

The Federal Reserve's Liquidity Backstops to the Municipal Bond Market during the COVID-19 Pandemic

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Summary:

The COVID-19 pandemic has caused tremendous hardship all over the world. In response, the Federal Reserve has moved quickly and aggressively to support the economy in the United States. In this article, we present some initial evidence for the effectiveness of some of the facilities in calming the municipal bond market, particularly the short-term variable-rate demand obligation (VRDO) market. We discuss the important role of liquidity backstops in mitigating runs and stabilizing financial markets in general based on insights from our study on the runs on VRDO and auction-rate securities (ARS) in 2008 during the financial crisis.

Key findings:

The COVID-19 outbreak disrupted the U.S. municipal bond market in March as a result of a "flight to safety." The aggressive emergency lending facilities of the Federal Reserve have helped calm the market. Based on insights from our study on the runs on the short-term muni market during the financial crisis, we discuss the important role of liquidity backstops in stabilizing financial markets in general.

JEL classification: G10, G20, G21

Key words: COVID-19 pandemic, liquidity backstops, municipal bond

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Recent Disruption in the Municipal Bond Market

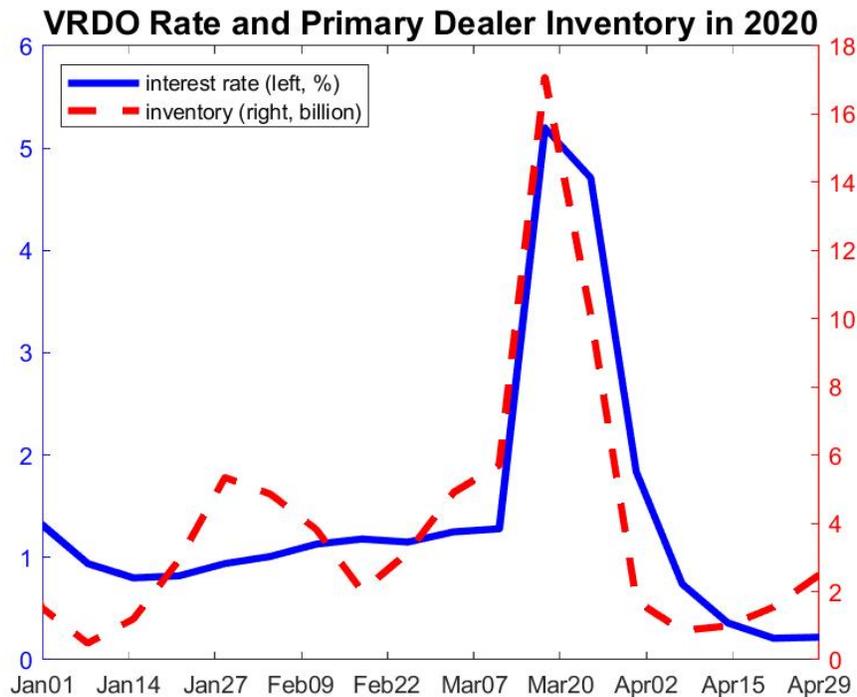
The COVID-19 pandemic has wreaked havoc on financial markets in the United States and the rest of the world. The S&P 500 stock market index dropped by 30 percent within only 22 trading days from its record high level on February 19, which is the fastest pace ever for such a drop. At the same time, the VIX index—the well-known “fear gauge”—skyrocketed to an all-time high of 82.69 on March 16, surpassing its previous peak of 80.86 on November 20, 2008, during the financial crisis.

Amid heightened uncertainty, investors started to view municipal bonds as riskier than previously thought. The resulting “flight to safety” disrupted the \$3.85 trillion market for municipal debt. According to the Investment Company Institute, for the week ending March 18, investors withdrew \$19 billion from municipal mutual funds and \$5 billion from tax-exempt money market funds, and similar outflows occurred in the following week. The COVID-19 pandemic has had an exceptionally large and negative impact on economic activity around the world.

