



Municipal Securities Rulemaking Board

MARCH 2026

Trading Volume and Transaction Costs for Municipal Bond ETFs

Source: MSRB analysis with data obtained from Rule 605 monthly disclosure.

Table 4 illustrates the aggregate average effective spread for all municipal bond ETFs by the four order size buckets: 100–499 shares, 500–1,999 shares, 2,000–4,999 shares and 5,000 shares or more. In addition to order size, Rule 605 data also provide the average effective spread for both market orders and marketable limit orders, which are priced orders with their limit prices at the NBBO quotes or worse than the NBBO quotes and are therefore immediately executable. For both market orders and marketable limit orders, only municipal bond ETFs that had traded 34 ETFs for market orders and 124 ETFs for marketable limit orders. Larger order sizes receive a higher effective market but similar to most stocks, for market orders, municipal bond ETFs that had traded ranging from less than \$0.006 for order sizes between 100 and 499 shares to a higher effective market more liquidity than smaller-sized market orders, resulting in higher effective order size buckets, hovering around \$0.05 for all four size buckets. In the other hand, marketable limit orders' effective spreads do not vary significantly across order size buckets, with the maximum effective spread bound to be around \$0.01. The disparity is attributed to the fact that larger order sizes receive a higher effective market but similar to most stocks, for market orders, municipal bond ETFs that had traded ranging from less than \$0.006 for order sizes between 100 and 499 shares to a higher effective market more liquidity than smaller-sized market orders, resulting in higher effective order size buckets, hovering around \$0.05 for all four size buckets. In the other hand, marketable limit orders' effective spreads do not vary significantly across order size buckets, with the maximum effective spread bound to be around \$0.01.²³

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Introduction¹

Municipal bond exchange-traded fund (ETF)² products have experienced extraordinary growth in the past two decades. Municipal bond ETF assets have increased at a rate of 37.9% annually between December 2007 and December 2025,³ as compared to 4.6% for municipal bond mutual funds and only about 1.2% annually for the entire municipal securities market. Increasingly, investors and market participants are incorporating municipal bond ETFs into their investment and trading portfolios to supplement their comparable transactions and holdings of individual municipal securities.⁴ As the municipal bond ETF market continues to grow and mature relative to municipal bond mutual funds, especially since 2022,⁵ there is an ongoing interest in monitoring their secondary market trading activities to get a full picture of the municipal securities market. While ETFs trade independently, they are intrinsically related to the underlying securities. This report offers two measures to assess secondary market trading for the municipal bond ETF market: 1) daily trading volume measured in dollar amount and 2) transaction costs as measured by effective spread.

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- ¹ The views expressed in the working papers are those of the author(s) and do not necessarily reflect the views and positions of the MSRB.
- ² For a detailed description of ETFs, please refer to Antoniewicz, Rochelle and Jane Heinrichs, "Understanding Exchange-Traded Funds: How ETFs work," Investment Company Institute (ICI) Research Perspective, Vol. 20, No. 5, September 2014; Wu, Simon and Meghan Burns, "Municipal Bond ETFs: Liquidity Impact on Municipal Bond Market," Research Paper, Municipal Securities Rulemaking Board, April 2018; and Wu, Simon and Nicholas Ostroy, "Liquidity Impact of Municipal Bond ETFs on Municipal Securities Market: An Updated Analysis," Research Paper, Municipal Securities Rulemaking Board, November 2025.
- ³ Based on the data from Investment Company Institute (ICI). For the most up-to-date figures about the fund industry, please visit www.ici.org/research/statistics.
- ⁴ In addition, although price discovery is not the focus of this report, the consensus is that fixed-income ETFs have altered the bond investment universe by providing intra-day real-time pricing previously unavailable from major bond indices.
- ⁵ Municipal bond mutual fund assets made up nearly 24% of all municipal debt outstanding in 2021 before declining to around 19% between 2022 and 2025.

Daily trading volume is frequently used as an indicator for market activities and conditions. This is because volume usually surges during a market stress period, such as the volatile months of March 2020 and April 2025.⁶ For municipal bond ETFs, trading volume can be measured in number of trades and/or number of shares. However, number of trades would be susceptible to average trade size fluctuations while number of shares would not account for the price-per-share difference. Therefore, these two features are deemed less adequate for this study. Instead, this report uses the dollar value of all trades, or the dollar volume, to measure trading volume. In addition, effective spread is considered a proxy measurement of market liquidity as well as market conditions in the equity market. Unlike fixed-income markets, the equity market, which includes ETFs, disseminates a consolidated national best bid-and-offer (NBBO) quote that is accessible and executable by all investors and market participants.⁷ As a result, there is less information asymmetry in the marketplace. The effective spread for municipal bond ETFs (as well as for other stocks and ETFs) therefore represents the liquidity premium and the volatility premium.⁸ Regardless, a good indicator of the municipal bond ETF market should discern unusual market conditions during a market stress period, such as April 2025. This report utilizes dollar volume and effective spread as a means to understand and monitor the behavior of municipal bond ETFs and their relationship to the municipal bond marketplace overall.

⁶ See Kahn, R. Jay & Nguyen, Vy, "Treasury Market Stress: Lessons from 1958 and Today," OFR Brief 22-01 (2022), Office of Financial Research, U.S. Department of the Treasury, <https://tinyurl.com/yc62s7xj>. Also see Wu, Simon, "Trading in Municipal Bond ETFs During the COVID-19 Crisis: Price versus Net Asset Value," MSRB Market Commentary, April 2020; and Wu, Simon and Nicholas Ostroy, "Performance of Municipal Bond Exchange-Traded Funds During April 2025," MSRB Research Paper, July 2025.

⁷ The adoption of SEC Regulation NMS in 2005 created a redesigned national market system for equities that provides regulatory structure for a consolidated and publicly disseminated best bid and offer. See 70 FR 37496 (June 29, 2005).

⁸ But not the information opacity premium as exists in other securities markets.

