US Municipal Market Overview: MSRB Trade Counts

**Figure 1:** With the exception of March and April, 2020 individual trade counts have decreased compared to 2019.

**Figure 2:** Shows decrease in % 2019 vs 2020.
- **Light blue:** All trades: Decreased trade counts with exception of March and April
- **Dark blue:** Count of trades >=1mln in notional. Shows similar or increased trading in block trades.

- **Overall** there are fewer small retail trades taking place in 2020 when compared to 2019.
US Municipal Market Overview: Liquidity

ICE BofA US Municipal Securities Index (U0A0): $25BN Liquidation Volume | 50bps Target Market Price Impact

- ICE US Municipal Securities Index (U0A0) with approximately 18k holdings
- Using constant assumptions of a $25BN liquidation volume and a 50bp target market price impact (i.e. cost of immediacy or price haircut), we tracked liquidity performance over time throughout the COVID-19 pandemic
- The display indicates the percentage of the index that can be liquidated in the various DTL buckets: <=1 Day, 2-3 Days, 4-7 Days, 8-30 Days, and 31+ Days
- The data shows an initial degradation of liquidity in the latter part of the week of March 10th.
- The impact of these DTL outputs is largely driven by certain factors including:
  - Bid-Ask Spreads
  - Price Volatility
  - Observed Trading Volumes

Source: ICE Data Services
US Municipal Market: Index Yields

Figure 4: Historical yields by asset class

- Shows average index yield to worst for Taxable, Tax Exempt municipal and US Treasury bonds: 2018 to 2020
- High correlation and comparable yields across US Treasuries and Tax-Exempt municipal bonds
- Divergence due to COVID-19 between US Treasuries, Tax Exempt and Taxable municipal bonds

Source: ICE Data Services

Figure 5: Annualized volatility: ICE US Broad Municipal Index: 2006-2020, ICE BofA US Taxable Index: 2010-2020

- Annualized historical volatility across tax-exempt and taxable municipal bonds, as applicable

Source: ICE Data Services

Figure 6: Bid/Ask Spread: Taxable vs Tax-exempt Municipal bonds

- Year to date Bid/Ask spreads across taxable and tax-exempt municipal bonds

Source: SIFMA & ICE Bonds
General Trading Activity Comparison
2007-2008 to 2008-2009

Trade Summary - 01/01/2007 to 01/01/2008

<table>
<thead>
<tr>
<th>Trade Type</th>
<th>Number of Trades</th>
<th>Par Amount ($ Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Bought</td>
<td>4,246,219</td>
<td>$2,022,206</td>
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<tr>
<td>Customer Sold</td>
<td>2,307,320</td>
<td>$2,420,360</td>
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<tr>
<td>Inter-Dealer Trade</td>
<td>2,517,290</td>
<td>$183,598</td>
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<tr>
<td>All Trades</td>
<td>9,072,822</td>
<td>$5,536,363</td>
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</tbody>
</table>

Trade Summary - 01/01/2008 to 04/01/2009

<table>
<thead>
<tr>
<th>Trade Type</th>
<th>Number of Trades</th>
<th>Par Amount ($ Millions)</th>
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</thead>
<tbody>
<tr>
<td>Customer Bought</td>
<td>6,570,056</td>
<td>$2,572,871</td>
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<tr>
<td>Customer Sold</td>
<td>2,795,623</td>
<td>$2,010,397</td>
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<td>Inter-Dealer Trade</td>
<td>3,769,449</td>
<td>$935,828</td>
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<tr>
<td>All Trades</td>
<td>13,005,128</td>
<td>$5,519,256</td>
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</tbody>
</table>

Overall Trading Activity- 01/02/2007 to 12/31/2007

Daily Averages
Par Amount: $25.146 Million
Number of Trades: 36,003

Overall Trading Activity- 01/02/2008 to 04/01/2009

Daily Averages
Par Amount: $17.839 Million
Number of Trades: 42,556

Source: MSRB EMMA, overall trade patterns, for more see MSRB Municipal Market COVID-19 Trading Report, updated monthly, Hilltop Securities
General Trading Activity Comparison

