Do Exchange-Traded Funds Improve Municipal Market Quality?

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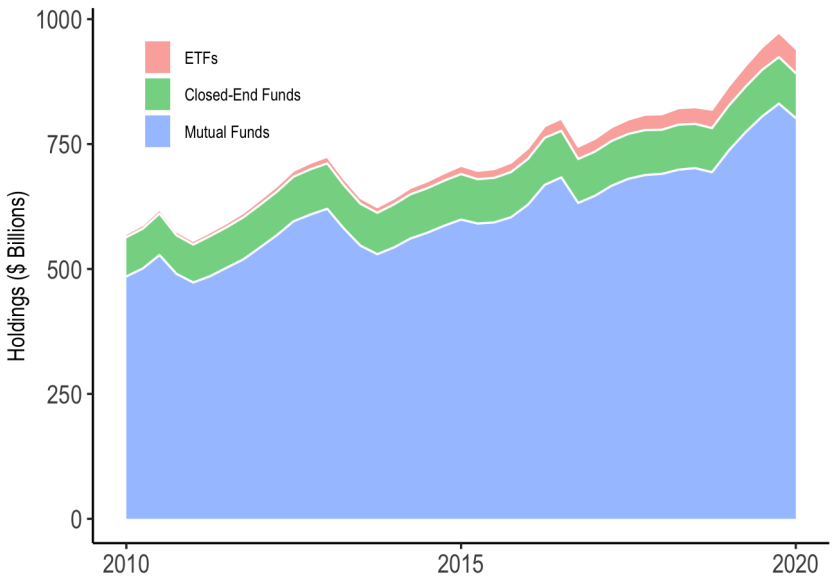