Data and Methodology

Rule 605 Data

One of the goals of this paper is to demonstrate the application of Securities and Exchange Commission (SEC) Rule 605 data for an analysis of municipal bond ETFs transaction costs. Under Rule 605, the SEC requires all registered market centers⁹ that trade national market system securities to make monthly electronic reports available to the public, including information about each market center's quality of executions on a stock-by-stock basis.¹⁰ When these reports are combined across market centers, we can get a fuller picture of the market.¹¹

This report uses Rule 605 monthly disclosure data for the following market centers which include the ten largest exchanges:¹² the New York Stock Exchange (NYSE), NYSE ARCA, the Nasdaq Stock Market, Chicago Board of Options Exchange (CBOE), BZX Exchange (formerly BAT Exchange), CBOE EDGX Exchange (formerly Direct Edge), Investors Exchange, MIAX Pearl Equities and Member Exchange (MEMX), as well as seven alternative trading systems (ATS). Please see the list of market centers used in this paper in Appendix A. Rule 605 data include municipal bond ETF market orders and marketable limit orders of various sizes that are executed relative to the public quotes, also known as effective spreads. Effective spreads represent the total cost an investor pays to have the market and marketable limit orders executed after being routed to a particular market center. Specifically, for all market centers, the average share-weighted monthly effective spread for each stock's or ETF's order executions are calculated by comparing the execution price of an order with the midpoint of the consolidated National Best Bid-and-Offer (NBBO) at the time of order receipt. This value is then doubled to capture the whole bid-offer spread. Unlike the bid-ask quoted spread, effective spread measures the actual spread when a trade is executed, as opposed to a spread before a trade is consummated.

⁹ Exchanges, OTC market makers, and alternative trading systems. In addition to its own order flows, market centers are required to report under Rule 605 on commitments to trade received pursuant to the Intermarket Trading System (ITS) Plan procedures. If a market center's handling of ITS commitments to trade differs materially from its handling of orders received through other mechanisms, it would be permissible to report on ITS activity as a separate market center.

¹⁰ Rule 605 data only include "covered" shares, which do not capture the entirety of the equity market (70 FR 37496). Hatheway, Frank, Amy Kwan, and Hui Zheng. "An Empirical Analysis of Market Segmentation on U.S. Equity Markets." *The Journal of Financial and Quantitative Analysis* 52, no. 6 (2017): 2399–2427. <https://www.jstor.org/stable/26590485>. The authors illustrate that based on covered shares alone, Rule 605 data captured only 43% of the total shares executed for Apple (APPL) in March 2011.

¹¹ It is the authors' understanding that Rule 605 Data has not been applied to a study of municipal bond ETFs before. The authors hope that this illustration demonstrates the application of Rule 605 data in an effort to better understand the municipal bond market.

¹² Based on the total reported volume (shares, trades and dollar value) for exchanges and ATS platforms by CBOE and FINRA.

For the purpose of this paper, all the analyses focused on the most recent period from January 2023 through December 2025 (Relevant Period).¹³

Other Data Sources

Aside from Rule 650 data on effective spreads, MSRB's Real-Time Transaction Report System (RTRS) database is used to calculate trading volume for municipal securities. In addition, net asset value (NAV) data for fixed-income ETFs and mutual funds are provided by the Investment Company Institute (ICI), supplemented by SEC's Form N-Port data for investment funds. Furthermore, total municipal debt outstanding data are sourced from the Federal Reserve's Financial Accounts of the United States, while data for a specific municipal bond ETF's daily trading volume and closing prices are downloaded from Nasdaq.com. Finally, the list of municipal bond ETFs as well as each ETF's total amount outstanding are obtained from etf.com and etfdb.com. There is a total of 164 municipal bond ETFs as of December 31, 2025 (Appendix B).

Commercial paper is typically not included in municipal bond ETFs, therefore it is excluded from the trading volume calculation for the analysis of the municipal securities market in the next section. Conversely, some municipal bond ETFs invest in both fixed-rate and variable-rate securities; therefore, variable-rate securities are included in the trading volume calculation. Finally, when necessary, the paper also highlights the three most actively traded municipal bond ETFs as seen in Table 1.

Table 1. Most-Actively Traded Municipal Bond ETFs

Issuer	ETF Name	Symbol	Index
iShares	National Muni Bond ETF ¹⁴	MUB	ICE AMT-Free US National Municipal Index ("ICE AMT-Free")
Vanguard	Tax-Exempt Bond Index Fund ETF ¹⁵	VTEB	S&P National AMT-Free Municipal Bond Index ("S&P AMT-Free")
iShares	Short-Term National Muni Bond ETF ¹⁶	SUB	ICE Short Maturity AMT-Free US National Municipal Index

¹³ While it will not impact this study, the SEC amended Rule 605 so that starting from August 1, 2026, the report will expand the scope of entities subject to Rule 605, modify the categorization and content of order information required to be reported under the rule, and require reporting entities to produce a summary report of execution quality. For a detailed description of the amendments, please refer to [Final Rule \(34-99679\)](#) and 90 FR 47552.

¹⁴ See <https://www.ishares.com/us/products/239766/ishares-national-amtfree-muni-bond-etf>.

