The "Privatization" of Municipal Debt[1]

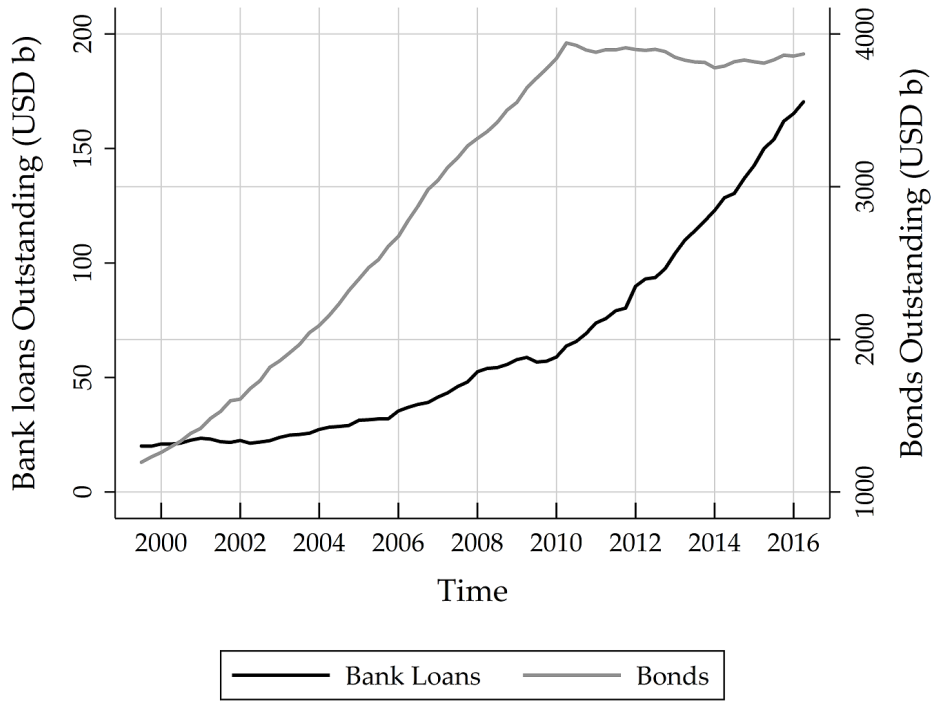
Ivan T. Ivanov, Federal Reserve Board
Tom Zimmermann, University of Cologne

07/17/2018

[1] The views expressed herein are those of the authors and do not necessarily reflect the views of the Federal Reserve Board or the Federal Reserve System.

Motivation

- The aftermath of the Great Recession has weakened the fiscal position of state and local governments in the U.S.
  - "Most [states] have a thinner financial cushion than they did before the last downturn." The Pew Charitable Trusts
  - Contributing factors include pension obligations, health care costs, and unmet infrastructure investments.
- At the same time state and local governments in the U.S. have substantially increased their reliance on private bank loans.



Motivation

- Empirical evidence on this trend has been nonexistent due to the lack of data.
  - No disclosure requirements exist for private muni debt, and very few entities choose to disclose voluntarily.
- Using supervisory loan-level data on bank loans to state and local governments, we study the municipal bank debt market:

Summary of Results

- Bank lending to state and local governments is heavily collateralized, has high contractual priority, has short maturities, and includes contractual guarantees.
    - This may limit the ability of municipalities to take on additional debt (see, Brunnermeier and Oehmke, 2013; Donaldson et al, 2017).
- Banks' internal assessments indicate that a substantial fraction of muni entities may have non-trivial credit risk.
- Cross sectional evidence and evidence from income shocks to municipalities suggests that:
    - Small, more levered, and low income counties are more reliant on bank debt.
    - Adverse permanent income shocks result in the issuance of new bank loans in low income municipalities.
    - Positive permanent revisions in income have no effect on debt structure.
    - Liquidity shocks lead to an increase in credit line commitments (temporary) and drawn amounts.