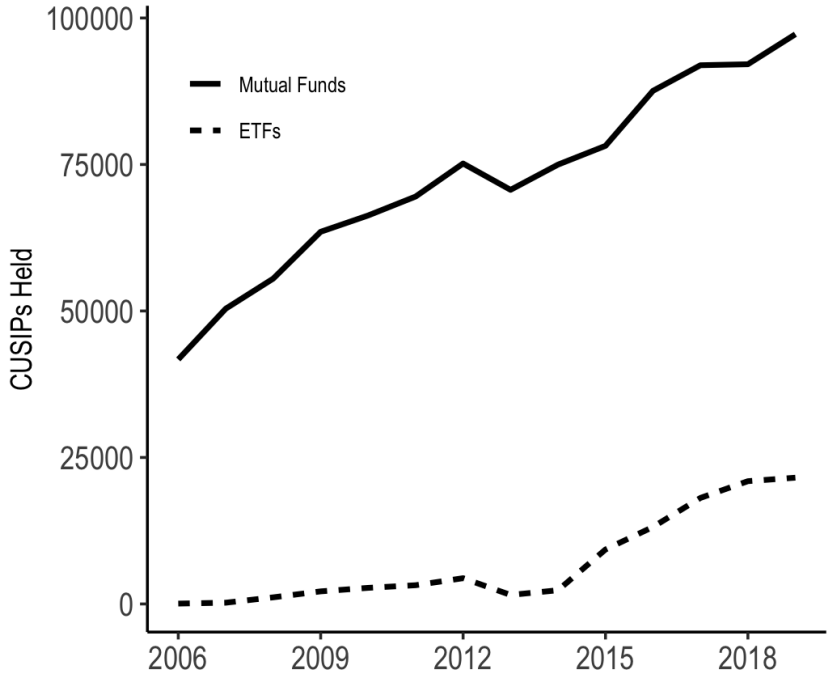
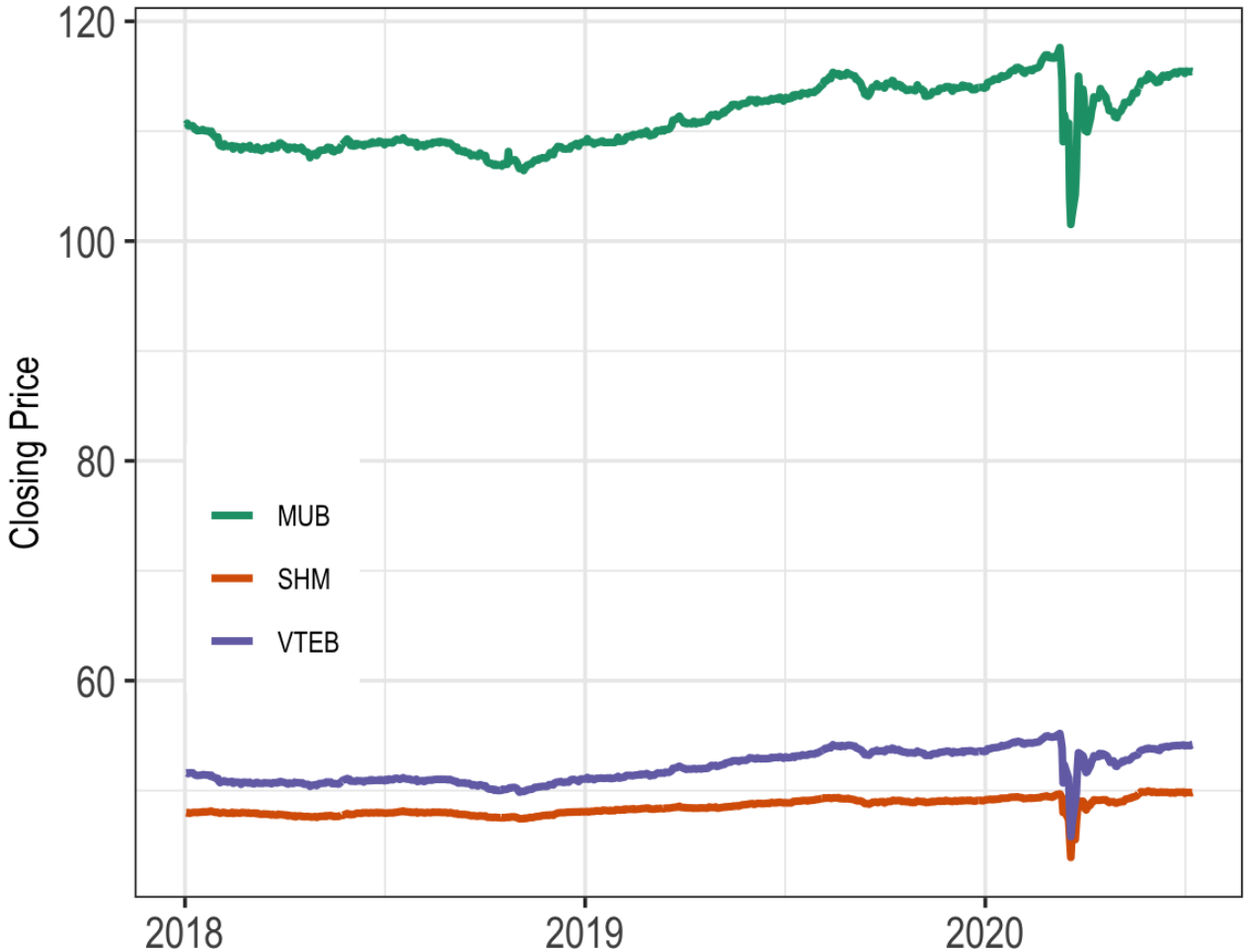
ETFs - A Growing Presence in the Muni Market