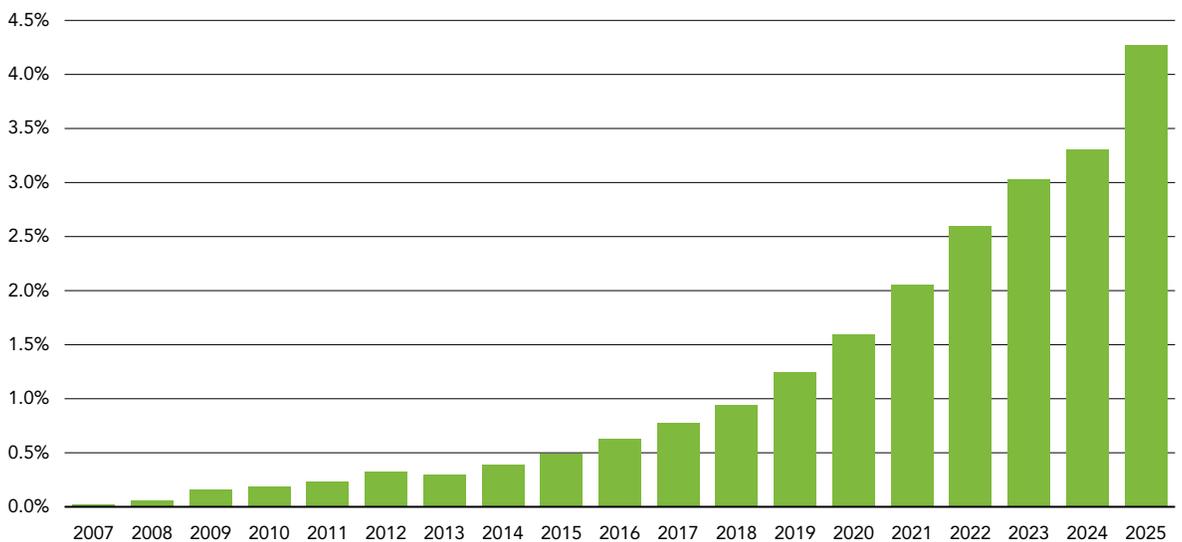
¹⁵ The daily net asset value of an index is determined by the weighted average of the evaluated price of each individual bond in the index. See <https://www.spglobal.com/spdji/en/indices/fixed-income/sp-national-amt-free-municipal-bond-index/#overview>.

¹⁶ <https://www.ishares.com/us/products/239772/>.

Growth of Municipal Bond ETFs

Chart 1 shows the proportion of municipal bond ETF net assets relative to total municipal securities outstanding. Municipal bond ETF net assets, while still a fraction of the overall municipal securities market, have grown impressively over the last decade. Even though ETF net assets represented only 4.3% of total municipal securities outstanding as of the end of 2025,¹⁷ they have grown faster than the overall municipal debt level and municipal bond mutual funds. This is especially true since 2022, when tax-exempt mutual funds had net outflows of more than \$122 billion while tax-exempt ETFs saw net inflows of more than \$117 billion.¹⁸ As recently as in 2017, municipal bond ETFs represented less than 0.8% of the total market share. Now, eight years later, the ratio is more than five times as much. This is remarkable especially when considering that the total amount of municipal debt also grew during the same period, from nearly \$4 trillion to \$4.4 trillion.¹⁹

Chart 1. Proportion of Municipal Bond ETF Net Assets Relative to Municipal Debt Outstanding, 2007–2025



Source: MSRB analysis with data obtained from the Federal Reserve, SEC N-Port and ICI.

In addition, municipal bond ETFs are more actively traded than individual municipal securities. Table 2 illustrates that in 2025, the dollar volume (measured as the dollar amount of shares traded) for all 164 municipal bond ETFs approached 12.4% of the total par value traded in the secondary market for municipal securities. This is notable considering municipal bond ETF net assets represent 4.5% of total municipal securities outstanding (excluding municipal bond ETFs).

¹⁷ Municipal securities debt size data from the Federal Reserve's [Financial Accounts of the United States](#) for the end of third quarter of 2025, and ETFs' net assets data are provided by ICI <https://www.ici.org/statistics>.

¹⁸ Information provided by ICI.

¹⁹ See the Federal Reserve's [Financial Accounts of the United States](#).

Another way to illustrate the higher trading activity of municipal bond ETFs when compared to individual municipal securities is by measuring the turnover ratio—the annual dollar amount traded as a percentage of the total outstanding amount. Table 2 shows that municipal securities’ annual turnover ratio when measured in par value was about 72% in 2025. This means that, on average, 72% of total municipal securities outstanding is expected to be traded in a year. By comparison, the annual turnover ratio is nearly 200% for all 164 municipal bond ETFs, almost three times more frequent than for municipal securities.

Table 2. Comparison of Municipal Bond ETFs to Municipal Securities: Trading Volume, Outstanding Amount and Turnover Ratio,²⁰ 2025 Data

	Municipal Securities	Municipal Bond ETFs	Ratio of Municipal Bond ETFs to Municipal Securities
Outstanding Amount/Net Asset Value	4,177,919,000,000	186,281,000,000	4.5%
Par Value/Dollar Value Traded	2,995,957,647,299	371,553,434,915	12.4%
Turnover Ratio	71.7%	199.5%	

Source: MSRB analysis with data obtained from MSRB’s RTRS, the Federal Reserve, SEC N-Port, Nasdaq.com and ICI.

While there are approximately 164 municipal bond ETFs as of December 2025, the top two ETFs, MUB and VTEB, have the lion share of the total assets and trading volume, as measured by the dollar volume of trades, as shown in Table 3. In fact, the next largest municipal bond ETF by NAV and by trading volume is SUB, which has only 5.5% of total NAV and 4% of total trading volume.