The strains in the municipal bond market are evident in the market for the short-term municipal bond market for variable-rate demand obligations (VRDOs). VRDOs offer floating interest rates that are typically reset on a weekly basis. The left axis of figure 1 plots the average seven-day interest rate paid on high-quality VRDOs (see the blue solid line).¹ As the figure shows, the VRDO rate skyrocketed from about 1 percent in the beginning of the year to around 5 percent in the two-week period ending March 25.

¹ Data on the average seven-day VRDO interest rate are available from the Municipal Swap Index published by the Securities Industry and Financial Markets Association (SIFMA). They can be downloaded from SIFMA's website, <https://www.sifma.org/swapdata>.

Figure 1: Average Interest Rate and Primary Dealer Inventory of VRDOs



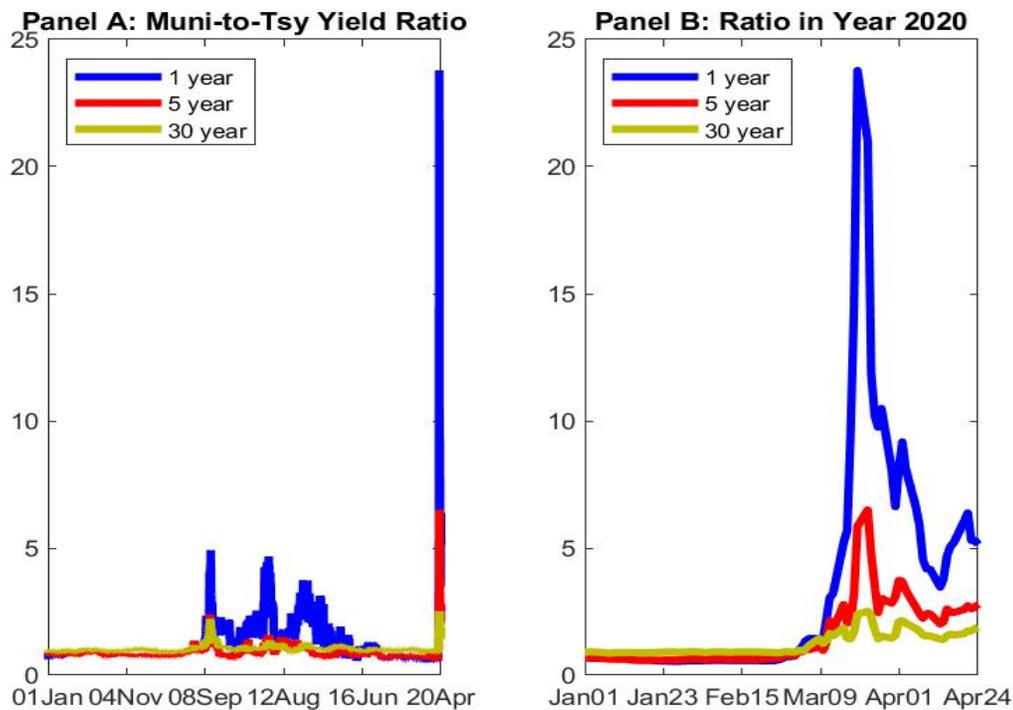
Source: SIFMA, the Federal Reserve Bank of New York, and Bloomberg

VRDOs explicitly have what is known as a liquidity guarantee, which a commercial bank or investment bank typically provides. The liquidity guarantee ensures the securities can be sold at full face value even if they cannot be successfully remarketed to other investors. In fact, as a result of the flight to safety, many VRDO holders offloaded them to primary dealers. The right-hand axis of figure 1 plots the inventories of VRDOs held by primary dealers (see the red dashed line). As the figure shows, the amount of VRDOs held by primary dealers skyrocketed to \$17 billion and \$10 billion, respectively, in the weeks ending March 18 and 25. In normal times the VRDO inventories of primary dealers average about \$3 billion with a standard deviation of \$1.7 billion. The recent sell-off in March thus increased primary dealers' VRDO inventories from its average level by four to eight standard deviations.