The ETF "Liquidity Mismatch"



Overview

The question: **Do exchange-traded funds (ETFs) improve municipal market quality?**

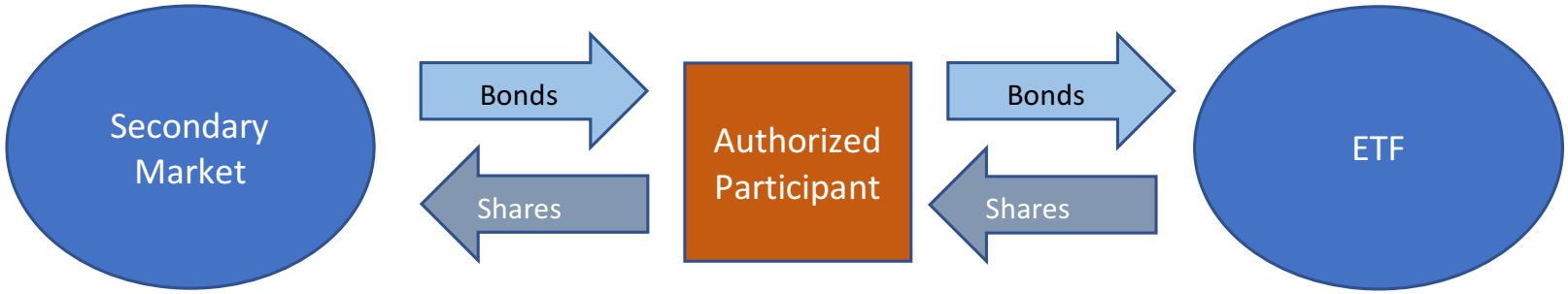
Specifically, are municipal bonds ("munis") held by muni ETFs: 1) More liquid? 2) Do they trade at lower price impact to trading? and 3) Do they exhibit more systematic risk?

Empirical setting: Muni holdings of 51 ETFs and 628 mutual funds from 2010 Q1 through 2020 Q1. Dataset includes more than 3 million secondary market trades in nearly 40,000 individual CUSIPs.

Main Finding: At best, munis held by ETFs are generally more liquid than munis held by mutual funds. This is especially true for lower-rated bonds. At worst, munis held by ETFs are no less liquid than munis held by mutual funds.

ETF Mechanics

When the ETF is Trading Above its Net Asset Value



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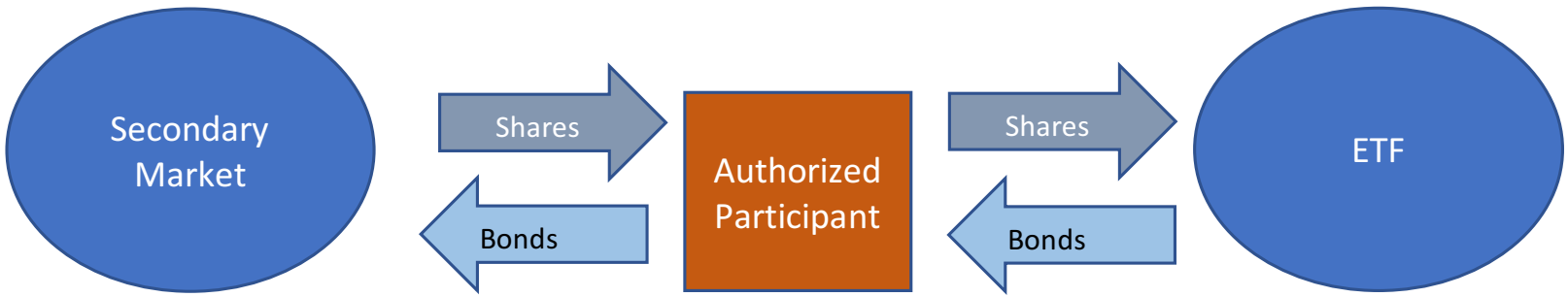


Two Perspectives on ETFs and Bond Liquidity

ETFs improve liquidity because:

- The arbitrage mechanism encourages trading
- APs expedite price discovery on behalf of all investors (Bhattacharya and O'Hara 2018; Tucker and Laipply 2013)
- Less-informed traders can tap into ETFs' liquidity flow

