

## Pushing bonds over the edge: Investor demand and municipal bond liquidity

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\*The views stated herein are those of the authors and are not necessarily the views of the Federal Reserve Bank of Chicago, the Federal Reserve Board, or the Federal Reserve System.

# De minimis risk and illiquidity

- SVB's and First Republic's muni bond portfolios:
  - *"Those bonds are very difficult to sell [because] the holdings consist of structure, not credit risk, which likely will require deep concessions given liquidity and U.S. de minimus tax risk" (Bond Buyer May 1, 2023)*
- This paper:
  - Document that de minimis risk leads to illiquidity
  - Mechanism: Main institutional investors withdraw from the market

# De minimis risk and illiquidity

- De minimis threshold (DT):
  - Bonds purchased below the DT generate ordinary income
- Why is the DT a risk for investors?
  - Muni bond investors are highly tax sensitive
  - Individual investors typically in the highest income tax brackets
  - Muni mutual funds typically cannot incur tax liability
- We study the price and liquidity dynamics around the DT:
  - Secondary market activity, liquidity, and transaction costs
  - Institutional investor dynamics around the DT

# Main results: The path to segmentation and illiquidity

- Trading dynamics around de minimis:
  - Trading plummets below the DT
  - Trading volume and trade size drop close to the DT
  - Sales timing depends on interest-rate sensitivity
  - Trading costs spike for all trade sizes below the DT
- Institutional investor dynamics around the DT:
  - Mutual funds exit bonds at de minimis risk well above the DT
  - Funds sell their entire positions before the DT
  - Other investors show similar pattern in anticipation of low liquidity
- Monetary policy tightening amplifies de minimis risk

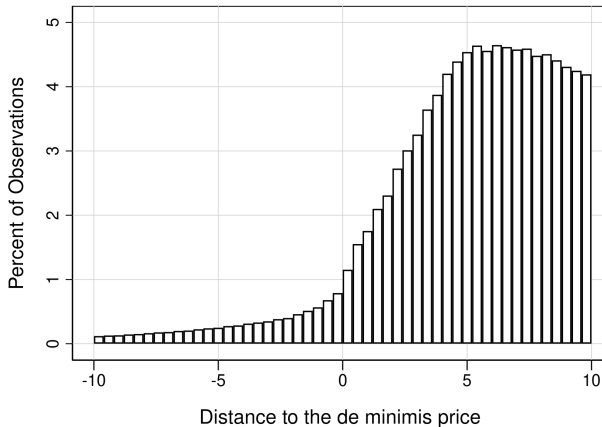
## Taxation: The de minimis threshold

- No income taxes on interest income from tax-exempt bonds
- DT: Adjusted offering price – ( $25bp \times$  remaining years)
- 10-year bond, issued at par (100), 5 years to maturity:
  - $DT = 100 - 5 \times 0.25 = 98.75$
  - Purchase price  $\geq 100 \implies$  no taxes
  - $98.75 \leq$  Purchase price  $< 100 \implies$  capital gains taxes
  - Purchase price  $< 98.75 \implies$  ordinary income taxes
- Discount bonds: Computation more complicated
  - Need to compute the adjusted offering price in each period

# Data

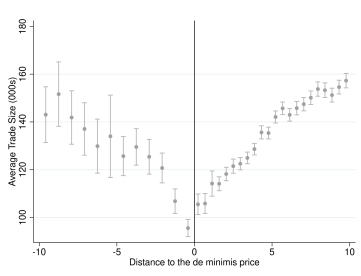
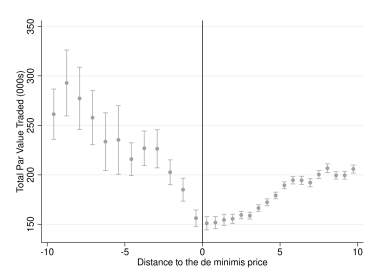
- Sample period: 2010-2022. 25million CUSIP-week observations
- Data sources: MSRB, eMAXX
- Compare trading activity in a close vicinity around the DT:
  - ES estimators of Calonico, Cattaneo, and Titiunik (2015)
  - Partition data into evenly-spaced bins.
  - Optimal bin selection, estimate local means within bins.
- Main variables:
  - Distance to de minimis price in percentage points of par value
  - Trading incidence, volume, avg. trade size & markups