Outline

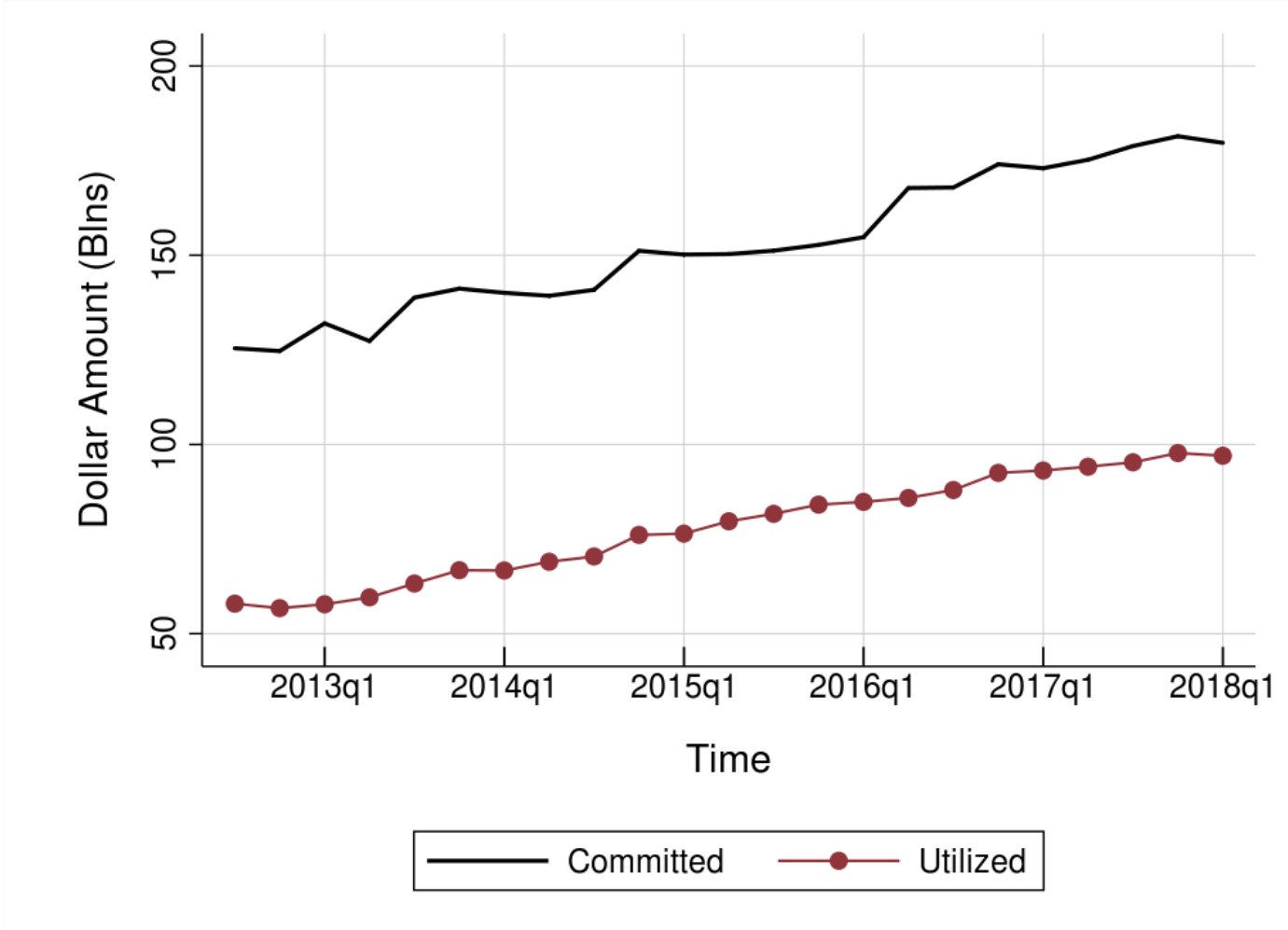
1. Data and Sample
2. Descriptive Results
3. Permanent and Liquidity Shocks
4. Managing Exogenous Income Shocks
5. Concluding Remarks

Data and Sample

Muni Loan and Bond Data

- Since 2012, Schedule H1 of FR-Y14Q provides banks' C&I loan portfolio holdings.
  - Starting 2012 Q3, includes loans in the banks' quarterly portfolios exceeding $1 million.
  - Data on credit lines, term loans, and other loans.
- Construct the panel of muni bonds outstanding for each municipality from the Mergent Municipal Securities Issuance dataset:
  - Convert issuance level into outstanding amounts data.
  - Classify into general obligation bonds (GO) and revenue bonds.

Muni Bank Loans in Y14



- We capture the majority of muni bank lending.
- Observe total commitments.