Table 3. Concentration of Municipal Bond ETFs, 2025 Data

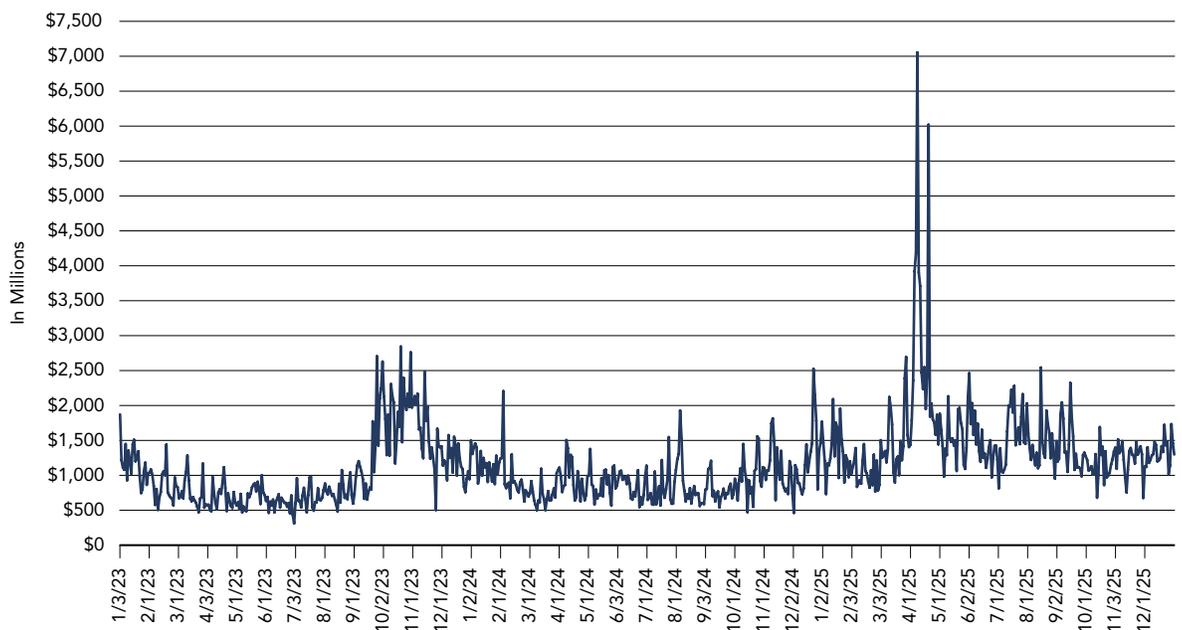
	Share of NAV	Share of Dollar Volume
MUB	22.0%	35.9%
VTEB	22.5%	22.1%
Top 2 ETFs Total	44.5%	58.0%

²⁰ The outstanding amount for municipal securities in this table excludes the net asset value of municipal bond ETFs as well as the outstanding amount for commercial paper, while the par value traded for municipal securities excludes the amount for commercial paper.

Daily Trading Volume for Municipal Bond ETFs

As noted earlier, one way to monitor municipal bond ETFs is to track the daily trading volume. Chart 2 shows the aggregate daily trading volume from January 2023 through December 2025 (Relevant Period) for all 164 municipal bond ETFs. Chart 2 illustrates that the daily trading volume mostly ranged from \$500 million to \$2.5 billion during the Relevant Period, with a few exceptions. Especially for the volatile month of April 2025, the daily trading volume exceeded \$3 billion for five trading days, with the top day exceeding \$7 billion. During periods of market stress, municipal bond ETFs played an even larger role than in normal times.²¹ For example, in April 2025, when financial markets experienced enormous volatility, while the total par value traded in municipal securities (excluding commercial paper) was 67.2% higher in April 2025 than in April 2024, the trading volume for all municipal bond ETFs was 178.3% higher. The ratio of ETF trading volume to municipal securities trading volume was 16.1% for April 2025. This compares to an average of 11.9% for the other months in 2025, even though the trading volume for municipal securities also reached an annual high in April 2025, suggesting the importance of ETFs in times of market turbulence.

Chart 2. Municipal Bond ETFs Daily Trading Volume, January 2023–December 2025



Source: MSRB analysis with data obtained from Nasdaq.com for all 164 municipal bond ETFs as classified by etf.com.

It is likely that the high growth rate of ETF municipal bond assets and trading activities will continue for the near future, given the recent trends.

²¹ See Bagley, John, Marcelo Vieira and Simon Wu, “[April 2025 Market Recap](#),” Research Paper, Municipal Securities Rulemaking Board, May 2025.

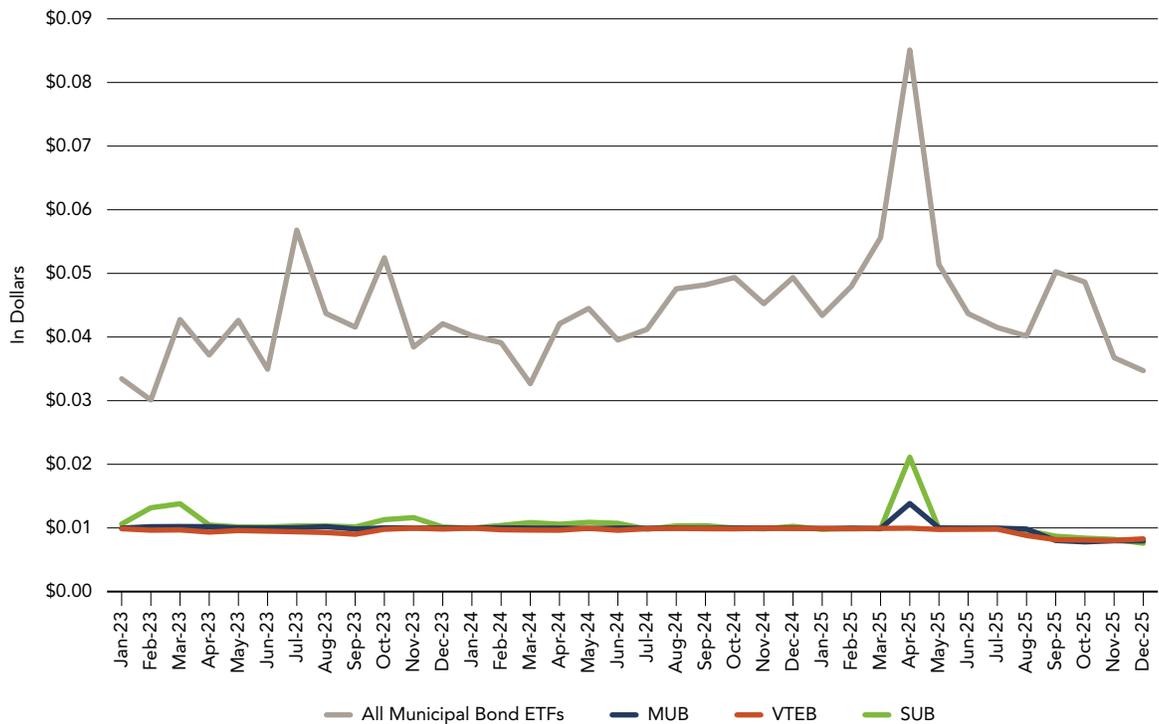
Effective Spread for Municipal Bond ETFs