## Trading activity declines sharply below DT



- Trading a lot less frequent below the cutoff
- Bonds with low duration trade more frequently closer to the DT

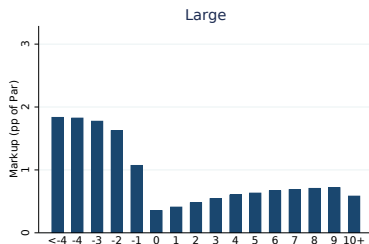
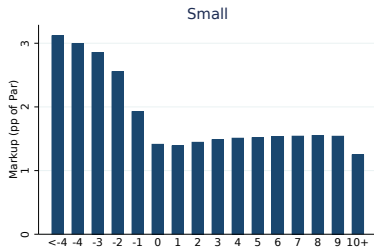
# Drop in trading volume and trade size approaching the DT



- Total volume and average trade size are low around DT

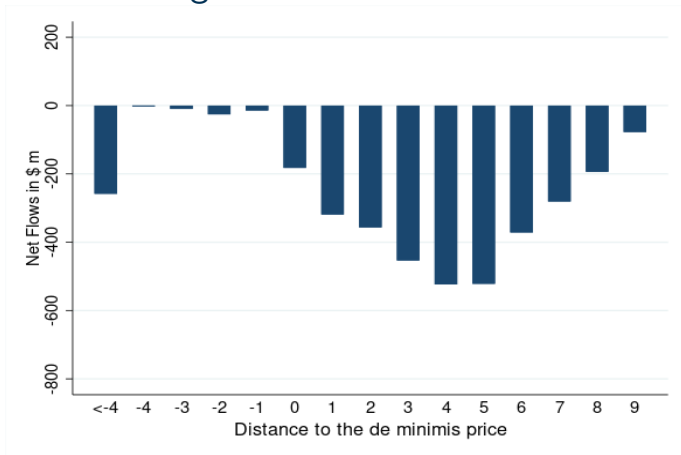


# Trading costs increase for all trades



- Compute markups following Li and Schürhoff (2019)
- Threefold increase in markups for both small and large trades

## Mutual funds are significant net sellers above the threshold



- Timing of selling depends on interest rate sensitivity
- Other investors behave in a similar way

Duration

Other investors

## Institutional sales translate to higher trading costs

Sample	(1)	(2)	(3)	(4)	(5)	(6)
	Small		Medium		Large	
	Full	High	Full	High	Full	High
Sales × Distance<-1	0.126*** (0.046)	0.113** (0.050)	0.097** (0.042)	0.100** (0.044)	0.058 (0.058)	0.077 (0.059)
Sales × Distance=-1	0.024 (0.087)	0.017 (0.091)	0.133* (0.076)	0.168** (0.078)	-0.016 (0.098)	-0.037 (0.108)
Sales × Distance=+1	-0.024 (0.052)	-0.034 (0.069)	0.122** (0.056)	0.156** (0.071)	-0.046 (0.053)	-0.093 (0.088)
N	959,695	818,825	906,922	686,106	355,804	221,610
R-squared	0.537	0.498	0.651	0.590	0.680	0.648
Bond FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
Rem Maturity FE	Y	Y	Y	Y	Y	Y

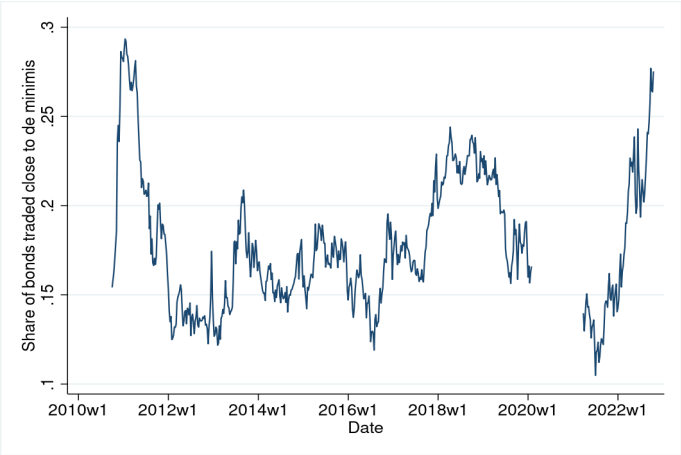
- Institutional sales → 10-17 bps higher markups
- Markups similar for large trades