2018-2019 to 2019-2020

Trade Summary - 09/15/2018 to 09/15/2019

<table>
<thead>
<tr>
<th>Trade Type</th>
<th>Number of Trades</th>
<th>Par Amount ($ Millions)</th>
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</thead>
<tbody>
<tr>
<td>Customer Bought</td>
<td>3,800,038</td>
<td>$1,478,191</td>
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<tr>
<td>Customer Sold</td>
<td>2,214,398</td>
<td>$928,392</td>
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<tr>
<td>Inter-Dealer Trade</td>
<td>3,626,201</td>
<td>$527,935</td>
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<tr>
<td>All Trades</td>
<td>9,440,637</td>
<td>$2,944,718</td>
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</table>

Trade Summary - 09/15/2019 to 09/15/2020

<table>
<thead>
<tr>
<th>Trade Type</th>
<th>Number of Trades</th>
<th>Par Amount ($ Millions)</th>
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</thead>
<tbody>
<tr>
<td>Customer Bought</td>
<td>3,175,239</td>
<td>$1,646,106</td>
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<tr>
<td>Customer Sold</td>
<td>2,100,335</td>
<td>$791,506</td>
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<tr>
<td>Inter-Dealer Trade</td>
<td>3,247,080</td>
<td>$501,036</td>
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<tr>
<td>All Trades</td>
<td>8,522,654</td>
<td>$3,118,671</td>
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Overall Trading Activity - 09/17/2018 to 09/13/2019

Daily Averages
Par Amount: $11.732 Million
Number of Trades: 37,612

Overall Trading Activity - 09/16/2019 to 09/14/2020

Daily Averages
Par Amount: $12.376 Million
Number of Trades: 33,820

Source: MSRB EMMA, overall trade patterns, for more see MSRB Municipal Market COVID-19 Trading Report, updated monthly, Hilltop Securities
Trading Spread Analysis

Spread to AAA
MMD Benchmark

Source: Refinitiv (formerly Thomson Reuters) TM3, Hilltop Securities
Trading Spread Analysis

Spread to AAA MMD Benchmark

Source: Refinitiv (formerly Thomson Reuters) TM3, Hilltop Securities
Transaction Costs During COVID-19

From the MSRB Report: When isolating the change in effective spread to the four-month period in 2020, Chart 3 shows that on certain trading days in mid-March and early April, the effective spread for fixed-rate municipal securities exceeded 100 basis points, with a peak of 165 basis points on March 20. Fluctuations in effective spread seemed to be correlated with the overall volatility of municipal securities price movements, as measured by the rolling 10-day standard deviation of the S&P Municipal Bond Index daily percentage change during the period. (The volatility itself was likely driven by other market factors, such as the liquidity crunch and uncertainty of pricing due to the potential elevated credit risks and other factors.) The volatility measure typically represents the level of risk and uncertainty in the marketplace, and data show it was significantly elevated in the one-month period between early March and early April. *

From the MSRB Report: Chart 4 shows that, despite narrowing the gap, smaller-sized customer trades continued to be executed with a higher effective spread than larger-sized customer trades as of early 2020. That said, the sharp increase in effective spread triggered by the COVID-19 pandemic was apparent for all trade size groups, including the below $100,000 trade size groups where retail investors usually predominate.*

COVID-19 Related Disclosures

By Week, Since March 2020

Source: MSRB
COVID-19 Related Disclosures
Primary Market and Continuing Disclosures

Total COVID-19 Related Disclosures: 18,135

Primary Market: 6,415
Continuing Disclosures: 11,720

Rating Changes accounted for 10% or 1,195 of continuing disclosures

Source: MSRB
New Issuance
Issuance Volume (2008 vs. 2020)

