results on LGB growth rate and excess borrowings are counter-intuitive, as we expect the government to be more stringent on controlling local debt growth, if the provincial bond balance begins to pile up more rapidly. One possible explanation could be that the Central Government is aware of the rationale of high growth in debt figures, as local government would report their respective borrowing plans before the start of each year. As such, the Central Government functions more like a regulatory body, only rejecting infeasible plans rather than actively managing local financing strategies.

Next, the weighted yearly average LGB yield has a positive correlation with the increase in LGB issuance limit, which seems to suggest that the Central Government was providing more LGB quota to riskier provinces. If the explanation in the previous part holds true, it could be that more underdeveloped provinces are inherently riskier, and thus requiring greater financial support to grow local economy. This would lead to a higher LGB issuance limit as local governments report their budget to the Central Government and get approved.

In terms of fiscal income figures, general public revenues have a significant negative correlation with LGB issuance limit, and general public expenses have a significant positive correlation with LGB issuance limit. Governmental funds revenue and expenses have no significant impact. It might seem that provinces with high general public revenues and low general public expenses would have higher fiscal income, therefore having a lower demand on issuing LGBs. However, such observations do not explain why governmental funds revenue and expenses led to non-significant results, as they would induce similar impact compared to general public income. A possible reason would be due to the inherent nature of LGBs, which were bonds issued for the purpose of public welfare projects. As such, income related to public welfare would induce a significant correlation with LGB issuance limit.

Lastly, among macro variables, GDP growth rate and Industry GDP contribution ratio have significant impact on LGB issuance limit. This is in line with our expectation as they act as variables that reflect the urbanization process and thus the amount of public welfare projects required to improve the standard of living of local residents.

Part 3.3.2: What Give Rise to Growing Local Debt? (Part 2)

In the second part of the research, we aim to explore the factors that gave rise to high local debt burden, especially in variables affecting local fiscal income. The regression model is adjusted as follows:

$$Debt\_Ratio_{y0} = \varepsilon Issue\_GR_{y0} + \beta LGB\_Yield_{y0} + \partial X_{y0} + uMacro_{y0}\ v_{Province} + t_{year} + c$$

From part (2) of Table 2, we could see that both growth rate of LGB issued and LGB yield have significant positive correlation with local debt ratio, which are in line with our observation in the

previous part of our research. Among fiscal income figures, general public expenses, governmental funds revenue and expenses yielded significant results, while only general public revenue remained as a non-significant variable. A possible explanation is that local government has no control over local general public revenue. Under China's taxation framework, local governments have no authority to collect taxes independently but are collecting taxes on behalf of the Central Government. A major portion of the tax revenue collected by the local government will be transferred to the Central Government at the end of the fiscal year. To resolve the issue of mismatched income and responsibility, the Central Government will make fiscal transfers to local government, with the amount decided by the MOF. On the other hand, local government could control over its funds revenue through adjusting the supply over land-use-rights or reducing local general public expenses through lower investment on public welfare projects, thus yielding significant results as shown in the table.

Part 3.3.3: How Chengtou Bonds are Affected by LGBs Issued (Part 3)

The last part of the research aims to reveal the financing strategies by local governors over different types of financing tools. As we are aware that Chengtou Bond acts as an unofficial tool for local government to finance public welfare projects, we could observe the relationship between LGBs and CBs by constructing the following regression model:

$$Chengtou\_Issue_{y1} = \varepsilon Chengtou\_Yield_{y0} + \beta Ordinary\_Issue_{y1} + \epsilon SPB\_Issue_{y1} + \eta RFB\_Issue_{y1} + \partial X_{y0} + uMacro_{y0}\ v_{Province} + t_{year} + c$$

In this model, Chengtou_Issue refers to the logarithmic value of Chengtou Bonds issued in year 1, while Ordinary_Issue, SPB_Issue and RFB_Issue refers to the logarithmic value of Ordinary Bonds, Special Purpose Bonds and Re-Financing Bonds issued in the same year. Lastly, Chengtou_Yield refers to the weighted average yield of the CBs issued in the previous year, with all other control variables same as previous parts of the research. Part (3) of Table 2 reported the OLS regression results.