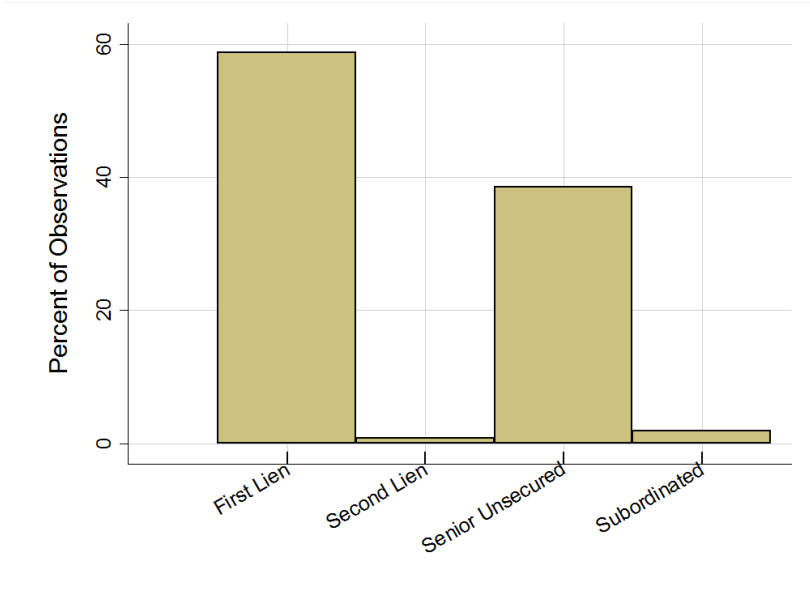
Descriptive Results

Bank Loan Characteristics

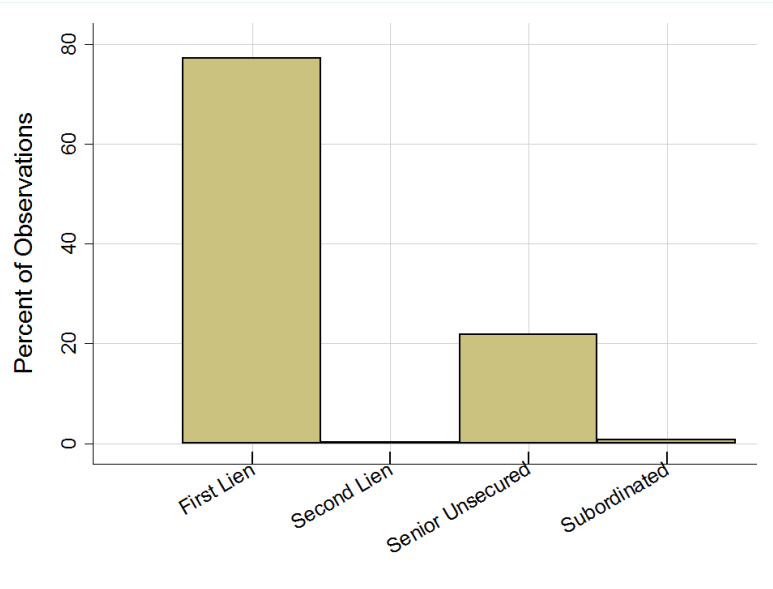
	States	Counties	Cities	Districts
Credit Lines				
Fraction of all loans	0.4064	0.2073	0.2575	0.2613
Committed Amount ($Mln)	36.4864	19.3063	22.6609	13.5478
Drawn Amount ($Mln)	6.2310	5.4806	4.0749	3.2409
Interest Rate	0.0267	0.0271	0.0272	0.0272
Rem. Maturity (Quarters)	8.7729	12.3432	12.5093	12.6418
N	10,848	7,289	25,817	11,505
Term Loans				
Fraction of all loans	0.3072	0.5801	0.5366	0.5138
Committed Amount ($Mln)	20.3693	8.9857	7.2732	6.9167
Interest Rate	0.0279	0.0308	0.0298	0.0300
Rem. Maturity (Quarters)	27.3422	30.8969	32.0201	30.9567
N	8,202	20,395	53,796	22,618
Leases				
Fraction of all loans	0.1564	0.1330	0.1202	0.1365
Committed Amount ($Mln)	5.8847	5.7039	5.1610	4.7543
Interest Rate	0.0310	0.0292	0.0303	0.0323
Rem. Maturity (Quarters)	23.3813	28.4548	30.4028	31.3756
N	4,175	4,676	12,047	6,009

- The majority of bank lending done via credit lines and term loans. Substantial unused capacity under credit lines.