Besides the market for short-term VRDOs, other segments of the municipal bond market experienced similar disruptions. Figure 2 plots the ratio between yields of municipal and Treasury securities of the same maturity. Panel A plots the ratios for three maturities (one-, five-, and ten-year) since 2001, and panel B zeroes in on the current year. The figure shows that the ratios (or spreads) between high-rated municipal and Treasuries securities spiked around March 20 and remain elevated. For example, the one-year municipal bond yield jumped to a level that was 25 times as large as

Treasuries of comparable maturity. Panel A shows that as of the end of April, the spreads between municipal and Treasury securities remain elevated, hovering around the levels last seen at the peak of the financial crisis.

Figure 2: AAA-rated Municipal Bond Yields as Percentage of Comparable-Maturity Treasury Yields



Source: Bloomberg

The Federal Reserve's Responses during the COVID-19 Pandemic

Issuing municipal debt helps state and local governments meet balanced budget requirements, given that major expenditures might arrive at different times than government revenues. The strains in the municipal bond market make it harder, and costlier, to issue municipal debt. The coronavirus outbreak further exacerbated such funding liquidity problems for state and local governments that have been under enormous stress because of revenue losses and increased expenses. On the one hand, social distancing has had an adverse impact on the spending and wage income of consumers, which, in turn, reduces sales tax and income tax revenue. In addition, the postponement of the federal tax-filing deadline to July 15 also leads to a three-month delay for many state and local governments to receive

their tax revenues. On the other hand, coronavirus-related spending on public health, Medicaid, and unemployment insurance payouts has increased. The weakened fiscal position of issuing municipalities might even worsen the condition of the municipal bond market through a feedback loop.

In response to the coronavirus crisis, the Federal Reserve launched a wide range of facilities aimed at improving the functioning of financial markets. Among them, the lending facilities backstopping the municipal bond market include the Commercial Paper Funding Facility (CPFF, announced on March 17), the Primary Dealer Credit Facility (PDCF, announced on March 17), the Money Market Mutual Fund Liquidity Facility (MMLF, announced on March 18), and the Municipal Lending Facility (MLF, announced on April 9):

- *The PDCF*: Primary dealers can borrow at the primary credit rate from the facility by posting municipal bonds as collateral.
- *The CPFF*: Eligible municipalities can issue three-month municipal commercial paper to the facility at the overnight index swap (OIS) rate plus 110 basis points (bps).
- *The MMLF*: Eligible banks can borrow at the primary credit rate plus 100 bps from the facility against the collateral of short-term municipal debt and VRDOs purchased from tax-exempt money market mutual funds.
- *The MLF*: The facility will purchase up to \$500 billion of short term notes directly from U.S. states and large counties and cities.²

Through those emergency lending facilities, the Federal Reserve provides an unprecedented liquidity backstop to state and local governments under the authority of Section 13(3) of the Federal Reserve Act.³ On April 24, 2020, the Federal Reserve issued the first report to Congress to provide updates on the PDCF, CPFF, and MMLF facilities.⁴ According to the report, as of April 14, 2020, the total outstanding amount of loans under the PDCF was about \$34 billion, \$250 million under the CPFF, and \$51 billion under the MMLF.

Figures 1 and 2 show that the announcement of these lending facilities calmed the municipal bond market. For example, Figure 1 shows that upon the introduction of the facilities, both the VRDO

² To be eligible, U.S. counties must have a population of at least 500,000 residents, and U.S. cities must have a population of at least 250,000 residents. The interest rate of a tax-exempt eligible note is a comparable maturity OIS rate plus the applicable spread ranging between 150 to 590 bps based on its long-term rating.

³ Under Section 14 of the Federal Reserve Act, the ability of the Federal Reserve is limited to purchasing municipal debt subject to a six-month maturity limit.

⁴ The report is available at www.federalreserve.gov/publications/files/pdcf-mmlf-and-cpff-4-24-20.pdf.