In addition to trading volume, another indicator that can be used to monitor the health of the municipal bond ETF market is transaction cost as measured by effective spread. As mentioned above, unlike most fixed-income markets, the equity market, which includes ETF products, has a consolidated NBBO quote that is accessible and executable by all investors and market participants. In fact, the NBBO quotes themselves are supplied by investors, dealers and other market participants through price competition. Therefore, effective spread in the equity market mostly reflects market liquidity, with more liquid securities generally having lower effective spreads than less liquid securities. Effective spreads for all securities are generally higher during a market stress period.

Using Rule 605 data, Chart 3 presents the aggregate average effective spread for all municipal bond ETFs, as well as the average effective spread for the three most-actively traded municipal bond ETFs: MUB, VTEB and SUB. For many actively traded stocks in the equity market, the effective spread is essentially \$0.01, which is the lowest possible increment for a bid-ask quote.²² This was the case for MUB and VTEB, and mostly the case for SUB after March 2023. The one exception was the volatile month of April 2025, where almost all municipal bond ETFs saw a significant rise in average effective spread, though VTEB's average remained at \$0.01. On the other hand, Chart 3 shows a significant variation in effective spread among municipal bond ETFs, where the aggregate average effective spread for all municipal bond ETFs is noticeably higher than the average for each of the top three ETFs, ranging from a low of \$0.03 in February 2023 to a high of \$0.085 in April 2025.

²² SEC Division of Market Regulation, Responses to Frequently Asked Questions Concerning Rule 612 (Minimum Pricing Increment of Regulation NMS), <https://www.sec.gov/divisions/marketreg/subpenny612faq.htm>. For stocks and ETFs with prices at \$1.00 per share or more, Rule 612 of Reg NMS prohibits their displayed quotes to be in sub-pennies, even though the actual traded prices are allowed to be in sub-pennies. In fact, market makers can provide price improvement to quoted prices in sub-penny increments.

Chart 3. Average Effective Spread for Municipal Bond ETFs, January 2023–December 2025



Source: MSRB analysis with data obtained from Rule 605 monthly disclosure.

Table 4 illustrates the aggregate average effective spread for all municipal bond ETFs by the four order size buckets: 100–499 shares, 500–1,999 shares, 2,000–4,999 shares and 5,000 shares or more. In addition to order size, Rule 605 data also provide the average effective spread for both market orders and marketable limit orders, which are priced orders with their limit prices at the NBBO quotes or worse than the NBBO quotes and are therefore immediately executable. For both market orders and marketable limit orders, only municipal bond ETFs that had trades in all four order size buckets during the Relevant Period are included in this analysis, which resulted in 34 ETFs for market orders and 124 ETFs for marketable limit orders. Unlike the municipal securities market but similar to most stocks, for market orders, municipal bond ETFs’ effective spread is positively correlated with the order size. Larger order sizes receive a higher effective spread, ranging from less than \$0.006 for order sizes between 100 and 499 shares to over \$0.03 for order sizes of 5,000 shares or more. The disparity is attributed to the fact that larger-sized market orders demand more liquidity than smaller-sized market orders, resulting in higher effective spreads. On the other hand, marketable limit orders’ effective spreads do not vary much between different order size buckets, hovering around \$0.05 for all four size buckets. This implies that those orders’ limit prices essentially set the maximum effective spread boundary and cushion the liquidity premium surge.²³

²³ Conversely, an immediate execution of a market limit order is not totally guaranteed as compared to a market order, if the market moves away after a marketable limit order was placed.

Table 4. Average Effective Spread for Municipal Bond ETFs by Order Type and Order Size, January 2023–December 2025

Order Type	Order Size	Number of Municipal Bond ETFs	Shares Traded	Average Effective Spread	Median Effective Spread
Market Order	100–499 Shares	34	1,024,984	\$0.0060	\$0.0038
Market Order	500–1,999 Shares	34	1,202,492	\$0.0088	\$0.0071
Market Order	2,000–4,999 Shares	34	564,092	\$0.0142	\$0.0126
Market Order	5,000 or More Shares	34	1,108,398	\$0.0307	\$0.0283
Marketable Limit Order	100–499 Shares	124	755,666,631	\$0.0463	\$0.0447
Marketable Limit Order	500–1,999 Shares	124	856,851,183	\$0.0502	\$0.0412
Marketable Limit Order	2,000–4,999 Shares	124	393,839,546	\$0.0521	\$0.0392
Marketable Limit Order	5,000 or More Shares	124	177,342,159	\$0.0456	\$0.0405

Source: MSRB analysis with data obtained from Rule 605 monthly disclosure.

Conclusions

The municipal bond ETF market offers another tool for investors and market participants that is different from what can be accessed directly in the over-the-counter bond market. ETFs can provide investors with another entry into the municipal bond market, although they can also present liquidity issues during periods of stress. As the rapid growth of municipal bond ETFs is expected to continue in the near future, there is an increasing interest in understanding and monitoring this market. This paper analyzed trading volume and effective spread in the municipal bond ETF market, and the analysis showed that both indicators were able to signal a market stress event such as what happened in April 2025. Moreover, since the growth in municipal bond ETF trading volume continues to outpace that of municipal securities, especially during market stress periods, trading in municipal bond ETFs could be viewed as a barometer of broader municipal market trends.

