

# Mutual Fund Flows and Capital Supply in Municipal Financing

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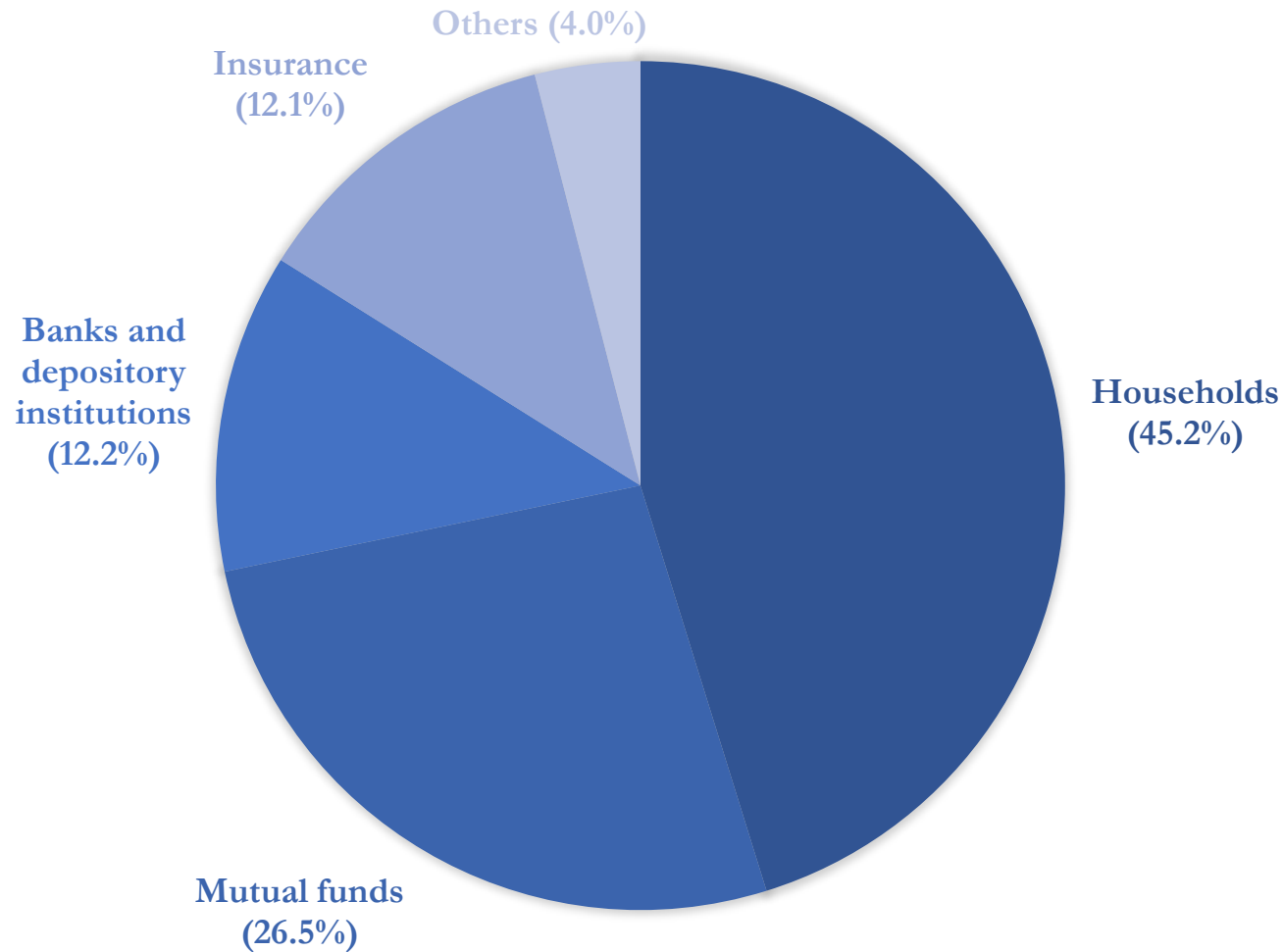
# Overview

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- Municipal bond market crucial in state and local government financing
  - Infrastructure building and maintenance, day-to-day government operation
  - 4-trillion-dollar market as of 2021
- Who are the capital suppliers in the municipal bond market
  - Individual investors
  - Mutual funds (money market funds, closed end funds, and ETFs)
  - Banks and insurance companies
- How would capital supply affect municipal financing
  - Compared to other markets (equity and corporate bonds), the supply side effect on municipal financing is not well understood
  - Important to understand its effect on local infrastructure investment

