

# The Impact of Bank Financing on Municipalities' Bond Issuance and the Real Economy

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# This Paper

## Do Government purchases stimulate the economy?

- Long-standing question in economics
- Muni bond market useful lab for fiscal multiplier debate
- Internally financed debt, not windfall money
- Unique institutional feature – *bank qualification* – source of cross-sectional heterogeneity
- Pin down exactly investor type – bank lender
- *Who* finances spending (high net-worth retail vs. bank), not just *how* spending financed (tax, deficit, transfer)

# Contribution

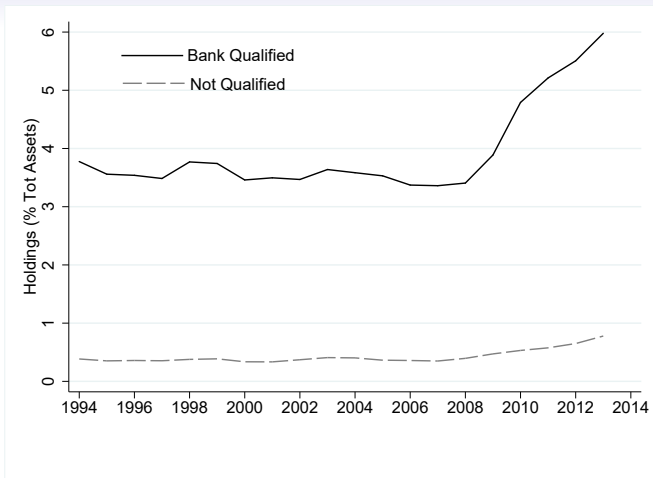
- Value of marginal \$1 of **privately** placed debt
  - Estimate local governments' behavioral response to substituting \$1 of bank-financed debt with \$1 of publicly placed debt
  - Estimate impact of marginal dollar bank-financed spending on real economy
  - Contributes to current debate on redistribution multipliers
  - Policy relevant: new SEC rule (Aug 2018) on bank financing disclosure

# Ownership Segmentation

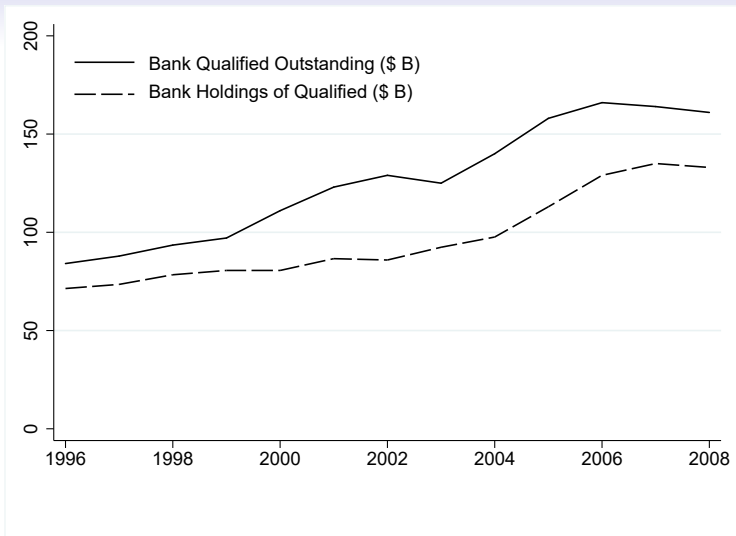
- 93% of municipal issuance eligible for tax-exemption
- Households receive full federal tax exemption
- Banks are taxed according to this rule:
  - Municipality Total Issuance in calendar year

$$\left\{ \begin{array}{l} \leq \$10M \rightarrow \text{tax-exemption for banks} \rightarrow \text{Bank-Qualified} \\ > \$10M \rightarrow \text{taxed (all, not marginal)} \rightarrow \text{Non-Qualified} \end{array} \right.$$

- Tax-Code Discontinuity unique to Banks (TEFRA (1982), Tax Reform Act (1986))