## Trading costs increase the most for illiquid bonds

	(1)	(2)	(3)	(4)	(5)	(6)
	Small trades		Mid-sized trades		Large trades	
	Full	High	Full	High	Full	High
Low $\times$ Distance<-1	0.022 (0.021)	0.020 (0.022)	0.102*** (0.025)	0.100*** (0.026)	0.124** (0.049)	0.115** (0.050)
Low $\times$ Distance=-1	0.014 (0.032)	0.004 (0.034)	0.110*** (0.041)	0.105** (0.043)	0.042 (0.075)	0.008 (0.081)
Low $\times$ Distance=+1	-0.008 (0.023)	0.006 (0.030)	0.057** (0.025)	0.112*** (0.037)	0.000 (0.033)	-0.005 (0.063)
N	655,759	558,719	642,165	486,240	266,418	174,755
R-squared	0.571	0.545	0.676	0.628	0.705	0.676
Bond FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
Rem Maturity FE	Y	Y	Y	Y	Y	Y

- Low turnover  $\rightarrow$  10-12 bps higher markups
- Liquidity vs. high implicit tax rates (Ang, Bhansali, and Xing 2010)

# Monetary policy amplifies de minimis risk



# Conclusion

- DT has significant impact on secondary market trading
- Bonds become illiquid and trading becomes more costly below DT
- Institutional investors avoid DT because of illiquidity and trading costs
- Anecdotes point to small banks and hedge funds purchasing bonds

# References

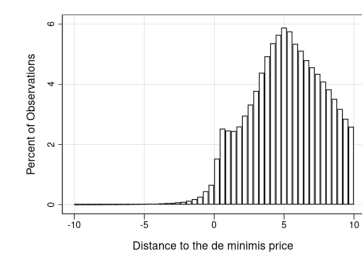
- Ang, Andrew, Vineer Bhansali, and Yuhang Xing, 2010, Taxes on tax-exempt bonds, *Journal of Finance* 65, 565–601.
- Calonico, Sebastian, Matias D Cattaneo, and Rocio Titiunik, 2015, Optimal data-driven regression discontinuity plots, *Journal of the American Statistical Association* 110, 1753–1769.
- Li, Dan, and Norman Schürhoff, 2019, Dealer networks, *Journal of Finance* 74, 91–144.

Additional Slides

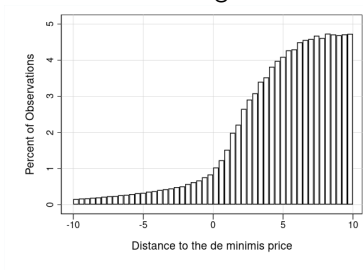


# Trading patterns depend on interest rate sensitivity

Low Duration



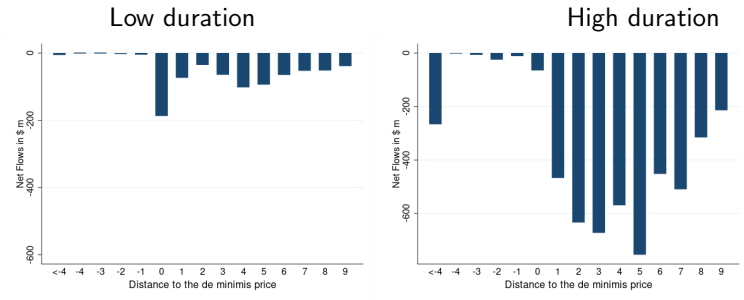
High Duration



- Trading in interest rate-sensitive occurs over a wider price range

Return

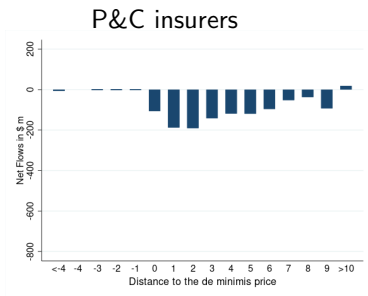
# Funds' sale timing depends on interest rate sensitivity



- Net Sales in low-duration bonds happen immediately above DT
- Net selling in high-duration bonds happens further away from the DT

Return

# Other institutional investors



- Selling pattern is similar to mutual funds
- Selling is driven by expected illiquidity and transaction costs

Return