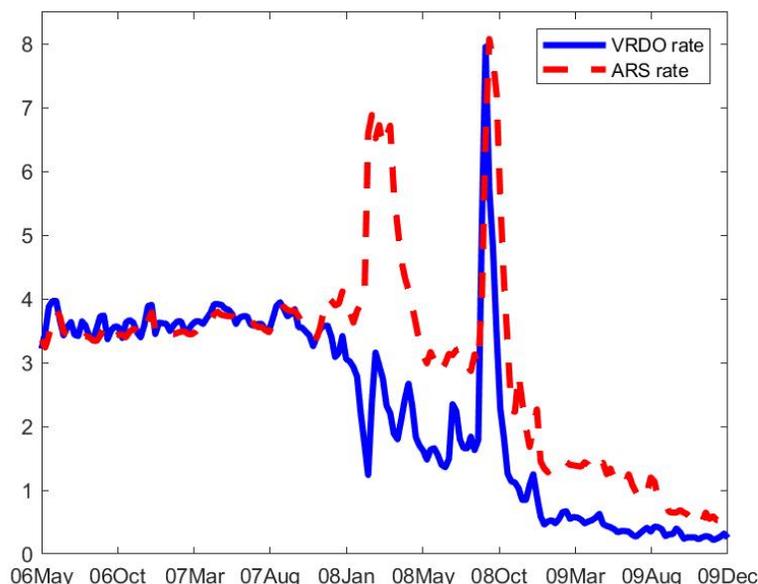
rate and primary dealers' VRDO holdings started to decline and settled at the levels seen before the coronavirus outbreak. Similarly, as Figure 2 shows, the spreads between longer-term municipal bonds and comparable Treasuries narrowed significantly. However, the spreads remain somewhat elevated, suggesting that some strains remain, possibly the result of issuing municipalities' weakened fiscal conditions.

The recent development in the municipal bond market illustrates the important role of liquidity backstops in stabilizing financial markets. A similar lesson can be learned from the turmoil in the short-term municipal bond market during the 2008–09 financial crisis. In fact, one segment of the short-term municipal bond market for ARS completely collapsed due to a lack of liquidity backstops. Our forthcoming paper provides a thorough analysis of the short-term municipal bond crisis during 2008 and quantifies the value of a liquidity backstop for its role in stabilizing financial markets. In the next section, we turn to the financial crisis and discuss lessons from the VRDO and ARS crisis in 2008.

The VRDO and ARS Crisis in 2008: The Role of Liquidity Backstops

ARS—another type of floating-rate municipal debt—are close substitutes for VRDOs. However, unlike VRDOs, ARS have no contractual liquidity backstops (Wei and Yue 2015). The markets for both VRDOs and ARS suffered runs in 2008 as many bondholders decided not to roll over the debt. Because of the lack of liquidity backstops, the run on ARS eventually caused the ARS market to collapse completely.

Figure 3 plots the average interest rates of VRDO and ARS between 2006 and 2009. Before the financial crisis, market participants had mistakenly believed that ARS have the same liquidity backstops as VRDOs, as reflected by the almost identical average interest rates in both markets before 2007. The outbreak of the financial crisis shattered this misconception: the average interest rates in these markets started diverging in November 2007.

Figure 3: VRDO and ARS Interest Rates during the Financial Crisis

Source: SIFMA and Bloomberg

One reason the interest rates of VRDOs and ARS diverged is the downgrades of several major municipal bond insurers (for example, Ambac and MBIA) that suffered losses on nonmunicipal credit exposures (for example, subprime mortgages). These downgrades resulted in selling pressure in the ARS market. Another cause of the divergence—the subprime mortgage meltdown—strained the balance sheets of auction agents (such as Citibank, Goldman Sachs, Lehman Brothers, UBS, Royal Bank of Canada, and JP Morgan) to the extent that they decided not to intervene, allowing the ARS auctions to fail in mid-February 2008. Reportedly, about 60 percent to 80 percent of auctions failed in the second half of February 2008.⁵ The wave of auction failures drove up the ARS rate to as high as 6.6 percent around mid-February 2008, as Figure 3 shows. The sheer volume of failed auctions—and the fear of future auction failures—propelled more investors to run on ARS. By contrast, the existence of liquidity backstops helped stabilize the VRDO market, and during that period the interest rate has stabilized at around 2 percent.

Later, the Lehman Brothers bankruptcy in September 2008 cast into doubt whether the liquidity providers would be able to honor their liquidity commitment. Consequently, runs on both VRDO and

⁵ See "Breakdown of auction rate securities markets," congressional testimony by Leslie Norwood, September 18, 2008.