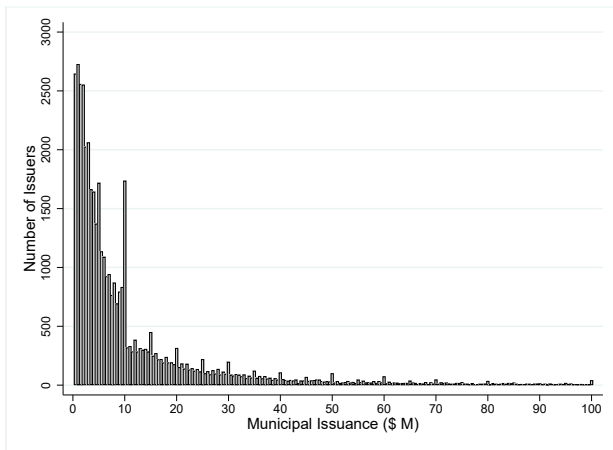


- Banks' holdings of Non-Qualified bonds trivial
- Bank-Qualified  $\sim 10\times$  Non-Qualified (% Total Assets)



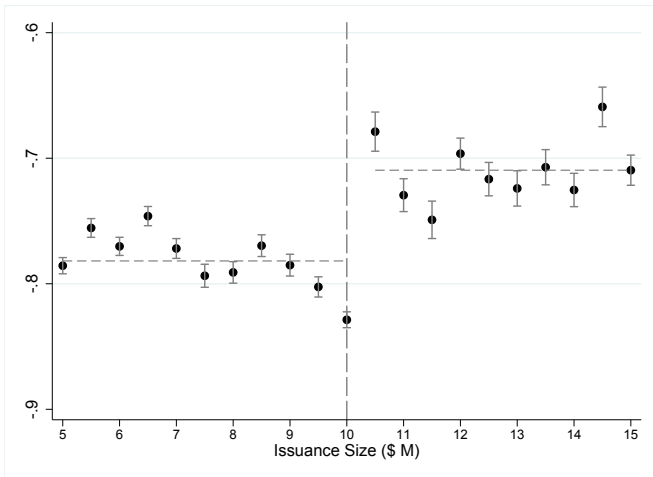
- Outstanding vs Bank held Qualified bonds (\$B)
- Banks hold (almost) all Qualified segment

# Local Governments' Issuance Decision



- Smooth if equivalent
- All investors tax-exempt (just different type)
- **Excess mass at \$10M** Ex-Post

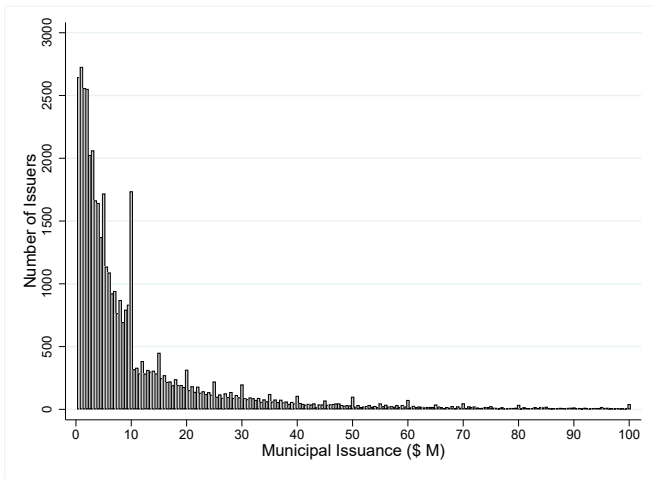
# Spreads around \$10M threshold



- Muni yield over matched synthetic Treasury at issuance
- Jump at Bank-Qualification cutoff of **\$10M** Ex-Post
- Under-estimate (self selection): extra \$1 → lose bank access, ~ \$200k-\$300k ↑ borrow costs

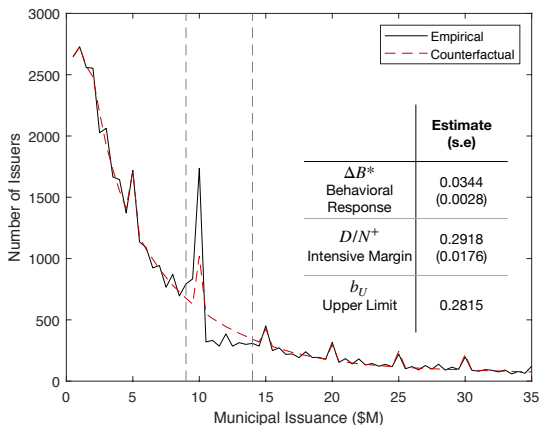


# Estimation



- Ownership segmentation generates notch in budget constraint
- Estimate Behavioral Response,  $\Delta B^*$   $\rightarrow$   $\downarrow$  issuance
- Estimate Intensive Margin response (mass of affected gvt's)