Bank Loan Security and Seniority



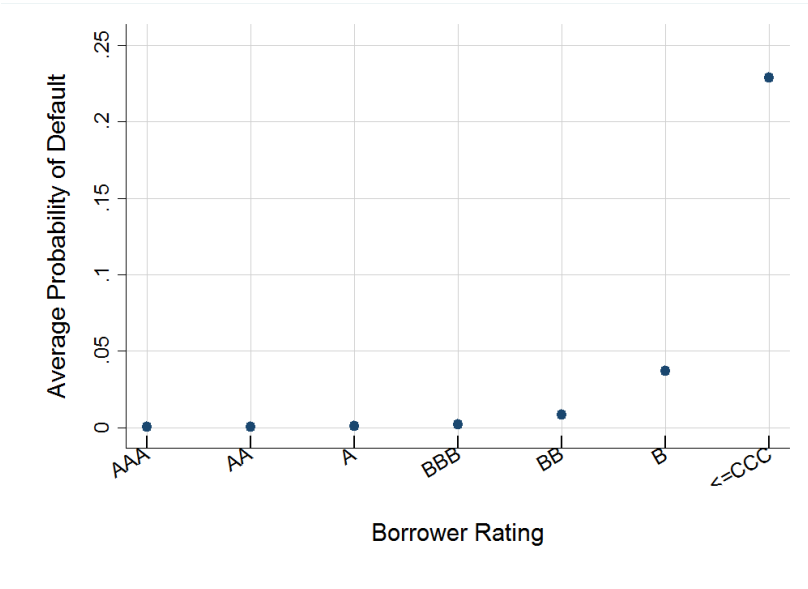
(a) Lines of Credit



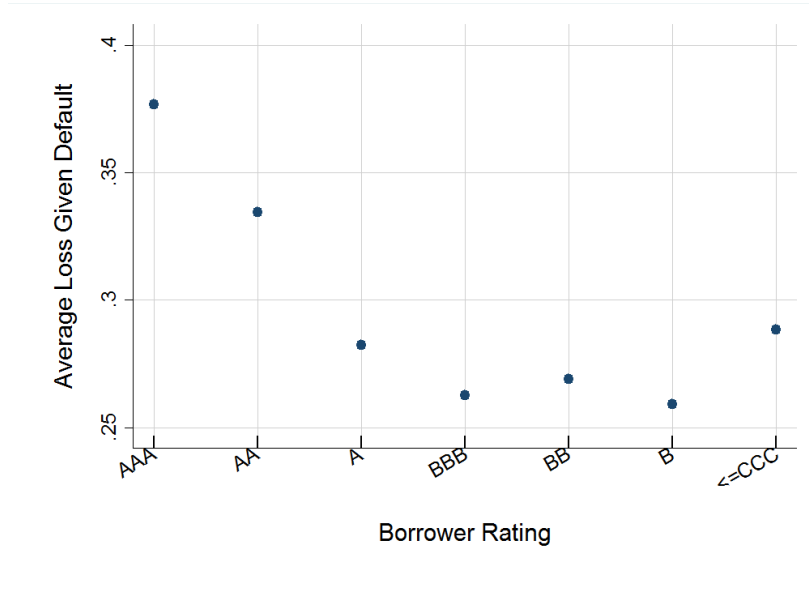
(b) Term Loans

- Bank loans heavily collateralized or contractually senior.

Credit Risk of Municipalities



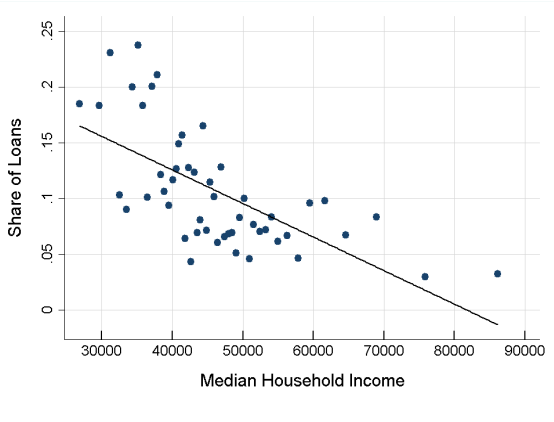
(a) Probability of Default



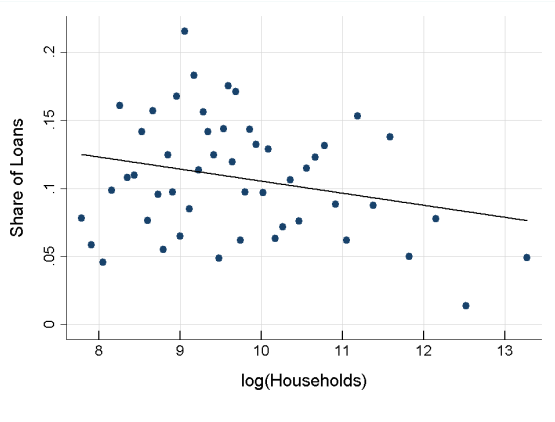
(b) Loss Given Default

- 18%, 16%, and 22% of state, county/city, and district issuers have ratings of BB and below.
- These figures combined with the graphs above indicate nontrivial credit risk.