ARS occurred, with the result that the average VRDO and ARS rates jumped in unison to around 8 percent. In the aftermath of the financial crisis, the ARS market collapsed afterwards, and no new ARS issuances have taken place since 2008.

These run episodes suggest that whether or not a liquidity backstop exists can lead to dramatically different dynamics in otherwise almost identical markets. In fact, the lack of a liquidity backstop makes the ARS market more susceptible to runs and led to its complete collapse.

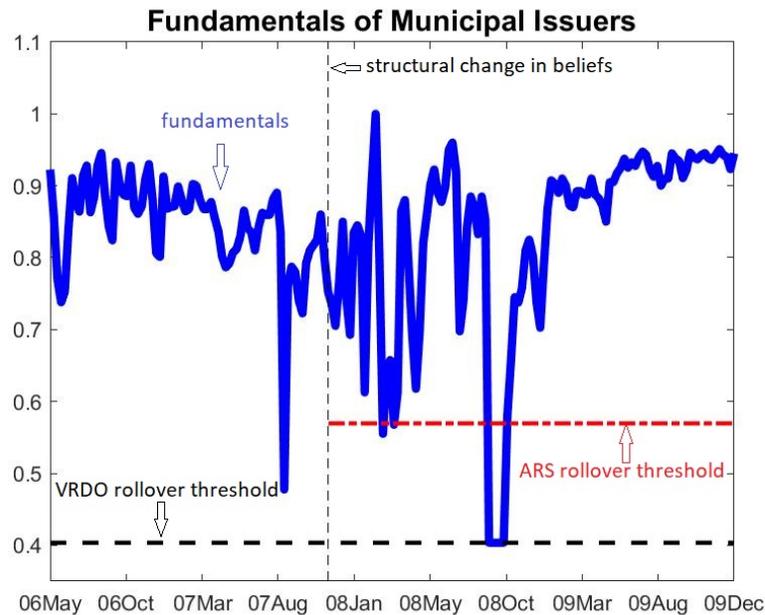
One important lesson that the VRDO and ARS crisis in 2008 taught us is that liquidity backstops play an important role in mitigating runs and stabilizing financial markets.

Quantifying the Value of a Liquidity Backstop

How do we quantify the value of a liquidity backstop for its run-mitigating role? In Wei and Yue (2020), we address this question by developing a dynamic debt run model based on He and Xiong (2012). The model captures the dynamic nature of the runs in these markets—that is, fear of possible future runs propels more investors to run earlier on. From the lens of the model, investors' decision to run or to roll over is characterized by a "rollover threshold." Whenever the fundamentals of the issuing municipality fall below the rollover threshold, investors decide not to roll over the debt.

Figure 4 illustrates the model's mechanism that explains the VRDO and ARS runs in 2008. The solid blue line depicts the model-implied fundamentals of the issuing municipality. The dashed vertical line represents a structural change in beliefs that occurred toward the end of 2007, when ARS investors started to recognize that the ARS market lacked liquidity backstops. As a result, the rollover threshold for ARS jumps to a higher level, depicted by the horizontal red line that sits above the horizontal black dashed line. The higher rollover threshold for ARS means that, all else being equal, ARS investors are more likely to run. We quantify the value of a liquidity backstop by estimating the increase in the ARS rate needed to equalize the rollover thresholds in both markets. Our estimation results suggest that a liquidity backstop is worth about 14.5 bps per annum, comparable with the Federal Deposit Insurance Corporation's deposit insurance premiums.

Figure 4: Dynamic Debt Runs on VRDO and ARS in 2008



Source: Wei and Yue (forthcoming) and authors' calculations

Conclusion

The COVID-19 pandemic has caused strains in various financial markets. In this article, we consider the recent disruption in the municipal bond market that occurred in March and present some initial evidence for the effectiveness of some of the Federal Reserve's emergency lending facilities in calming the market. Based on our forthcoming paper on the VRDO and ARS runs in 2008 during the financial crisis, we discuss the important role of liquidity backstops in mitigating runs and generally stabilizing financial markets.

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