ETFs inhibit liquidity because:

- Sponsors and APs both take indexed bonds "out of circulation"
- They take uninformed traders out of the cash market, leaving behind informed traders who are less likely to trade with each other (Ben-David, et. al. 2017; Dannhauser 2017)
- APs tend to withdraw from ETF arbitrage when their balance sheets are constrained (Pan and Zeng 2019)

Data and Sample Selection

Data sources:

- Refinitiv - ETF (51) and mutual fund (628) muni holdings from 2010-2020; includes 39,553 individual CUSIPs from 2,895 issuers
- MSRB - All secondary market sales to customers in munis held by an ETF at any time from 2010-2020 (total of 9,540,963 trades)
- Mergent - Bond characteristics including rating, years to maturity, par value, etc.

Key explanatory variable: ETF holdings of a bond as a % of its par value (mean = 5.198%; SD = 8.450%)

For comparison, all model specifications also include mutual fund holdings of a bond as a % of its par value (mean = 22.297%; SD = 63.170%)

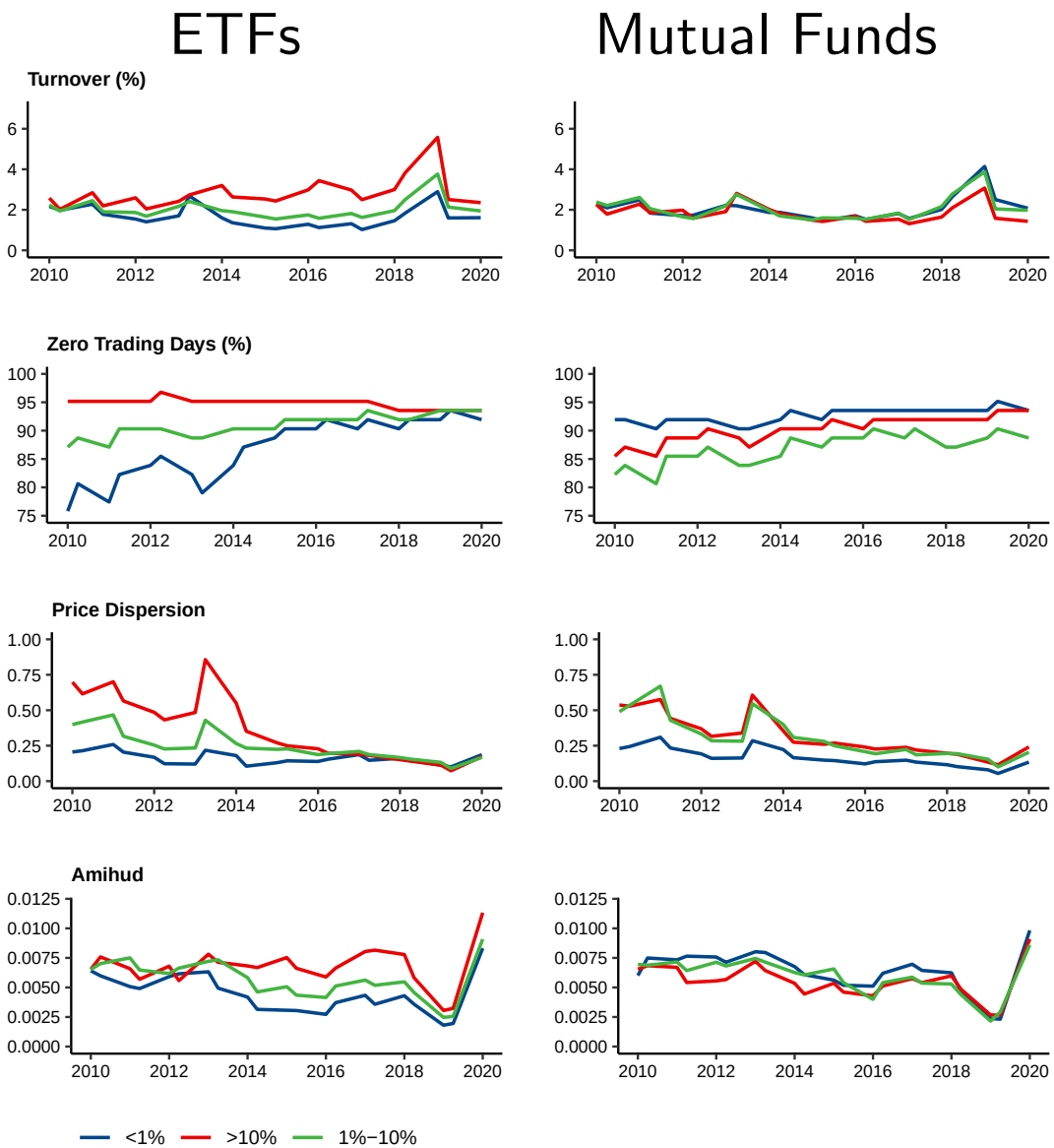
Holdings measures computed for each fund on the last day of each quarter