The results show that CB yield, OBs issued and SPBs issued have significant positive correlation with size of CBs issued in that given year, while the issuance size of the RFBs has no significant impact. This is reasonable as strong local investment demand will trigger growth in all financing tools, while RFBs only serve re-financing purposes, thus fluctuate independently from other bond types. The significant positive correlation between CB yield and CBs issued could reflect an inherent risk embedded in provinces that are issuing more CBs, as provinces with more expensive CB yield are likely to be less developed provinces but are taking up more local public welfare projects. Also, the significant negative correlation between GDP Growth rate and CBs Issued suggests that slow-growth provinces are issuing more CBs, thus supporting the previous argument. Lastly, the Industry GDP Contribution Ratio has significant positive correlation with size of CBs issued, showing that more urbanized provinces favor CBs more.

Part 3.3.4: Results of Other Control Variables

Table 3. Year Control Variables

Dependent Variable	LGB Issuance Limit	Local Government Debt Ratio	Chengtou Bonds Issued
	(1)	(2)	(3)
2016	-2.0751***	0.3593***	-1.9905**
	[0.522]	[0.089]	[0.910]
2017	-1.7819***	0.3801***	-1.7831*
	[0.001]	[0.093]	[0.941]
2018	-1.8219***	0.3709***	-1.7397*
	[0.002]	[0.099]	[0.991]
2019	-1.5259***	0.4073***	-1.1905
	[0.014]	[0.105]	[1.039]
2020	-1.2151***	0.4745***	-0.5527
	[0.643]	[0.109]	[1.133]
2021	-1.4610***	0.4765***	-0.1629
	[0.656]	[0.112]	[1.161]
Observations	186	186	186

Note. Robust standard errors in parenthesies; *,**,*** refer to data significance at 10%,5%,and 1% levels (two-sided tests)

From the results, we could observe that there are year-specific events that impact all dependent variables. Such events are likely to be policy driven, as the government has been trying to improve local government debt and prevent financial distress. However, local government debt ratio continues to increase, as more financing is required to finance local investment projects. The significant negative correlation between year variables and size of Chengtou Bonds issued from 2016-2018 could signify the trend of local government shifting to more legal form of government borrowings, after Chengtou Bonds become more regulated by the Central Government.

Table 4. Province Control Variables

Dependent Variable	LGB Issuance Limit	Local Government Debt Ratio	Chengtou Bonds Issued
	(1)	(2)	(3)
Anhui	**0.5620*** **	-0.0195	0.3274
	[0.147]	[0.025]	[0.264]
Beijing	**-1.1997** **	**0.2526*** **	**-1.7316** **
	[0.469]	[0.080]	[0.861]
Fujian	0.1636	-0.0183	-0.2619

	[0.179]	[0.030]	[0.297]
Gansu	**-0.4401***	**0.0853****	0.7143*
	[0.223]	[0.038]	[0.377]
Guangdong	**0.6915*****	-0.0536	**-1.2697*****
	[0.228]	[0.039]	[0.387]
Guangxi	**0.4280*****	**-0.0617****	**1.0136*****
	[0.145]	[0.025]	[0.263]
Guizhou	**-0.8620*****	**0.3503*****	**1.0515*****
	[0.148]	[0.025]	[0.266]
Hainan	-0.4097	0.0381	**-2.1405*****
	[0.299]	[0.051]	[0.545]
Hebei	**0.9110*****	-0.0298	**-1.2013*****
	[0.147]	[0.025]	[0.288]
Henan	**0.8964*****	**-0.1131*****	0.0119
	[0.161]	[0.027]	[0.309]
Heilongjiang	0.0525	-0.0832	0.4112
	[0.306]	[0.052]	[0.512]
Hubei	**0.4711*****	**-0.0760*****	**0.5887****
	[0.128]	[0.022]	[0.229]
Hunan	**0.4436*****	-0.0102	**0.6369****
	[0.120]	[0.020]	[0.249]
Jilin	-0.0797	**0.0619***	0.0999
	[0.196]	[0.033]	[0.331]
Jiangsu	**0.4486***	-0.0131	0.5230
	[0.235]	[0.040]	[0.405]
Jiangxi	0.0639	0.0170	**0.8308*****
	[0.126]	[0.021]	[0.206]
Liaoning	**-1.0662*****	**0.1088*****	**-2.2903*****
	[0.138]	[0.023]	[0.284]
Inner Mongolia	**-0.6858****	**0.2030*****	**-1.8540*****
	[0.280]	[0.048]	0.488
Ningxia	**-2.2743*****	**0.2734*****	**-1.1033***
	[0.299]	[0.051]	[0.579]
Qinghai	**-2.2482*****	**0.5945*****	-0.5946
	[0.512]	[0.087]	[0.908]
Shandong	**0.9772*****	**-0.0866****	0.0299