# Estimation Results



- Average reduction in bond issuance:  $\downarrow$  3.4%
- Max reduction in bond issuance:  $\downarrow$  28%
- Mass of government affected: 29%

Validate Counterfactual

# Robustness – Bunching

	(1)	(2)	(3)	(4)	(5)
Behavioral Response ( $\Delta B^*$ )	0.0338 (0.0028)	0.0330 (0.0028)	0.0275 (0.0025)	0.0264 (0.0025)	0.0367 (0.0024)
Intensive Margin Effect ( $\hat{D}/\hat{N}^+$ )	0.2565 (0.0160)	0.2272 (0.0143)	0.2006 (0.0135)	0.1797 (0.0127)	0.1917 (0.0098)
Extensive Margin Effect ( $(\hat{M} - \hat{D})/\hat{N}^+$ )	0.0308 (0.0160)	0.0596 (0.0085)	0.0156 (0.0135)	0.0649 (0.0127)	0.0083 (0.0098)
Exclusion Limits (\$M)	(9,14.5)	(9,15)	(8.5,17.5)	(8.5,18)	(9,17)
Polynomial	p=13	p=13	p=13	p=13	p=6

- Behavioral Response robust
- Splitting?
- Max out credit line?

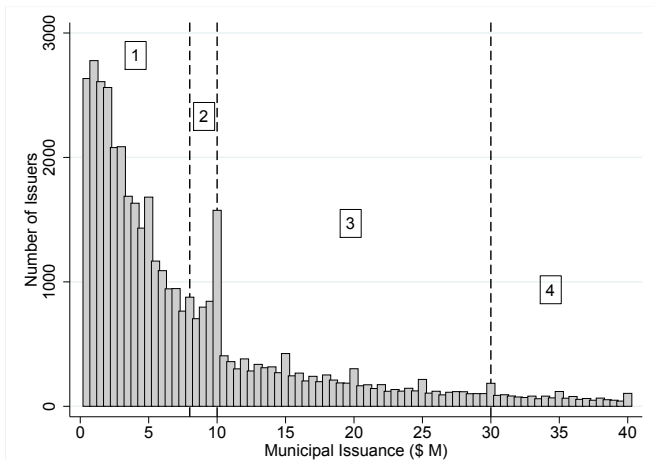
# Relax Access to Bank-Financing Constraints

Recap:

- Stark ownership segmentation
- Local Gvts *not* indifferent btw \$1 of bank and \$1 of public placement

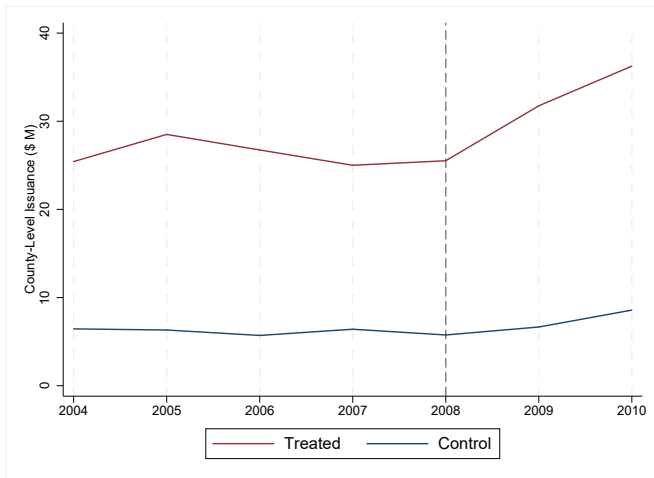
Value of marginal \$1 of bank-financed Gvt spending on real economy?

# Regulation Change



- Amendment of §265 of Tax Act: \$10M → \$30M for 2009-2010
- Law applies in levels, regardless of size/population
- Differentially affected regions: focus (1) & (2) bank-dependent

# Effect on New Bank-Financed Debt Issued



- Treated:  $Intensity_i > 0$
- Control:  $Intensity_i = 0$
- Bank-Financed debt  $\uparrow$  more in counties where (ex-ante) bunching issuers

