

The Effects of Municipal Bonds on Economic Growth in China

Yifan YANG

2024 April

Introduction

Background Information

What is Municipal Bond in China?

- Local Government Financing Vehicles (LGFV)

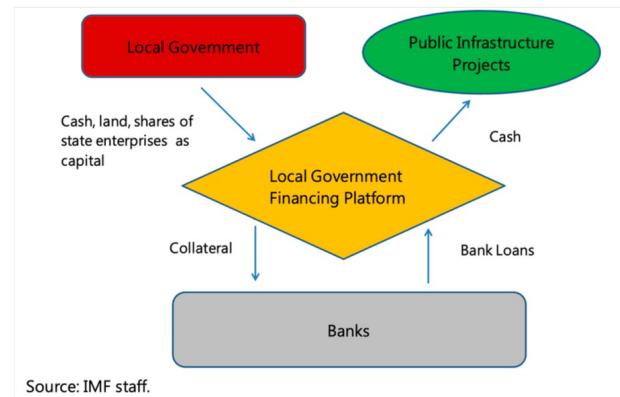


Figure 1: The structure of LGFV (source: [Lu and Sun \(2013\)](#))

- Properties of Municipal Bonds in China
 - Usage: construction of public welfare projects
 - Risk: vulnerable to the real estate market

Research Question: Effects of municipal bonds on economic growth at prefecture city level in China

The reason we care about this question:

- 3.6 trillion & increasing risk => M.B. itself becomes an outstanding problem
- The majority research focus on the risk and price, but rarely on the performance and rationality
 - (+) Government Expenditure increase
 - (-) Crowding out effect
- Rational economic decision or not? How many issuance is rational?

Key literature: Chen, S., & Li, W. (2019) (*Local government debt and regional economic growth in China*) & Wang, Q. (2008). (*The Effect of Public Debt on State and Local Economic Growth*) & Lu, Y. and Sun, T. (2013) (*Local government financing platforms in China*)

1. Regional difference,
2. Invert U shape relationship

Contribution:

1. Using data after 2010
2. Introduce the fixed asset investment and land price
 1. *MB finance public projects and*
 2. *related to the land price*
3. Investigate regional difference more specifically
 1. *7 regions divided according to the geographic proximity and cultural commonalities.*

Empirical Works

- 297 prefectoral level cities
 - Municipal Bond Issuance
 - GDP
- 2005 – 2021
 - Fixed Asset Investment
 - Foreign Direct Investment
 - Export & Import => Trade Openness
 - Government Expenditure
- - Population
 - ~~- Registered unemployment rate~~
 - ~~- Number of Employee~~
 - Education Expenditure
 - Residential Property Price

- The basic model is from Chen and Li (2019)

$$\gamma_{i,t} = c + \beta_1 \cdot \ln \text{debt}_{i,t-1} + \beta_2 \cdot \ln \text{debt}_{i,t-1}^2 + \delta \cdot X_{i,t-1} + \alpha_i + \varepsilon_{i,t}.$$

- Address lagged effect by using logarithmic difference:

$$\frac{\ln y_{i,t+s} - \ln y_{i,t}}{s}$$

$$s = \{5, 7, 9\}$$

Regression Equation:

$$\frac{\ln y_{i,t+s} - \ln y_{i,t}}{s} = c + \beta_1 \ln MB_{i,t} + \beta_2 \ln MB_{i,t}^2 \\ + \beta_3 FAI_{i,t} + \beta_4 \ln LP_{i,t} \\ + \beta_5 TO_{i,t} + \beta_6 FDI_{i,t} + \beta_7 GC_{i,t} \\ + \beta_8 Edu + \beta_9 Popu + \beta_{10} Labor + \varepsilon_{i,t}.$$

Notations:

- y : GDP per capita
- MB : annual municipal bond issuance.
- FAI : ratio of fixed asset investment to GDP
- LP : land price
- TO : trade openness, calculated by $\frac{export+import}{GDP}$
- FDI : ratio of foreign direct investment to GDP
- GC : ratio of government expenditure to GDP
- Edu : ratio of government educational expenditure per capita to GDP per capita
- $Popu$: population
- $Labor$: labor force
- i refers city and t refers the year.

Result

For i = 2006

Coefficient	$s = 5$	$s = 7$	$s = 9$
<i>const</i>	0.3534** (0.114)	0.2860** (0.091)	0.2011* (0.093)
$\ln MB$	0.0083 (0.018)	0.0027 (0.014)	-0.0087 (0.015)
$\ln MB^2$	-0.0044 (0.013)	-0.0011 (0.010)	0.0067 (0.011)
FAI	-1.161e-05 (4.98e-05)	-7.331e-06 (3.99e-05)	-5.39e-06 (4.05e-05)
$\ln LP$	-0.0266 (0.015)	-0.0225 (0.012)	-0.0187 (0.012)
FDI	-0.0044* (0.002)	-0.0030 (0.002)	-0.0010 (0.002)
TO	-8.548e-05 (9.38e-05)	-8.257e-05 (7.52e-05)	-7.183e-05 (7.64e-05)
EDU	0.0009 (0.002)	0.0007 (0.001)	0.0012 (0.001)
GE	-0.0002 (0.000)	-0.0002 (0.000)	-0.0002 (0.000)
$Popu$	0.0070 (0.009)	0.0067 (0.008)	0.0079 (0.008)
R^2	0.733	0.751	0.663
Adj. R^2	0.623	0.649	0.525
<i>Observations</i>	32	32	32

Table 1: OLS Results for $s = 5, 7, 9$

Problems:

- 1) Strong multicollinearity or other numerical problems.
- 2) Bad dataset

Improvement:

- 1) Find better datasets
- 2) Solve the Endogeneity problem
- 3) Try to divide the cities by groups

Reference

1. Thurston, W. P. (1988). On the geometry and dynamics of diffeomorphisms of surfaces. *Bull. Am. Math. Soc.*, 19, 417-431.
2. Zhou, J. Q. (2013). China's Local Government Debt and Economic Growth. *Gettysburg Economic Review*, 7, Article 6. Retrieved from <https://cupola.gettysburg.edu/ger/vol7/iss1/6>
3. Xu, C.-s., Cheng, L., & Zhuang, J.-q. (2016). Influence and mechanism of local debts on regional economic growth——Analysis on panel quantile model. *Economist*, (5), 77-86. Retrieved from <https://d.wanfangdata.com.cn/periodical/jjxj201605009>
4. Hildreth, W. B., & Zornt, C. K. (2005). The evolution of the state and local government municipal debt market over the past quarter century. *Public Budgeting and Finance*, 25(4), 127-153.
5. Hildreth, W. B., & Miller, G. J. (2002). Debt and the local economy: problems in benchmarking local government debt affordability. *Public Budgeting and Finance*, 22(4), 99-113.
6. Wang, Q. (2008). The Effect of Public Debt on State and Local Economic Growth and Its Implication for Measuring Debt Capacity: A Simultaneous Equations Approach. ABFM. Chicago, IL.
7. Chen, S., & Li, W. (2019). Local government debt and regional economic growth in China. *China Political Economy*, 2(2), 330-353. doi: 10.1108/CPE-10-2019-0028