- 2020 total issuance has been high through September, ranking 1st in total issuance volume over the past 35 years
- Highlights include:
  - Total 2020 tax-exempt volume is projected to be approximately $2 billion lower than in 2008, despite new money issuance being down due to the COVID-19 pandemic
  - Total 2020 taxable volume is projected to be over $118 billion higher than in 2008
  - Total 2020 issuance is projected to be $482 billion, approximately $116 billion higher than in 2008

**Annual Municipal Issuance Volume Through September**

**Issuance Highlights (in $MM)**

- 2008 Taxable Issuance: 24,252
- 2008 Tax Exempt Issuance: 341,264
- 2020* Taxable Issuance: 142,740
- 2020* Tax Exempt Issuance: 339,277

Source: Bond Buyer. Note 2020 Issuance is through September, Siebert Williams Shank & Co
Municipal New Issuance, 2009-Present

Tax Status as Percentage of the Market

35% of new issuance was taxable in July. Highest since BABs in Dec 2010.

Source: Siebert Williams Shank & Co
Municipal New Issuance in 2020

By Tax Status

<table>
<thead>
<tr>
<th>Month</th>
<th>Tax-Exempt</th>
<th>Taxable</th>
<th>AMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 20</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Feb 20</td>
<td>0.2</td>
<td>0.8</td>
<td>0.5</td>
</tr>
<tr>
<td>Mar 20</td>
<td>0.0</td>
<td>14.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Apr 20</td>
<td>0.1</td>
<td>21.7</td>
<td>0.9</td>
</tr>
<tr>
<td>May 20</td>
<td>0.4</td>
<td>22.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Jun 20</td>
<td>1.0</td>
<td>30.0</td>
<td>7.9</td>
</tr>
<tr>
<td>Jul 20</td>
<td>0.9</td>
<td>26.6</td>
<td>17.9</td>
</tr>
<tr>
<td>Aug 20</td>
<td>0.7</td>
<td>27.9</td>
<td>18.2</td>
</tr>
<tr>
<td>Sep 20</td>
<td>3.4</td>
<td>29.7</td>
<td>16.7</td>
</tr>
</tbody>
</table>

Source: Siebert Williams Shank & Co
2019-2020 Fund Flows and Issuance Volume

2019 vs. 2020 Municipal Issuance Volume by Month

Municipal Bond Mutual Fund Inflows and Outflows ($ billions)

Source: Thomson Reuters – SDC Platinum as of 10/1/2020 (Negotiated & Competitive Issuance); Lipper Fund Flows as of 9/24/20; Siebert Williams Shank & Co
The Fed has updated the terms and pricing of its Municipal Liquidity Facility (below shows amendments in italics)

It will charge issuers a premium as it is intended to be used as a last resort

Summary of Key Terms: Municipal Liquidity Facility (as of 8/11/2020)

- **Facility**: The Municipal Liquidity Facility will support lending to U.S. States and District of Columbia, U.S. Cities with populations >250k, U.S. Counties with populations >500k, and Multi-State Entities
- **Eligible Notes**: TANs, TRANS, BANs and other similar short-term notes that do not mature later than 36 months from the date of issuance
- **Eligible Issuers**: State, City or County (or instrumentality), or Multi-State Entity. Only one issuer per State, City, County
  - Non-Multi-State Entity must be rated at least BBB-/Baa3 as of 4/8/20 by two or more major NRSROs and at least BB-/Ba3 at time of issuance
  - Multi-State Entity must be rated at least A-/A3 as of 4/8/20 by two or more major NRSROs and at least BBB-/Baa3 at time of issuance
  - If State, City, County or Multi-State Entity was rated by only one major NRSRO as of 4/8/20, it may be an Eligible Issuer if the rating was at least consistent with criteria above and it is rated by at least two major NRSROs at time of issuance
- **Borrowing Limit**: 20% of the general revenue and utility revenue from own sources in FY2017 of State, City or County; 20% of Multi-State Entity’s gross revenue as reported in FY2019 audit
  - States may request borrowing in excess of the limit to assist political subdivisions and instrumentalities that are not eligible for the Facility
- **Security**: Will depend on applicable constitutional and statutory provisions governing the Eligible Issuer and should be generally consistent with the source of repayment and strongest security typically pledged to repay publicly offered obligations of the Eligible Issuer
  - Eligible Notes issued by Non-Multi-State Entities will generally be expected to represent general obligations, or be backed by tax or other specified governmental revenues of State, City, or County
  - If the Eligible Issuer is an authority, agency, or other entity of a State, City, or County, such Eligible Issuer must either commit the credit of, or pledge revenues of, the State, City, or County, or the State, City, or County must guarantee the Eligible Notes issued by such issuer
  - If the Eligible Issuer is a Multi-State Entity, the Eligible Notes will be expected to be parity obligations of existing debt secured by a senior lien on the Multi-State Entity’s gross or net revenues