# First Stage: Bank-Financed Gvt Debt

First Stage - Issuance								
	All				Urban			
Intensity x Post	32.446*** (7.318)	33.430*** (7.642)	25.515*** (6.794)	24.701*** (7.009)	31.992*** (7.940)	32.565*** (8.275)	26.549*** (7.406)	25.078*** (7.598)
Post	2.167*** (0.763)	2.535*** (0.8158)			2.618*** (0.954)	3.117 (1.018)		
Extra Controls	No	Yes	No	Yes	No	Yes	No	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Decile by Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R <sup>2</sup>	0.054	0.057	0.105	0.115	0.060	0.060	0.111	0.123
Observations	3,528	3,180	3,528	3,180	3,073	2,825	3,073	2,825
Counties	504	504	504	504	439	439	439	439

- 1 st.dev. ↑ *Intensity* → \$3.7M bank-financed debt (relative to control) ↑
- 1 st.dev. ↑ *Intensity* → 7.3% bank-financed debt ↑ [In Logs](#)
- Window of opportunity? Over-reaction?

## 2SLS: (Log) Employment

<i>All Counties</i>						
	Private Employment			Government Employment		
Issuance	0.176** (0.087)	0.157* (0.087)	0.252** (0.111)	0.127* (0.074)	0.101 (0.065)	0.138 (0.095)
Extra Controls	No	Yes	No	No	Yes	No
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Size Decile by Year FE	No	No	Yes	No	No	Yes
F-stat first stage	19.59	19.08	14.19	19.59	19.08	14.19
Observations	3,515	3,169	3,515	3,515	3,169	3,515
Counties	503	503	503	503	503	503

- Marginal \$1M bank-financed  $\rightarrow$  14.7 jobs ( $= \text{elasticity} \times \frac{\bar{E}}{I}$ )
- Effect concentrated in Private sector



## 2SLS: Employment Urban

<i>Urban Counties</i>						
	Private Employment			Government Employment		
Issuance	0.239** (0.098)	0.196** (0.090)	0.256** (0.115)	0.155* (0.081)	0.117* (0.071)	0.152 (0.100)
Extra Controls	No	Yes	No	No	Yes	No
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Size Decile by Year FE	No	No	Yes	No	No	Yes
F-stat first stage	16.23	15.47	12.94	16.23	15.47	12.94
Observations	3,064	2,816	3,064	3,064	2,816	3,064
Counties	438	438	438	438	438	438

- Relatively higher effect in urban subset (open economy leak)
- Marginal \$1M bank-financed  $\rightarrow$  22.5 jobs ( $= elasticity \times \frac{\bar{E}}{I}$ )
- Effect still concentrated in Private sector
- Money likely not fungible

## 2SLS: Wage Bill Urban

<i>Urban Counties</i>						
	Private Wages			Government Wages		
Issuance	0.214*	0.156	0.277*	0.144*	0.117	0.119
	(0.122)	(0.110)	(0.143)	(0.081)	(0.076)	(0.096)
Extra Controls	No	Yes	No	No	Yes	No
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Size Decile by Year FE	No	No	Yes	No	No	Yes
F-stat first stage	16.23	15.47	12.94	16.23	15.47	12.94
Observations	3,064	2,816	3,064	3,064	2,816	3,064
Counties	438	438	438	438	438	438

- Marginal \$1 bank-financed  $\rightarrow$  \$0.8 ( $= \text{elasticity} \times \overline{\frac{W}{T}}$ )
- Cost per job  $\sim$  \$44,500
- Mean compensation job created (or saved) \$35,600

# Robustness: Aggregation

## Non-Qualified Spending

	Other Spending - All				Other Spending - Urban			
Intensity x Post	-125.95 (103.21)	-146.534 (107.287)	-112.226 (118.141)	-101.564 (92.240)	-144.67 (131.56)	-146.400 (115.429)	-122.764 (130.406)	-107.784 (100.231)
Post	14.688 (27.437)	-3.137 (11.089)			18.545 (34.574)	-4.150 (13.891)		
Extra Controls	No	Yes	No	Yes	No	Yes	No	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Decile by Year FE	No	No	Yes	Yes	No	No	Yes	Yes
p-value	0.222	0.172	0.342	0.271	0.272	0.205	0.347	0.283
F-first stage	1.49	1.87	0.90	1.21	1.21	1.61	0.88	1.16
Observations	3,528	3,180	3,528	3,180	3,073	2,825	3,073	2,825
Counties	504	504	504	504	439	439	439	439
R <sup>2</sup>	0.0006	0.018	0.024	0.036	0.0007	0.018	0.027	0.037