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Appendix A: List of Market Centers Used for Rule 605 Monthly Disclosure

Market Center Code	Type	NMS Name	Broker-Dealer Operator
TLATS	ATS	Barclays ATS	Barclays Capital Inc.
BYXX	Exchange	Cboe BYX	Cboe Global Markets
BATS	Exchange	Cboe BZX (BATS)	Cboe Global Markets
EDGK	Exchange	Cboe Edge	Cboe Global Markets
EDGJ	Exchange	Cboe Edge A	Cboe Global Markets
ICBX	ATS	CBX ATS	Instinet, LLC
TIATS	ATS	IBKR ATS	Interactive Brokers LLC
TMLIX	ATS	Instinct X	BofA Securities, Inc.
V	Exchange	IEX Exchange	Investors Exchange, LLC
U	Exchange	Members Exchange	MEMX Exchange
EPRL	Exchange	MIAX Pearl Exchange	Miami International Holdings, Inc.
Q	Exchange	Nasdaq	Nasdaq, Inc.
NXNYS	Exchange	NYSE	Intercontinental Exchange (ICE)
PARCAX	Exchange	NYSE Arca	Intercontinental Exchange (ICE)
CGXS	ATS	OneChronos ATS	OneChronos Markets LLC
TPURE	ATS	PureStream ATS	PureStream, LLC
TUBSA	ATS	UBS-A ATS	UBS Securities LLC

Appendix B: List of Municipal Bond ETFs as of December 2025

Ticker	ETF Fund Name	With Trades in All Four Order Size Groups?	Issuer
MUB	iShares National Muni Bond ETF	Yes	BlackRock, Inc.
VTEB	Vanguard Tax-Exempt Bond ETF	Yes	Vanguard
SUB	iShares Short-Term National Muni Bond ETF	Yes	BlackRock, Inc.
JMST	JPMorgan Ultra-Short Municipal Income ETF	Yes	JPMorgan Chase
CGMU	Capital Group Municipal Income ETF	Yes	The Capital Group Companies
JMUB	JPMorgan Municipal ETF	Yes	JPMorgan Chase
SHM	SPDR Nuveen ICE Short Term Municipal Bond ETF	Yes	State Street
CMF	iShares California Muni Bond ETF	Yes	BlackRock, Inc.
HYD	VanEck High Yield Muni ETF	Yes	VanEck
TFI	SPDR Nuveen ICE Municipal Bond ETF	Yes	State Street
PZA	Invesco National AMT-Free Municipal Bond ETF	Yes	Invesco
HYMB	SPDR Nuveen ICE High Yield Municipal Bond ETF	Yes	State Street
SCMB	Schwab Municipal Bond ETF	Yes	The Charles Schwab Corp.
CGHM	Capital Group Municipal High-Income ETF	Yes	The Capital Group Companies
MUNI	PIMCO Intermediate Municipal Bond Active Exchange-Traded Fund	Yes	Allianz
ITM	VanEck Intermediate Muni ETF	Yes	VanEck
HIMU	iShares High Yield Muni Active ETF	Yes	BlackRock, Inc.
FMB	First Trust Managed Municipal ETF	Yes	First Trust
DFNM	Dimensional National Municipal Bond ETF	Yes	Dimensional
VTES	Vanguard Short-Term Tax Exempt Bond ETF	Yes	Vanguard
VTEC	Vanguard California Tax-Exempt Bond ETF	Yes	Vanguard
MEAR	iShares Short Maturity Municipal Bond Active ETF	Yes	BlackRock, Inc.
MMIT	NYLI MacKay Muni Intermediate ETF	Yes	New York Life
PWZ	Invesco California AMT-Free Municipal Bond ETF	Yes	Invesco
SMMU	PIMCO Short Term Municipal Bond Active ETF	Yes	Allianz
BAB	Invesco Taxable Municipal Bond ETF	Yes	Invesco
NYF	iShares New York Muni Bond ETF	Yes	BlackRock, Inc.
FLMI	Franklin Dynamic Municipal Bond ETF	Yes	Franklin Templeton
TAFI	AB Tax-Aware Short Duration Municipal ETF	Yes	Equitable
VTEI	Vanguard Intermediate-Term Tax-Exempt Bond ETF	Yes	Vanguard
CGSM	Capital Group Short Duration Municipal Income ETF	Yes	The Capital Group Companies
FMHI	First Trust Municipal High Income ETF	Yes	First Trust
HMOP	Hartford Municipal Opportunities ETF	Yes	The Hartford Insurance Group, Inc.

