

# **The Effects of Municipal Bonds on Economic Growth in China**

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# Introduction

## What is Municipal Bond in China?

- Local Government Financing Vehicles (LGFV)

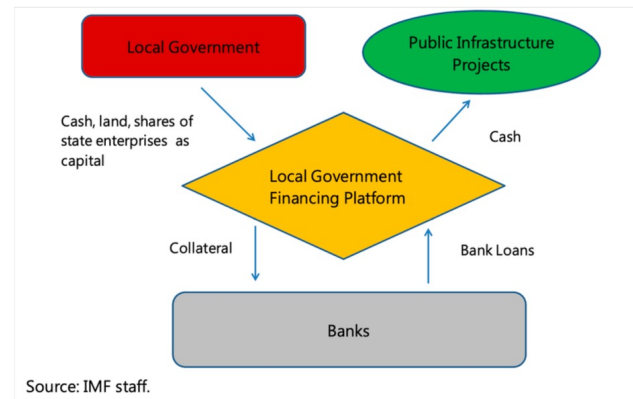


Figure 1: The structure of LGFV (source: Lu and Sun (2013))

- 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  $\Rightarrow$  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 cultural commonalities.*

## Empirical Works

- 297 prefectural level cities
  - 2005 – 2021
- Municipal Bond Issuance
  - GDP
  - 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:

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

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)
<i>FAI</i>	-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)
<i>FDI</i>	-0.0044* (0.002)	-0.0030 (0.002)	-0.0010 (0.002)
<i>TO</i>	-8.548e-05 (9.38e-05)	-8.257e-05 (7.52e-05)	-7.183e-05 (7.64e-05)
<i>EDU</i>	0.0009 (0.002)	0.0007 (0.001)	0.0012 (0.001)
<i>GE</i>	-0.0002 (0.000)	-0.0002 (0.000)	-0.0002 (0.000)
<i>Popu</i>	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

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