- Instrument uncorr to spending by other cities
- No sorting on transfers
- Issuance vs. Expenditure

# Discussion

- Cost per job in this paper  $\sim$  \$44,500
- Estimates in literature (transfers)
- Redistribution: taxing A to finance B  $\Rightarrow$  B multiplier  $> 0$ , but aggregate is 0
- Not so if agents myopic or bound rational
- Empirical question
- Open economy deficit public placement  $\sim$  \$20,000 (Adelino et al. (2017))
- Non-bank financed issuers

# Conclusion

- ① \$1 of **privately** placed  $\neq$  \$1 of **publicly** placed debt
- ② Large local gvt's behavioral response to substituting away from bank financing
- ③ Open economy deficit financed multiplier  $\sim 45,000$  when bank lender
- ④ Cost larger than with public placement of debt  $\rightarrow$  bank re-allocating capital? crowding out?

## 2SLS Specification

$$Issuance_{i,t} = b_1 Intensity_i \times Post_t + b_2 X_{i,t} + a_i + a_{size,t} + e_{i,t}$$
$$Y_{i,t} = \beta_1 \widehat{Issuance}_{i,t} + \beta_2 X_{i,t} + a_i + a_{size,t} + \xi_{i,t}$$

- ▲ Aggregation: county level, spending leak
- ▲  $Intensity_i$ : fraction bunching municipalities in county
- ▲  $Issuance_{i,t}$ : bank financed debt raised by region (1) & (2) gvt's
- ▲ Excluded Instrument:  $Intensity_i \times Post_t$
- ▲  $Y_{i,t}$ : (log) employment and wage bill
- ▲  $a_i, a_{size,t}$ : county & size-decile by year FE
- ▲  $X$ : HPI, number of households

# Pre-Regulation Change Characteristics

	Treated			Controls			Difference (s.e.)
	<i>N</i>	<i>mean</i>	<i>sd</i>	<i>N</i>	<i>mean</i>	<i>sd</i>	<i>Treat minus Control</i>
Total Revenue	1354	44352.61	46651.81	6611	17838.48	29956.40	26514.13*** (1456.7)
Total Taxes	1351	18970.94	21974.23	6587	6573.88	10931.89	12397.06*** (837.3)
Property Tax	1347	15705.15	19475.14	6547	5179.15	9244.04	10526 *** (759.6)
Property Tax (% Tot tax)	1347	0.82	0.25	6547	0.81	0.26	0.01 (0.01)
Inter-Gvt Revenue	1347	16293.02	22605.02	6556	6525.78	12403.59	9767.24*** (712.6)
<b>Per-Capita</b>							
Total Revenue	607	1.810	1.535	4126	1.658	5.871	0.152 (0.124)
Total Taxes	607	0.760	0.786	4123	0.656	3.732	0.104 (0.076)
Property Tax	603	0.540	0.711	4083	0.459	2.109	0.081 (0.057)
Inter-Gvt Revenue	600	0.349	0.465	4071	0.324	1.826	0.025 (0.038)

- Matched Census 2007 Gvt budgets
- Assumption: sorting on distance to constraints does not sort on economic trajectory
- Size matters for up-against constraint
- No difference per capita