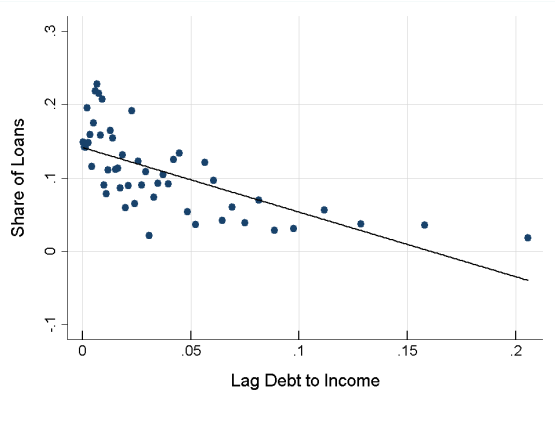
Bank Loan Share and County Characteristics



(a) *Household Income*



(b) *Population*



(c) *Debt − to − Income*

- Lower-income, less populated, and less levered counties tend to have greater reliance on bank debt.

Permanent and Transitory Income Shocks

Permanent Income Shocks

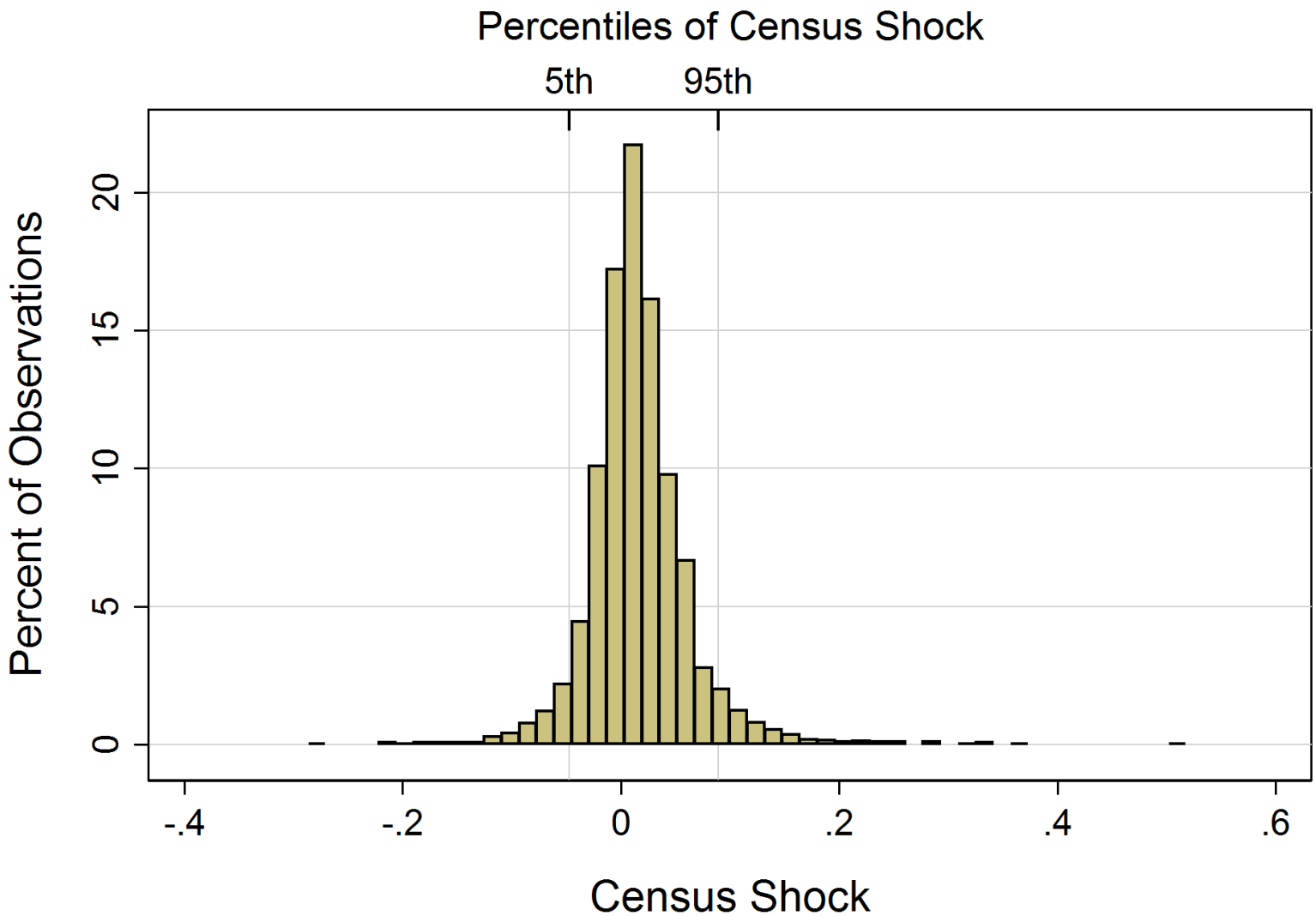
- Construction of census follows Suarez-Serrato and Wingender (2016):
  - Census shock is the percentage difference between *actual population* in 2010 and *estimated population* in 2010
  - Actual population: From 2010 Census
  - Estimated population: From intercensal regression estimates