	[0.199]	[0.034]	[0.348]
Shanxi	**-0.4008****	0.0248	**-1.8178*****
	[0.176]	[0.030]	[0.320]
Shannxi	**-0.2589***	**0.0640*****	-0.0060
	[0.136]	[0.023]	[0.232]
Shanghai	**-1.3787*****	**0.2449*****	**-2.4656*****
	[0.440]	[0.075]	[0.795]
Sichuan	**0.6390*****	-0.0187	**1.0148*****
	[0.124]	[0.021]	[0.238]
Tianjin	**-1.1222*****	**0.2653*****	-0.6974
	[0.366]	[0.062]	[0.647]
Xizang	**-4.4734*****	0.1462	1.2641
	[0.787]	[0.134]	[1.468]
Xinjiang	-0.0427	**0.0993*****	**0.9598****
	[0.289]	[0.049]	[0.485]
Yunnan	**0.3631****	**0.1230*****	0.3588
	[0.151]	[0.026]	[0.273]
Zhejiang	0.2007	0.0316	-0.2839
	[0.257]	[0.044]	[0.436]
Chongqing	-0.2507	**0.0680****	0.4618
	[0.175]	[0.030]	[0.296]
Observations	186	186	186

Note. Robust standard errors in parenthesies; *,**,*** refer to data significance at 10%,5%,and 1% levels (two-sided tests)

Some Trends could also be observed from the provincial data as shown in Table 4. A summarized table of significant results is presented in Table 5 below:

Table 5. Province Control Variables (Significant Results)

Dependent Variable	LGB Issuance Limit (1)	Local Government Debt Ratio (2)	Chengtou Bonds Issued (3)
Positively Correlated	Anhui	Beijing	Guangxi
	Guangdong	Gansu	Guizhou
	Guangxi	Guizhou	Hubei
	Hebei	Jilin	Hunan
	Henan	Liaoning	Jiangxi

	Hubei	Inner Mongolia	Sichuan
	Hunan	Ningxia	Xinjiang
	Jiangsu	Qinghai	
	Shandong	Shannxi	
	Sichuan	Shanghai	
	Yunnan	Tianjin	
		Xinjiang	
		Yunnan	
		Chongqing	
Negatively Correlated	Beijing	Guangxi	Beijing
	Gansu	Henan	Guangdong
	Guizhou	Hubei	Hainan
	Liaoning	Shandong	Hebei
	Inner Mongolia		Liaoning
	Ningxia		Inner Mongolia
	Qinghai		Ningxia
	Shanxi		Shanxi
	Shannxi		Shanghai
	Shanghai		
	Tianjin		
	Xizang		

One insight that are be generated from this table is that provinces that are given lesser LGB issuance limits are provinces with higher local government debt ratio, and vice versa. No obvious pattern is observed on CBs issued.

3.4 Research Limitations and Improvements

One key limitation of this research is the availability of the sample. As China only began imposing LGB issuance limits since 2015, there are only 186 data points which would result in sampling bias, as it could be undermined by trends in the recent years. In addition, provincial level data are less effective in digging out ongoing trends, and results from specific investment decisions could be offset by other investments within the region. Lastly, the scope of discussion is limited to LGBs and Chengtou Bonds, which could be further developed by including local LGFVs. In addition, more detailed variables could be included to explore the effects of LGBs on public welfares, such as education level and healthcare system in different regions.

4. Conclusion

This research used provincial LGB data and fiscal income statistics to establish relationships with local debt burden, governors' financing decisions, as well as the LGB issuance limit setting process. From OLS regression results, we found that the Central Government functions more like a regulatory body, only rejecting infeasible plans rather than actively managing local financing strategies. We also found that a higher governmental funds income played a significant role in reducing local government debt ratio, while general public revenue has no significant impact. Lastly, slow-growth provinces are issuing more CBs at higher yields, suggesting a higher financial risk exposure in these regions. The trend of provincial debt to GDP ratio also suggests that less developed regions are piling up debts faster compared to developed regions. This could provide insights on future LGB policies and reveal possible areas that could help in resolving local debt problems at a provincial level.

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