Trading Volume and Transaction Costs for Municipal Bond ETFs

Ticker	ETF Fund Name	With Trades in All Four Order Size Groups?	Issuer
IBMP	iShares iBonds Dec 2027 Term Muni Bond ETF	Yes	BlackRock, Inc.
MLN	VanEck Long Muni ETF	Yes	VanEck
IBMO	iShares iBonds Dec 2026 Term Muni Bond ETF	Yes	BlackRock, Inc.
IBMQ	iShares iBonds Dec 2028 Term Muni Bond ETF	Yes	BlackRock, Inc.
TAXF	American Century Diversified Municipal Bond ETF	Yes	American Century Investments
DFCA	Dimensional California Municipal Bond ETF	Yes	Dimensional
FSMB	First Trust Short Duration Managed Municipal ETF	Yes	First Trust
MUST	Columbia Multi-Sector Municipal Income ETF	Yes	Ameriprise Financial
VCRM	Vanguard Core Tax-Exempt Bond ETF	Yes	Vanguard
EVSM	Eaton Vance Short Duration Municipal Income ETF	Yes	Morgan Stanley
IBMN	iShares iBonds Dec 2025 Term Muni Bond ETF	Yes	BlackRock, Inc.
SHYM	iShares Short Duration High Yield Muni Active ETF	Yes	BlackRock, Inc.
IBMM	iShares iBonds Dec 2024 Term Muni Bond ETF	Yes	BlackRock, Inc.
SHYD	VanEck Short High Yield Muni ETF	Yes	VanEck
MINO	PIMCO Municipal Income Opportunities Active Exchange-Traded Fund	Yes	Allianz
MMIN	NYLI MacKay Muni Insured ETF	Yes	New York Life
TAFM	AB Tax-Aware Intermediate Municipal ETF	Yes	Equitable
JMSI	JPMorgan Sustainable Municipal Income ETF	Yes	JPMorgan Chase
IBMR	iShares iBonds Dec 2029 Term Muni Bond ETF	Yes	BlackRock, Inc.
BSMQ	Invesco BulletShares 2026 Municipal Bond ETF	Yes	Invesco
HYMU	iShares High Yield Muni Income Active ETF	Yes	BlackRock, Inc.
SMB	VanEck Short Muni ETF	Yes	VanEck
BSMR	Invesco BulletShares 2027 Municipal Bond ETF	Yes	Invesco
BSMS	Invesco BulletShares 2028 Municipal Bond ETF	Yes	Invesco
FUMB	First Trust Ultra Short Duration Municipal ETF	Yes	First Trust
JMHI	JPMorgan High Yield Municipal ETF	Yes	JPMorgan Chase
BSMP	Invesco BulletShares 2025 Municipal Bond ETF	Yes	Invesco
VSDM	Vanguard Short Duration Tax-Exempt Bond ETF	Yes	Vanguard
BSMT	Invesco BulletShares 2029 Municipal Bond ETF	Yes	Invesco
FCAL	First Trust California Municipal High Income ETF	Yes	First Trust
RMOP	Rockefeller Opportunistic Municipal Bond ETF	Yes	Toroso Investments Topco LLC
APMU	ActivePassive Intermediate Municipal Bond ETF	Yes	Envestnet
BSMU	Invesco BulletShares 2030 Municipal Bond ETF	Yes	Invesco
XMPT	VanEck CEF Muni Income ETF	Yes	VanEck
FMUN	Fidelity Systematic Municipal Bond Index ETF	Yes	Fidelity
CALI	iShares Short-Term California Muni Active ETF	Yes	BlackRock, Inc.

Trading Volume and Transaction Costs for Municipal Bond ETFs

Ticker	ETF Fund Name	With Trades in All Four Order Size Groups?	Issuer
AVMU	Avantis Core Municipal Fixed Income ETF	Yes	American Century Investments
BSMO	Invesco BulletShares 2024 Municipal Bond ETF	Yes	Invesco
INMU	iShares Intermediate Muni Income Active ETF	Yes	BlackRock, Inc.
PZT	Invesco New York AMT-Free Municipal Bond ETF	Yes	Invesco
RVNU	Xtrackers Municipal Infrastructure Revenue Bond ETF	Yes	Deutsche Bank AG
FMUB	Fidelity Municipal Bond Opportunities ETF	Yes	Fidelity
IBMS	iShares iBonds Dec 2030 Term Muni Bond ETF	Yes	BlackRock, Inc.
BSMV	Invesco BulletShares 2031 Municipal Bond ETF	Yes	Invesco
BSMW	Invesco BulletShares 2032 Municipal Bond ETF	Yes	Invesco
GCAL	Goldman Sachs Dynamic California Municipal Income ETF	Yes	Goldman Sachs
EVIM	Eaton Vance Intermediate Municipal Income ETF	Yes	Morgan Stanley
MUNY	Vanguard New York Tax-Exempt Bond ETF	Yes	Vanguard
GMUB	Goldman Sachs Municipal Income ETF	Yes	Goldman Sachs
BSSX	Invesco BulletShares 2033 Municipal Bond ETF	Yes	Invesco
FLMB	Franklin Municipal Green Bond ETF	Yes	Franklin Templeton
TAXE	T. Rowe Price Intermediate Municipal Income ETF	Yes	T. Rowe Price Group, Inc.
NHYM	Nuveen High Yield Municipal Income ETF	Yes	TIAA Board of Governors
VTEL	Vanguard Long-Term Tax-Exempt Bond ETF	Yes	Vanguard
NUMI	Nuveen Municipal Income ETF	No	TIAA Board of Governors
BSMY	Invesco BulletShares 2034 Municipal Bond ETF	Yes	Invesco
CATF	American Century California Municipal Bond ETF	Yes	American Century Investments
MFSM	MFS Active Intermediate Muni Bond ETF	Yes	Sun Life Financial, Inc.
NMB	Simplify National Muni Bond ETF	Yes	Simplify
MNBD	ALPS Intermediate Municipal Bond ETF	Yes	SS&C
PUSH	PGIM Ultra Short Municipal Bond ETF	Yes	Prudential
EVYM	Eaton Vance High Income Municipal ETF	Yes	Morgan Stanley
MMCA	NYLI MacKay California Muni Intermediate ETF	Yes	New York Life
PVI	Invesco Floating Rate Municipal Income ETF	Yes	Invesco
IMSI	Invesco Municipal Strategic Income ETF	No	Invesco
IROC	Invesco Rochester High Yield Municipal ETF	No	Invesco
JHMU	John Hancock Dynamic Municipal Bond ETF	Yes	Manulife
TAFL	AB Tax-Aware Long Municipal ETF	Yes	Equitable
MBND	SPDR Nuveen Municipal Bond ETF	Yes	State Street
MMSD	NYLI MacKay Muni Short Duration ETF	Yes	New York Life
HTAX	Macquarie National High-Yield Municipal Bond ETF	Yes	Delaware Management Company Inc
OVM	Overlay Shares Municipal Bond ETF	Yes	Liquid Strategies