$$\Delta Pop_{ct} = \beta_1 Births_{ct} + \beta_2 Deaths_{ct} + \beta_3 Migration_{ct} + \epsilon_{ct}$$

  - Census shock:

$$CS_c = log(Pop_c^{Census,2010}) - log(Pop_c^{\widehat{Estimated},2010})$$

Census Shocks



Response to Permanent Shocks

- Investigate sensitivities of changes in debt (structure) outcomes on positive and negative permanent shocks:
  - Use the following equation:

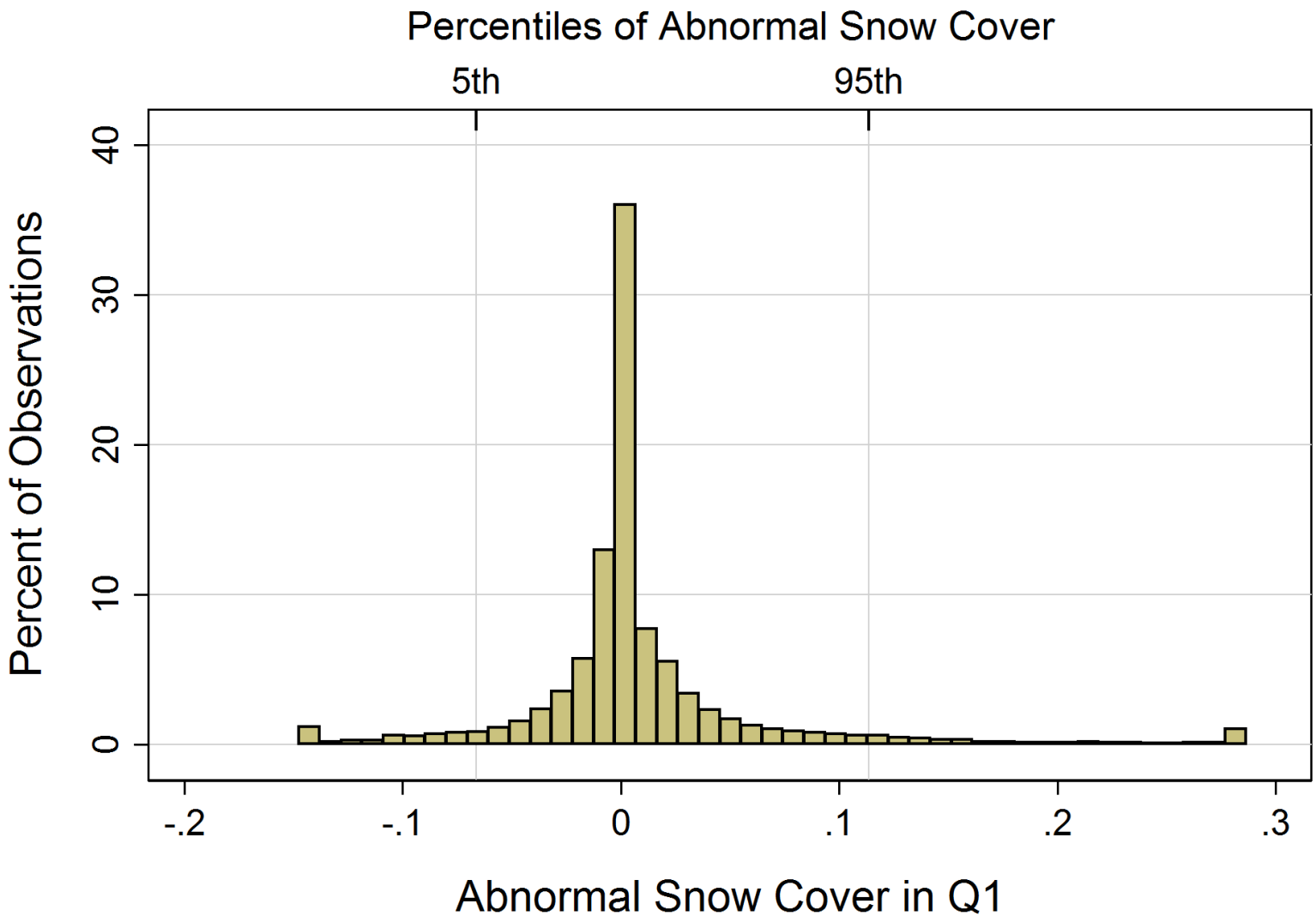
$$\Delta Outcome_{c,t-0} = \beta_1 max(CS_c, 0) + \beta_2 min(CS_c, 0) + \gamma Controls_c + \epsilon_{ct}$$

  - Includes municipality size, firm productivity, and income controls in addition to state, and time (quarter) FE.