# Who Holds Municipal Bonds?

## MUNICIPAL BOND HOLDINGS AS OF 2020Q3



# Municipal Funds as Capital Supplier

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- Municipal financing is mainly through the bond market
  - Bank direct lending accounts only for a small fraction of total municipal lending (less than 10% of total municipal lending as of 2020)
- More supply of capital to funds should lead to more bond issuance
- Demand-side frictions, however, can lead to a muted response of issuance to fund flows
  - Institutional and political constraints
  - e.g., GO vs. REV bonds; voting requirements; new issuance vs. refinance

# Financing, Fund Flows, and Municipal Bond Issuance

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- Primary market is fragmented, so issuers-underwriter relationship likely to matter
  - Bond financing is technically arm's length lending, but relationship is important
  - Switching lenders is costly for issuers because relationships are sticky
- Mutual funds also maintain on-going relationships with underwriters
  - In the primary market, obtain desired allocations in initial offerings of bonds
  - Need to trade with the same underwriters who are also secondary market dealers
- Shocks to fund flows should affect relationship borrowers
- Economic channel unique to the municipal bond market
  - In stocks and bonds, noise in market prices from fire sales and purchases affects corporate financing (e.g., Edmans, Goldstein, and Jiang 2012; Zhu, 2021)
  - In municipal bonds, this feedback effect of market prices is non-existent as muni bond prices are almost unobservable (trade only a few times per year)

# What We Do

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- Examine the extent to which investor flows drive municipal bond issuance
  - Both the likelihood and size of bond issuance
  - Do issuer-underwriter-fund relationships matter in municipal bond financing?
  
- Where do fund flows end up?
  - New projects / infrastructure vs. refinancing of existing projects
  - General obligation (GO) vs. revenue bonds
  - Does voting requirement matter for GO vs. revenue decision?

# Identifying the Supply Side Effect

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- Two distinct approaches to identify the supply side effect
- Exploit mechanical changes in Morningstar overall star rating at the 5-year mark
  - Morningstar overall star rating changes when funds turn 5-years old because five-year star rating suddenly becomes available
  - Flows respond to this change in overall rating
- Exploit within-issuer variation in funds' participation in the primary market
  - Which funds participate in new bond purchase of the same issuer?
  - Use issuer-times-time fixed effects to purge out any unobservable demand side effects

# Results (1)

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- Municipalities are 5% more likely to issue bonds when fund flows increase by one standard deviation (7% of AUMs)
  - Bond issuance size also increases with fund flows
- Document a causal link between flows and issuance using our identification strategies
  - When Morningstar star ratings are upgraded because of a mechanical change in the rating for five-year-old funds, flows respond positively
  - Municipalities issue more and in larger amounts in response to this upgrade-driven fund flows, establishing a causal link



## Results (2)

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- Funds participate in bond issuance from their relationship municipal issuers
  - Obtain these results after purging out any demand-side effects, exploiting within-issuer participation in new bond purchases
- Fund flows used to finance bonds with lower administrative burden
  - Capital flows are but mostly refunding existing bonds
  - Revenue bonds more common than GO bonds (which require voter approval), particularly in states that require supermajority approval
- Overall, municipalities opt for issuances with less administrative burden and faster response time to take advantage of favorable capital supply conditions

# Data

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- Issuer information:
  - Municipal issuer information in Bloomberg
  - Geographic information + county-level macro variables (BLS/BEA)
  - Individual municipal bond issuance information (Mergent Municipal)
  
- Fund information:
  - Municipal bond fund holdings (CRSP MF), quarterly
  - Fund characteristics e.g., TNA, age, returns (CRSP MF)
  - Morningstar star rating and risk-adjusted return
  
- Final sample: 20,502 issuers and 1,010 funds between 2000Q1 and 2020Q3

# Identification Strategy: Morningstar Star Ratings

- Investors response to discrete changes in Morningstar star ratings
  - Morningstar risk-adjusted return (MRAR):

$$MRAR_{i,t}(T) = \left[ \frac{1}{T} \sum_{j=0}^{T-1} (1 + Excess\ Return_{i,t-j})^{-2} \right]^{-\frac{12}{2}} - 1$$