Measurement Framework for Liquidity

I employ four proxy measures for liquidity:

1. *Turnover*, computed as total trading volume in a bond as a % of par value (more turnover = more liquidity)
2. *Zero Trading Days*, computed as % of days in a quarter that the bond does not trade (more ZTD = less liquidity)
3. *Price Dispersion*, computed as the difference between maximum and minimum weekly prices (more dispersion = less liquidity)
4. *Amihud* (2002) measure of price impact of trading, computed as daily returns as a percent of trade volume (more impact = less liquidity)

Liquidity Measures Over Time



Estimation Strategy

Regress one of the liquidity proxies on ETF and mutual fund holdings, according to one of several different specifications. The main specification of interest is:

$$\text{Liqudity} = \alpha + \beta_1 \text{ETF Holdings}_{t-1} + \beta_2 \text{Mutual Fund Holdings}_{t-1} + \gamma + \epsilon$$

where γ is a vector of control variables including: coupon, years to maturity, bond par value, issue par value, callable, insured, and rating categories

All specifications include fixed effects on the quarter, the state where the issuer is located, and the bond's security pledge

Base Model Results

	Model II		Model IV	
	ETF_t	Mutual $Fund_t$	ETF_{t-1}	Mutual $Fund_{t-1}$
Turnover	0.4920	0.0870	0.1630	0.0790
Zero Trading Days	0.0290	0.0170	0.0410	0.0170
Price Dispersion	-0.0001	-0.0003	-0.0001	-0.0003
Amihud	-0.0002	<-0.0001	-0.0002	<-0.0001

Practically speaking, this means:

- An eight percent increase in ETF ownership of a muni increases turnover by about four percent; mean turnover is 10%.
- If ETF ownership increases from 5% to 22% - i.e. a two standard deviation increase above the mean - Amihud decreases by 34 basis points, or about a 20% off the mean
- Results on zero trading days and price dispersion are are not economically meaningful.

Highlights from Sub-Sample Analysis

- Effects on turnover for BBB and <BBB-rated bonds are three to four times stronger
- During the COVID-19 crisis, the coefficients on turnover shrink considerably and become equivalent mutual funds
- Price impacts to trading are not related to market conditions
- ETF ownership does not appear to induce greater systematic risk

Conclusions, Implications, and Next Steps

These results do not ameliorate concerns about the "liquidity mismatch." However, they do suggest that ETFs could amplify that mismatch for certain types of bonds in particular market circumstances.

Next steps:

- Do ETFs lead to more issuer-specific information - especially financial disclosures - impounded in prices and returns?
- Does liquidity vary by the type of ETF - active vs. passive, longer vs. shorter duration, high-yield vs. broadly diversified, etc.?
- How does the ETF share creation/redemption process affect intra-day price volatility?