Liquidity Shocks

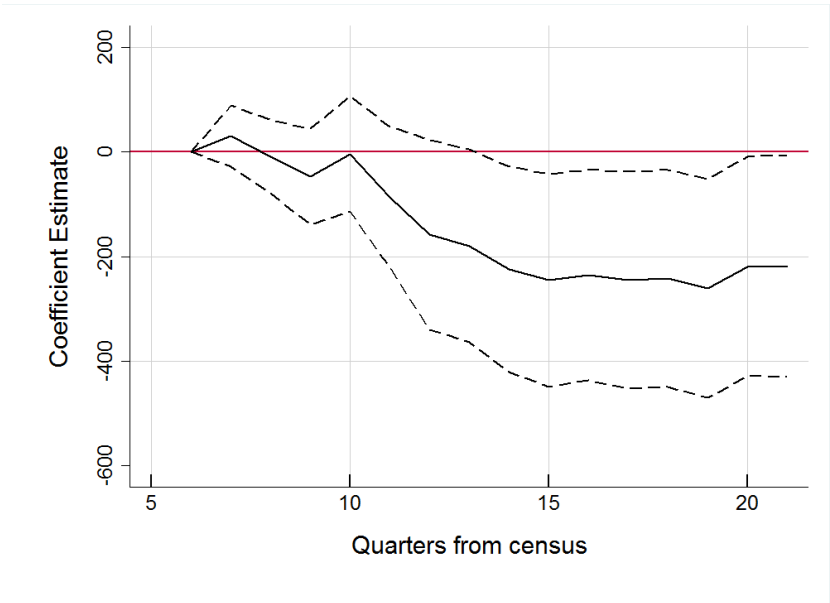
- Use adverse unexpected weather shocks to examine the response of debt structure to liquidity shocks:
  - It temporarily increases operating costs (and decreases worker productivity) to municipalities.
  - But, does not otherwise affect the underlying economic environment.
  - Academic literature supporting these ideas: Brown, Gustafson, and Ivanov (2017), Roth Tran (2016), Bloesch and Gourio (2015)
- Use NOAA data to construct *Abnormal Snow Cover*:
  - For each county-day, compute median snow cover.
  - Take the average for the first calendar quarter.
  - Substract the county's mean over the previous 10 years.