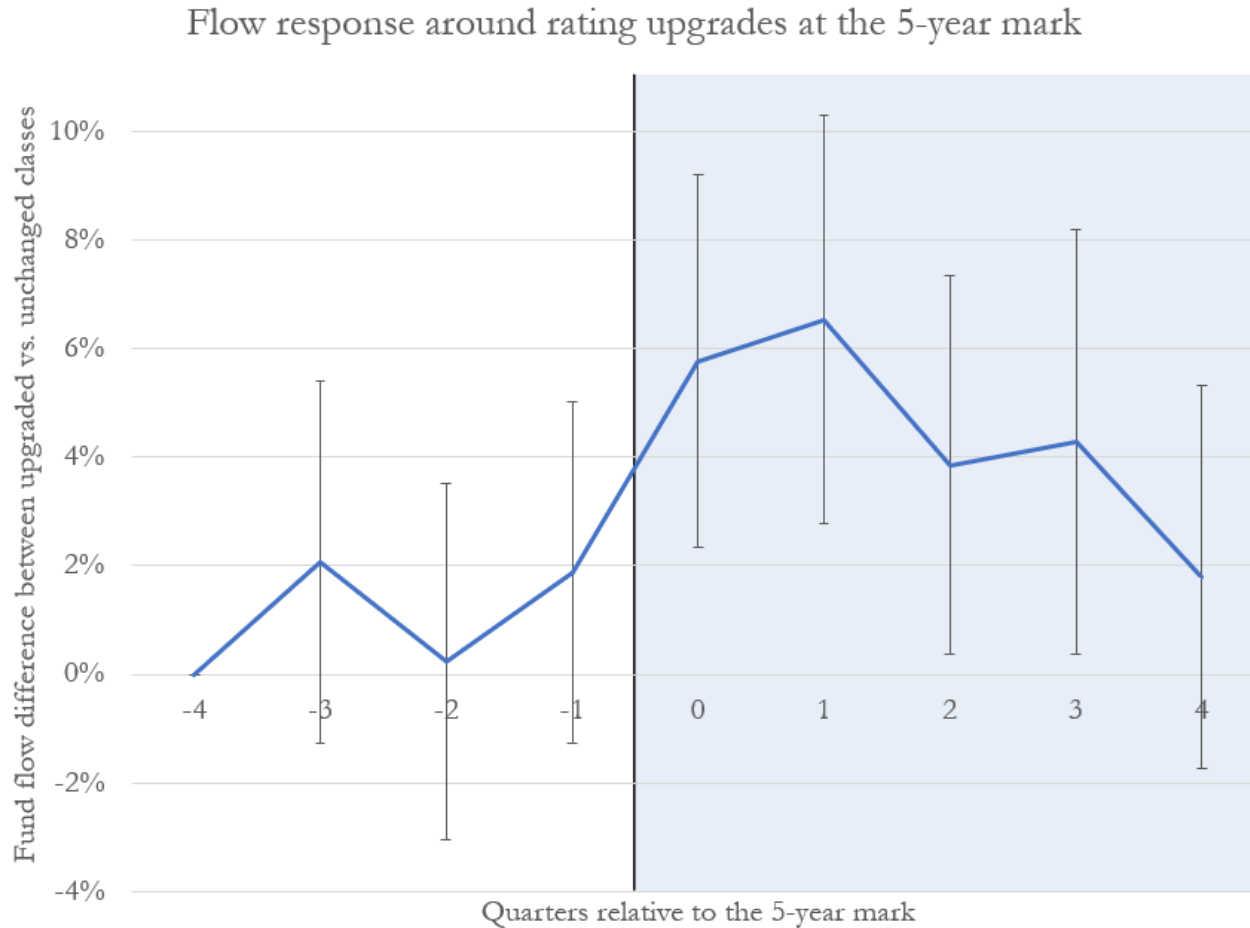
- Within-category rankings are calculated based on MRAR over past 3-, 5-, and 10-year horizons
- Top 10% awarded 5 stars, next 22.5% 4 stars, next 35% 3 stars, etc
- Overall star ratings calculated by averaging 3-, 5-, and 10-year star ratings
- Investors respond strongly to star rating change, controlling for fund performance (Ben-David et al., 2021; Evans and Sun, 2021; Reuter and Zitzewitz, 2021)

# Identification: 5-Year Rating Introduction

- Funds younger than 5 years, overall star rating = 3-year rating
- But on the 5-year mark, the 5-year rating suddenly enters
  - Overall rating now becomes a rounded integer of  $60\% \times 5\text{-year}$  +  $40\% \times 3\text{-year ratings}$
  - This 5-year rating is based on relatively “stale” information
  - Treated: 60-month-old funds that have just been upgraded
  - Control: those reaching 60 months old and remaining at the old rating
- Diff-in-diff (1): This upgrade is not driven by recent fund performance.  
Do fund flows still respond to it?
- Diff-in-diff (2): Do the municipalities held by treated funds issue more than those held by control funds?