# Pre-Regulation Change Trends

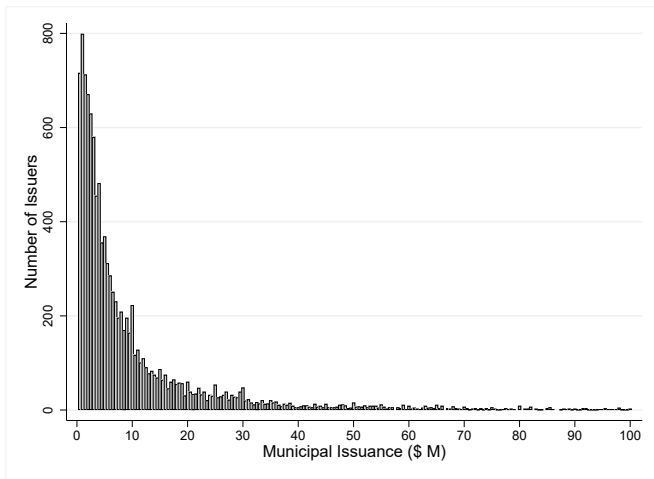
	All				Urban			
	Treated	Control	Difference (s.e.)	Obs.	Treated	Control	Difference (s.e.)	Obs.
Total Employment (growth)	0.006	0.004	0.002 (0.002)	2016	0.007	0.004	0.002 (0.002)	1756
Private Employment (growth)	0.006	0.004	0.002 (0.002)	2006	0.006	0.004	0.001 (0.002)	1750
Gvt Employment (growth)	0.011	0.006	0.005** (0.002)	2006	0.012	0.005	0.006*** (0.002)	1750
Total wages (growth)	0.044	0.044	0.000 (0.002)	2016	0.045	0.043	0.001 (0.003)	1756
Private wages (growth)	0.044	0.046	-0.001 (0.003)	2007	0.045	0.045	0.000 (0.003)	1750
Gvt wages (growth)	0.044	0.042	0.002 (0.003)	2007	0.044	0.039	0.005 (0.002)	1750
Issuance (growth)	0.000	0.002	-0.002 (0.027)	2016	0.004	0.007	-0.003 (0.033)	1756
HPI (growth)	0.027	0.026	0.002 (0.002)	1668	0.028	0.028	0.000 (0.003)	1508
Ratings	12.538	12.319	0.218 (0.221)	69891	12.540	12.443	0.097 (0.230)	67699
Spreads (% , no tax adj)	-0.493	-0.486	-0.007 (0.033)	117764	-0.494	-0.534	0.041 (0.034)	112170

- County level pre-trends
- Similar economic trajectory

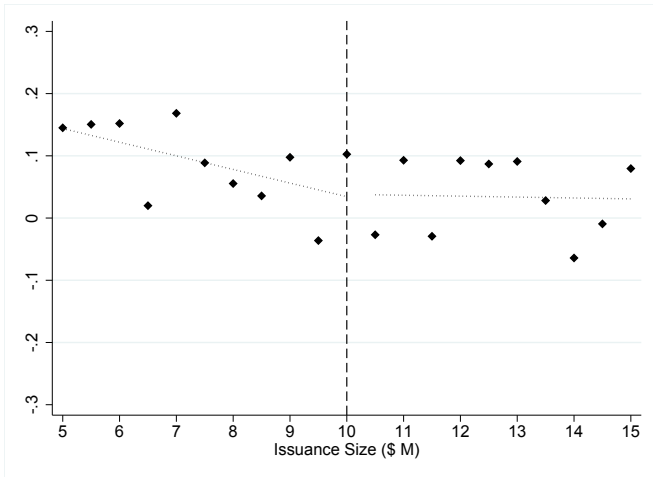
[Heatmap](#)