Trading Volume and Transaction Costs for Municipal Bond ETFs

Ticker	ETF Fund Name	With Trades in All Four Order Size Groups?	Issuer
MINN	Mairs & Power Minnesota Municipal Bond ETF	Yes	Mairs & Power, Inc.
PMIO	PGIM Municipal Income Opportunities ETF	Yes	Prudential
AUSM	Allspring Ultra Short Municipal ETF	Yes	Allspring Group Holdings LLC
LMUB	iShares Long-Term National Muni Bond ETF	Yes	BlackRock, Inc.
IBMT	iShares iBonds Dec 2031 Term Muni Bond ETF	Yes	BlackRock, Inc.
FMNY	First Trust New York Municipal High Income ETF	Yes	First Trust
CA	Xtrackers California Municipal Bond ETF	Yes	Deutsche Bank AG
GMNY	Goldman Sachs Dynamic New York Municipal Income ETF	Yes	Goldman Sachs
RMCA	Rockefeller California Municipal Bond ETF	No	Toroso Investments Topco LLC
RTAI	Rareview Tax Advantaged Income ETF	Yes	Neil Azous Revocable Trust
RMNY	Rockefeller New York Municipal Bond ETF	Yes	Toroso Investments Topco LLC
MFLX	First Trust Flexible Municipal High Income ETF	Yes	First Trust
INTM	Invesco Intermediate Municipal ETF	No	Invesco
TAXT	Northern Trust Tax-Exempt Bond ETF	No	Northern Trust Corp.
GUMI	Goldman Sachs Ultra Short Municipal Income ETF	Yes	Goldman Sachs
MBNE	SPDR Nuveen Municipal Bond ESG ETF	Yes	State Street
SMI	VanEck HIP Sustainable Muni ETF	No	VanEck
MUND	Northern Trust 2055 Tax-Exempt Distributing Ladder ETF	No	Northern Trust Corp.
MUNC	Northern Trust 2045 Tax-Exempt Distributing Ladder ETF	No	Northern Trust Corp.
GMUN	Goldman Sachs Access Municipal Bond ETF	No	Goldman Sachs
GENM	Genter Capital Municipal Quality Intermediate ETF	Yes	Mcivry Co. LLC
MYMI	SPDR SSGA My2029 Municipal Bond ETF	Yes	State Street
TAXM	BondBloxx IR+M Tax-Aware ETF for Massachusetts Residents	No	Bondbloxx Investment Management Corp.
MYMJ	SPDR SSGA My2030 Municipal Bond ETF	Yes	State Street
TAXI	Northern Trust Intermediate Tax-Exempt Bond ETF	No	Northern Trust Corp.
MYMF	SPDR SSGA My2026 Municipal Bond ETF	Yes	State Street
MYMG	SPDR SSGA My2027 Municipal Bond ETF	Yes	State Street
STAX	Macquarie Tax-Free USA Short Term ETF	Yes	Macquarie Group Ltd
WTMU	WisdomTree Core Laddered Municipal Fund	Yes	WisdomTree, Inc.
MUNA	Northern Trust 2030 Tax-Exempt Distributing Ladder ETF	No	Northern Trust Corp.
MUNB	Northern Trust 2035 Tax-Exempt Distributing Ladder ETF	No	Northern Trust Corp.
MYMH	SPDR SSGA My2028 Municipal Bond ETF	No	State Street
ZTAX	X-Square Municipal Income ETF	Yes	X-Square Capital
WTMY	WisdomTree High Income Laddered Municipal Fund	Yes	WisdomTree, Inc.
TAXS	Northern Trust Short-Term Tax-Exempt Bond ETF	No	Northern Trust Corp.
CAM	AB California Intermediate Municipal ETF	No	AllianceBernstein LP

Trading Volume and Transaction Costs for Municipal Bond ETFs

Ticker	ETF Fund Name	With Trades in All Four Order Size Groups?	Issuer
NYM	AB New York Intermediate Municipal ETF	No	AllianceBernstein LP
MUNX	AMG GW&K Muni Income ETF	No	Affiliated Managers Group
ZMUN	F/m Ultrashort Tax-Free Municipal ETF	No	1251 Capital Group Inc.
FTNJ	Franklin New Jersey Municipal Income ETF	No	Franklin Templeton
FTMS	Franklin Short-Term Municipal Income ETF	No	Franklin Templeton
FTMN	Franklin Minnesota Municipal Income ETF	No	Franklin Templeton
RJMI	RJ Eagle Municipal Income ETF	No	Raymond James Financial
TMNL	T. Rowe Price Long Municipal Income ETF	No	T. Rowe Price Group, Inc.
TMNS	T. Rowe Price Short Municipal Income ETF	No	T. Rowe Price Group, Inc.
THYM	T. Rowe Price High Income Municipal ETF	No	T. Rowe Price Group, Inc.
FTMA	Franklin Massachusetts Municipal Income ETF	No	Franklin Templeton
BSMZ	Invesco BulletShares 2035 Municipal Bond ETF	No	Invesco
MMMA	NYLI MacKay Muni Allocation ETF	No	New York Life
AMUN	Abrdn Ultra Short Municipal Income Active ETF	No	Abrdn Plc
FTMU	Franklin Municipal Income ETF	No	Franklin Templeton
MYMK	State Street My2031 Municipal Bond ETF	No	State Street
MUNB	Northern Trust 2035 Tax-Exempt Distributing Ladder ETF	No	Northern Trust Corp.
FTMH	Franklin Municipal High Yield ETF	No	Franklin Templeton
FTCA	Franklin California Municipal Income ETF	No	Franklin Templeton
FTNY	Franklin New York Municipal Income ETF	No	Franklin Templeton
FTOH	Franklin Ohio Municipal Income ETF	No	Franklin Templeton
FTPA	Franklin Pennsylvania Municipal Income ETF	No	Franklin Templeton
SCNM	Sterling Capital National Municipal Bond ETF	No	Guardian Capital Group Ltd.

See www.etf.com. In addition to municipal bond ETFs representing the broad municipal securities market, there are also many municipal bond ETFs seeking to replicate segments of the market, such as by geographic areas, sectors and bond maturities.

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