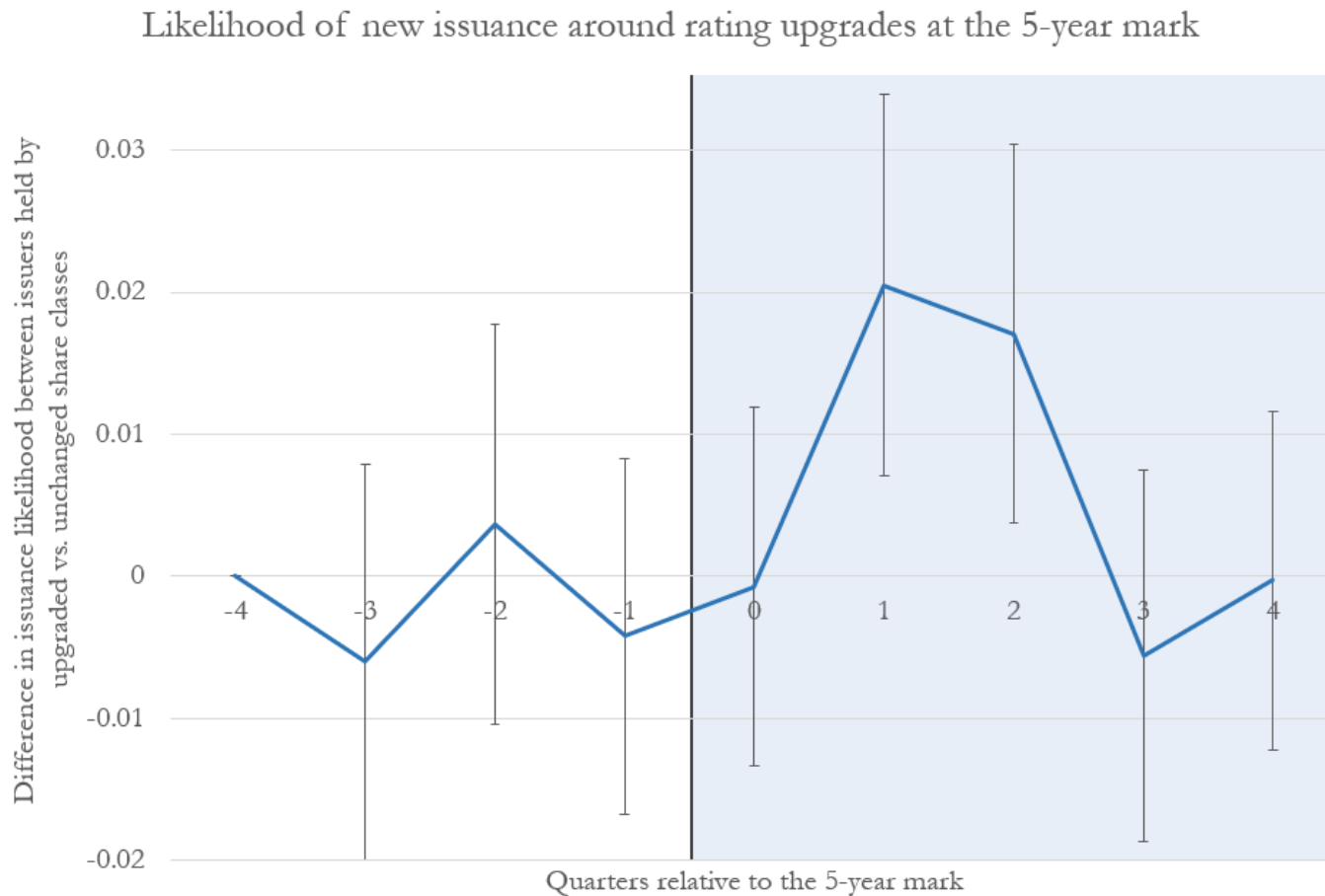
# Fund Flows at the 5-Year Mark

Difference in flows between upgraded vs. remaining funds at 5-year mark



# Bond Issuance at the 5-Year Mark

Difference in bond issuance between upgraded-held vs. remaining-held issuers at 5-year mark



# Morningstar rating changes and issuance: 5-year mark

	Dependent variable	
	(1)	(2)
	New issuance dummy	Log new issuance amount
Post 5-year	0.002 (0.335)	-0.002 (-0.021)
Treated × Post 5-year	0.013*** (2.834)	0.266*** (3.241)
MRAR	0.000 (0.292)	0.013 (0.497)
No. of observations	250,148	250,148
Adjusted R-squared	0.435	0.463
Share class FE	YES	YES
Issuer FE	YES	YES
State-by-quarter FE	YES	YES