Weather Shock

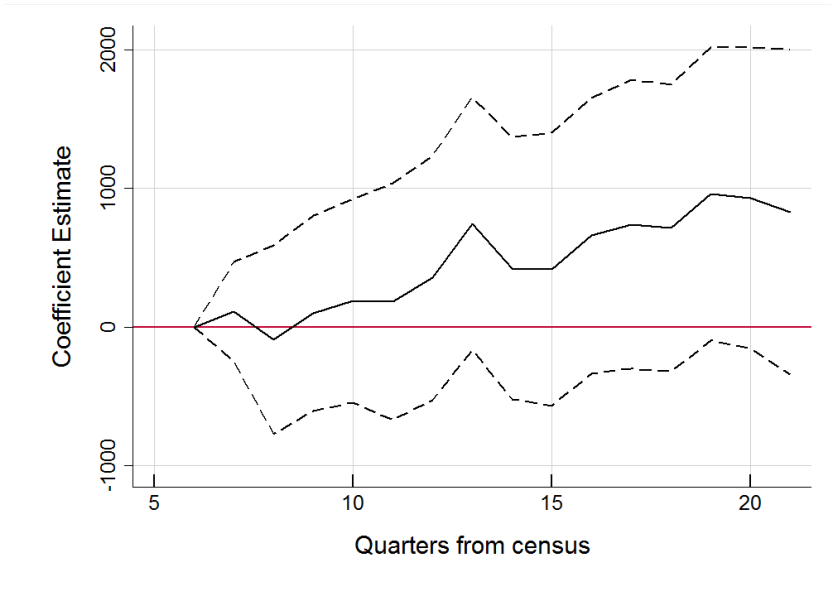


Managing Exogenous Income Shocks

Permanent Adverse Shocks: Financing Changes



(a) *Bank Financing*



(b) *Bond Financing*

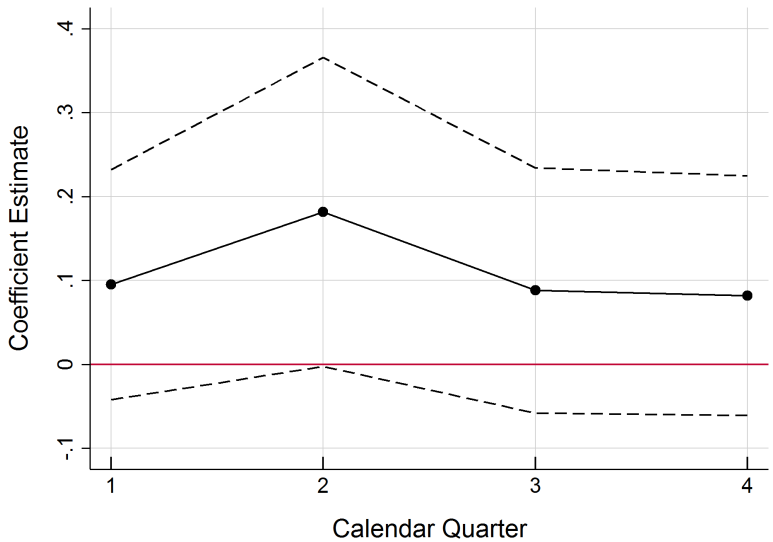
- An increase in bank debt and a (weak) decrease in bond financing following permanent adverse income revisions.
- The share of bank loans in municipal debt structure goes up.

Debt Structure Response to Liquidity Shocks

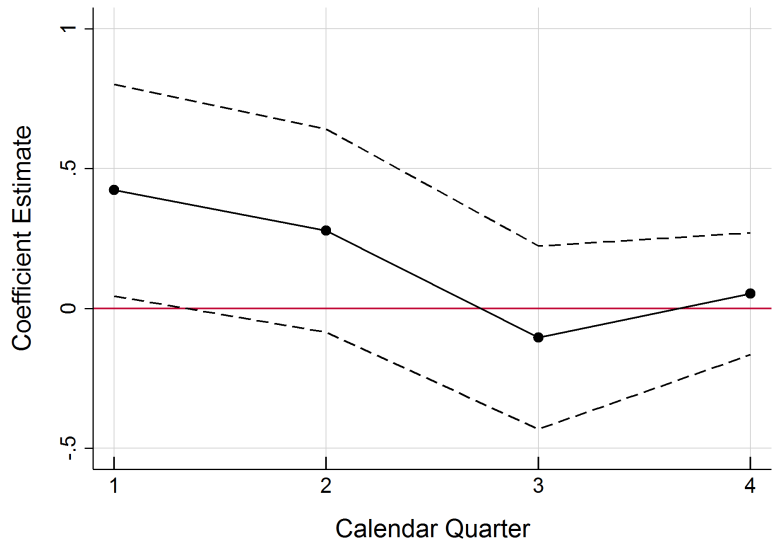
	Δ *Revolvers* (1)	Δ *Revolvers Used* (2)	Δ*Term Loans* (3)	Δ*GO Bonds* (4)	Δ*Rev Bonds* (5)
Snow Cover	0.1319*	0.1282*	0.3392	4.9715	−1.2174
	(0.0777)	(0.0688)	(0.7379)	(4.1715)	(5.0427)
Adj. R-sq	0.0027	0.0011	0.0180	0.0030	0.0117
N	30,506	30,506	30,506	30,506	30,506
Year-over-year changes					
Snow Cover	1.8238	1.7038**	8.7958	39.6444	−116.7959
	(1.4369)	(0.6883)	(5.6620)	(25.3272)	(159.8637)
Adj. R-sq	0.0085	0.0081	0.0363	0.0078	0.7278
N	7,030	7,030	7,030	7,030	7,030

- On average, larger quarterly snow cover increases average outstanding credit line drawn amount and line size.
- These changes in credit line size disappear within 3 quarters of the transitory shock but credit line draw is not fully repaid.

Liquidity Shocks: Timing



(a) *Credit Line Use*



(b) *Credit Line Size*

Conclusion

- The trend towards increased reliance on private bank loans is likely to persist as more municipalities face eroding fiscal positions.
    - Increasing the effective debt priority in a municipal issuer's capital structure may make it difficult to raise additional debt in the future.
- Our paper also shows that claim dilution may be a relevant consideration for pre-existing bond holders.
    - The absence of disclosure of private debt claims may lead to higher costs of bond financing for state and local governments.