Source: SIFMA, Federal Reserve; as of 8/11/2020, Siebert Williams Shank & Co
MLF Borrowings
State of Illinois & NY MTA

**State of Illinois MLF Borrowing**
- In June, the State of Illinois became the first to use the Federal Reserve’s MLF program
- **Size:** Illinois issued $1.2 billion general obligation backed Notes
- **Pricing:** The Notes priced at a rate of 3.82% which represents a 380 basis point spread over the overnight swap index and 366 basis point spread over AAA MMD
- **Proceeds:** Proceeds are being used to bolster state liquidity and offset a portion of the tax hit from the COVID-19 crisis
- **Ratings:** The State is rated Baa3/BBB-/BBB- by Moody’s, S&P and Fitch, respectively

**Metropolitan Transportation Authority MLF Borrowing**
- On Tuesday, August 18th, the New York Metropolitan Transportation Authority rejected 20 bids on $465 million of Notes, opting instead to sell the notes through the Fed’s Municipal Liquidity Facility
- The 20 bids from 10 different banks averaged a True Interest Cost of 2.79%
- The Notes ultimately sold through the MLF pricing at a True Interest Cost of 1.93%, resulting in savings of approximately 86 basis points compared to public market levels
- The transaction closed on August 26th
- The MTA is currently projecting a $12 billion deficit through next year due to drastic declines in ridership as a result of the COVID-19 crisis
- **Credit:** Transportation Revenue Bonds are rated A2/BBB+/A+/AA+ by Moody’s, S&P, Fitch, and Kroll
- **Par Size:** $465 million Bond Anticipation Notes
- **Maturity Date:** August 1, 2023
- **Pricing:** The Notes priced at a rate of 1.93% which represents a 178 basis point spread to AAA MMD
- **Proceeds:** Proceeds of the notes will be used to retire BANs maturing on September 1st

Source: BondBuyer and EMMA, Siebert Williams Shank & Co
Going forward
State and local governments will have to continue to tackle significant fiscal challenges in Q4.

- S&P published a mid-year sector report for U.S. states with the expectation that rating stability in the 2nd half of 2020 remains negative.
  - Leading factors that predict budgetary distress continue to include revenue volatility, weaker rainy day reserves (especially after COVID), and elevated fixed costs.
  - In addition, many state budget decisions hinge on additional federal aid, but the amount and timing of this is uncertain.
  - The following are the agency’s key credit drivers for the 2nd half of 2020:

**Credit Drivers For Second Half Of 2020**

- **Pandemic response**
  - COVID-19 responses will continue to affect nearly all state expenditures, as well as many revenue streams.

- **Federal stimulus**
  - Additional aid possible, but timing and amount uncertain.

- **Uneven economic recovery**
  - Economic concentration and potential for additional pandemic-caused closures pressure pace of recovery.

- **Social unrest**
  - Protests against racial and income inequality could drive state policy changes, and if protracted affect economic and financial recovery.

- **Event risk**
  - Natural disaster and cybersecurity event risks coupled with recessionary pressures could make response more challenging and costly.

- **Revenue volatility**
  - Cash management and revenue predictability will be key to credit stability.

- **Fixed costs**
  - Pensions, Medicaid, OPES, and debt may worsen and where they were already a constraint, could further limit budget options.

Source: S&P, Siebert Williams
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