# Fund Flow and Issuance: Role of Relationship

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- Municipal bond market is heavily fragmented
  - > 2,000 underwriters, more than double those in corporate bond market
  - “Municipal bonds are not bought but sold”: underwriters approach their established customers for potential new issuances
  - Relationship is likely to matter a lot
- Exploit within-issuer variation in fund relationship
  - Issuer-times-time fixed effects
  - Can purge out any demand-side effects on bond issuance
- We examine three different kinds of relationship
  - Fund-issuer
  - Fund-underwriter
  - Fund-underwriter-issuer



# Issuer, fund, and underwriter relationship

	Dependent variable: New issuance participation dummy		
	(1)	(2)	(3)
Relationship level	Fund-issuer	Fund-underwriter	Fund-underwriter-issuer
Fund flow	0.036***	0.030***	0.058***
× Prev. relationship dummy	(9.335)	(9.334)	(9.704)
Fund flow	0.010***	-0.001	0.008***
× No prev. relationship dummy	(7.292)	(-0.944)	(6.354)
No. of observations	15,856,904	15,856,904	15,856,904
Adjusted R-squared	0.398	0.398	0.398
Issuer-by-quarter FE	YES	YES	YES
Share class FE	NO	NO	NO

- Similar patterns hold in our identification settings

# Method of Offering

- These relationships should matter more when an issuer approaches the underwriter for negotiated sale rather than call for competitive auction bids

	Dependent variable: New issuance dummy	
	(1)	(2)
	At least one competitive bids	Negotiated sales (no competitive bids)
Rating upgrade at 5-year × Post 5-year	0.004* (1.884)	0.009* (1.870)
No. of observations	250,148	250,148
Adjusted R-squared	0.358	0.419
Issuer FE	YES	YES
Share class FE	YES	YES
State-by-quarter FE	YES	YES

- Economic significance more than doubles for negotiated sales

# Source of Repayment and Capital Purpose

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- When capital supply increases, which bonds do municipalities issue?
- General obligation (GO) vs. non-GO bonds
  - GO bonds are backed by tax-payers' money and costlier to issue because voter approval is usually required at the ballot box
  - Particularly difficult in states that require supermajority approval
  - Non-GO bonds are easier and quicker to issuer without requiring voter approval
- New filing vs. refinancing bonds
  - New filings are issued for new projects
  - Refinancing bonds replace existing bonds and are easier to issue with lower transaction costs

# Source of Repayment and Capital Purpose

	Dependent variable: New issuance dummy			
	(1)	(2)	(1)	(2)
	At least one GO issuance	No GO issuance	New filing issuance only	Refunding issuance only
Rating upgrade at 5-year × Post 5-year	0.003 (1.607)	0.010** (2.513)	0.004 (1.036)	0.009** (2.225)
No. of observations	250,148	250,148	250,148	250,148
Adjusted R-squared	0.358	0.419	0.261	0.316
Issuer FE	YES	YES	YES	YES
Share class FE	YES	YES	YES	YES
State-by-quarter FE	YES	YES	YES	YES

# Political Obstacles and GO vs. Rev Bond Issuance

	Dependent variable: New issuance dummy			
	Supermajority states		No supermajority states	
	(1)	(2)	(1)	(2)
	At least one GO issuance	No GO issuance	At least one GO issuance	No GO issuance
Rating upgrade at 5-year × Post 5-year	0.004 (0.652)	0.034*** (3.468)	0.003 (1.643)	0.007* (1.745)
No. of observations	37,086	37,086	212,063	212,063
Adjusted R-squared	0.293	0.329	0.370	0.400
Issuer FE	YES	YES	YES	YES
Share class FE	YES	YES	YES	YES
State-by-quarter FE	YES	YES	YES	YES

- The difference in GO vs. revenue issuance likelihood is much more pronounced in states that require supermajority approval for GO bond issuance

# Conclusion

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- Capital flows from bond funds play an important role in municipal bond financing
- We show a causal effect of fund flows on bond issuance using
  - Quasi-natural experiments based on Morningstar rating introduction and
  - Relationship through underwriters is the channel through which shocks to fund flows affect municipal financing
- Evidence suggests that capital inflows do not finance new investments
  - Municipalities use the funds on refinancing of existing projects
  - Easy-to-issue bonds (e.g., revenue bonds)
  - Fiscal policymakers should be aware of this implication of capital supply shock