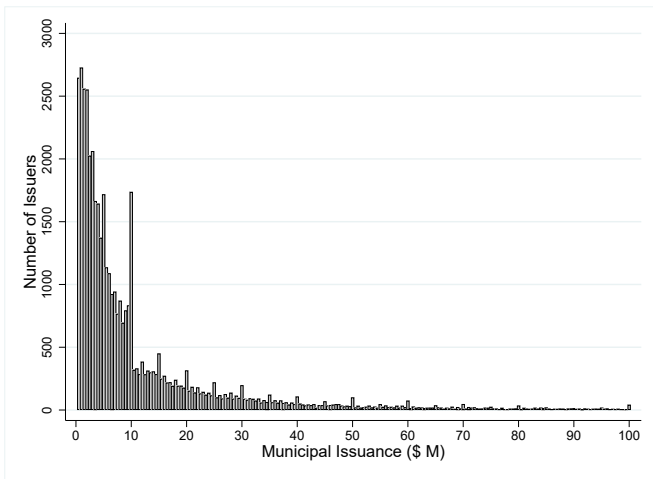
# Distribution during Regulation Change



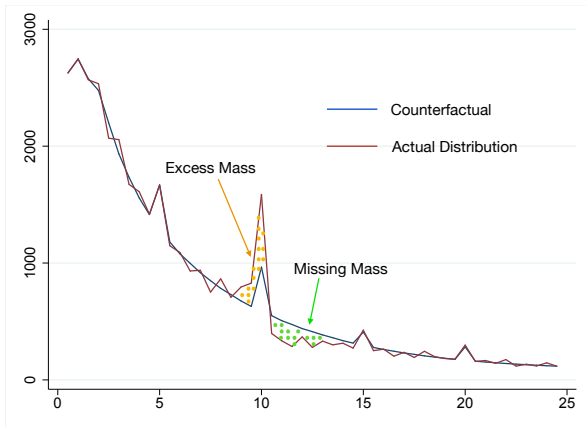
# Spreads during Regulation Change



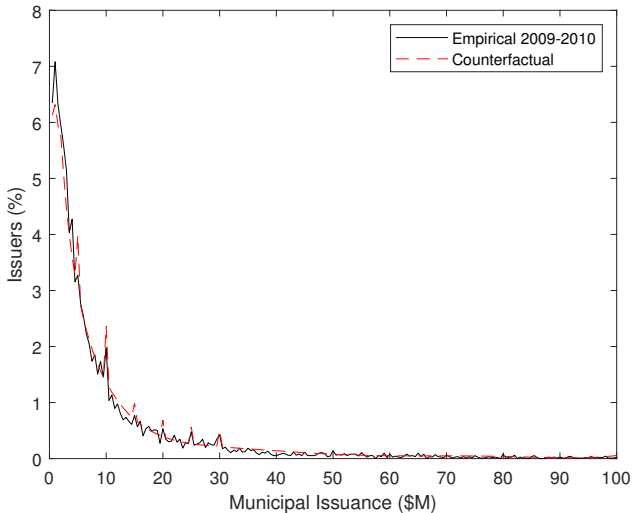
# Municipal Bonds Issuance: Pre-Reform



# Estimation



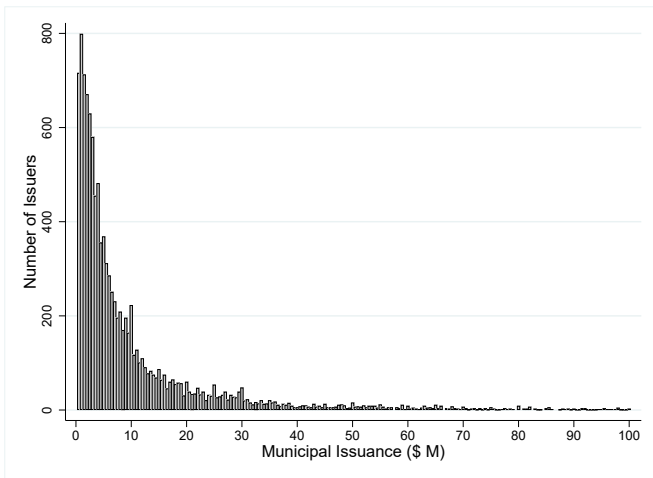
# Validate Counterfactual



- Estimated density tracks closely actual density during limit removal

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# Absence of \$10M cutoff



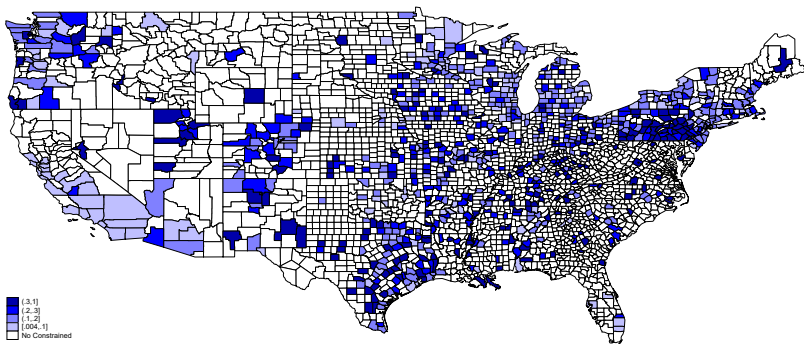
# First Stage

First Stage - Issuance (log)								
	All				Urban			
Intensity x Post	0.655** (0.279)	0.789*** (0.273)	0.700** (0.300)	0.754*** (0.291)	0.834*** (0.307)	0.955*** (0.294)	0.728** (0.323)	0.777** (0.314)
Post	0.043 (0.047)	0.043 (0.048)			0.010 (0.001)	0.012 (0.054)		
Extra Controls	No	Yes	No	Yes	No	Yes	No	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size Decile by Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R <sup>2</sup>	0.010	0.013	0.028	0.041	0.01	0.015	0.032	0.047
Observations	3,528	3,180	3,528	3,180	3,073	2,825	3,073	2,825
Counties	504	504	504	504	439	439	439	439

● 1 st.dev. ↑ *Intensity* → 7.3% bank-financed debt ↑

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# Geo Distribution of Bunching Issuers



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