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When COVID-19 Reached the Corporate Bond Market

We investigate how the pandemic affected the corporate bond market, and how the Fed responded.

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The views expressed in this article are not necessarily those of the Federal Reserve.

As the economic implications of the COVID-19 crisis became clear, financial markets across the globe entered a period of distress. As asset prices fell, investors rushed to liquidate large portions of their portfolios in a "dash for cash." However, in several key markets, investors found it difficult to find dealers that would buy these assets at a reasonable price.

One market that was under severe distress was the $10 trillion U.S. corporate bond market. This market, which is the primary source of funding for large U.S. corporations, was bound to play an important role during the pandemic, since firms in a number of hard-hit sectors–such as travel, hospitality, and entertainment–would surely need to borrow in order to survive significant declines in revenue. However, by the middle of March 2020, the corporate bond market was "basically broken," prompting the Federal Reserve to intervene in an unprecedented fashion.[1]

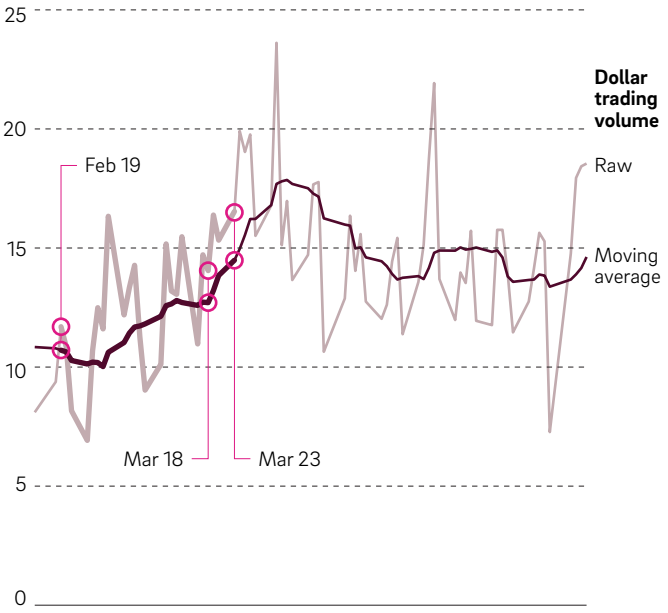
In this article, I describe the deterioration in trading conditions in the corporate bond market at the onset of the pandemic, and the likely causes of this deterioration. Then, I describe how the Federal Reserve intervened, and how the market responded. Finally, I pose a few questions for policymakers to consider before the next crisis.

FIGURE 1

Trading Volume Nearly Doubled from the Beginning to the End of March 2020

This reflects a surge in selling pressure.

Trading volume, billions of dollars, February 14 to May 30, 2020



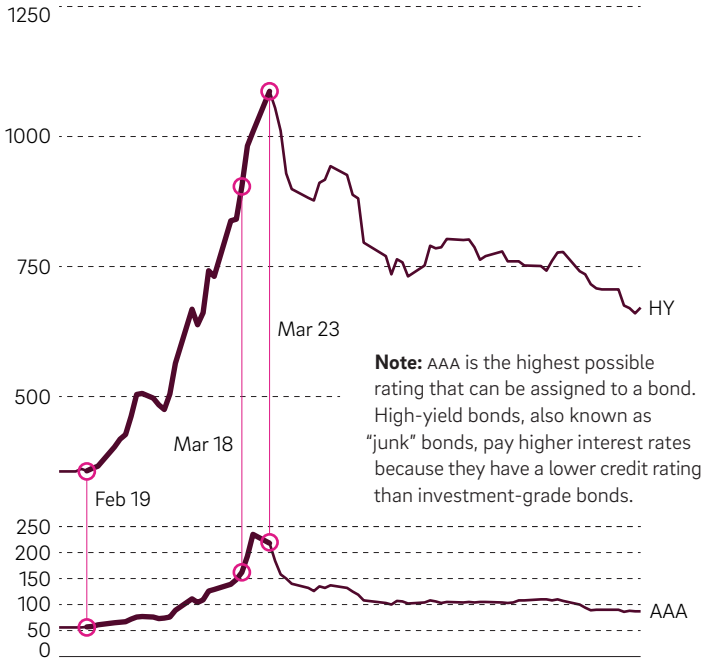
Source: TRACE corporate bond data set combined with the Mergent Fixed Income Securities Database (FISD).

FIGURE 2

Before the Fed's Interventions, Interest Rates on Bonds Surged as Their Prices Fell

The decline in prices affected both lower- and highly rated bonds.

Credit spread between corporate bonds and a risk-free security (a Treasury) in basis points, high-yield (HY) bonds and AAA-rated bonds, February 14 to May 30, 2020



Note: AAA is the highest possible rating that can be assigned to a bond. High-yield bonds, also known as "junk" bonds, pay higher interest rates because they have a lower credit rating than investment-grade bonds.

Source: ICE Data Indices (ICE BofA AAA U.S. Corporate Index Option-Adjusted Spread and ICE BofA U.S. High Yield Index Option-Adjusted Spread, both available from Federal Reserve Economic Data [FRED], St. Louis Fed).

Trouble in the Corporate Bond Market

After reaching an all-time high on February 19, 2020, U.S. equity markets began a rapid decline in early March as the COVID-19 virus spread throughout the world.[2] Soon after, the sell-off extended beyond equity markets and into a number of key credit markets.

In the corporate bond market, trading volume surged by more than 50 percent, reflecting a sharp increase in selling pressure (Figure 1). As a result, corporate bond prices began to fall and interest rates on corporate bonds—which move in the opposite direction as prices—rose sharply. In Figure 2, I plot the changes in interest rates for two types of corporate bonds relative to a risk-free benchmark. One line represents the spread between the interest rate on relatively safe corporate bonds (rated investment grade) and the interest rate on a risk-free security (a Treasury). The other line depicts the corresponding spread for riskier, high-yield corporate bonds (rated below investment grade). We see that interest rates on both relatively safe and somewhat riskier corporate debt spike substantially relative to the risk-free benchmark: The credit spread for safe bonds increased by about 150 basis points at the height of the crisis, while the corresponding spread for high-yield corporate debt increased more than 500 basis points.

Although it's painful for owners of corporate bonds, as well as for firms that need to borrow, there is nothing necessarily wrong with an increase in selling pressure and a subsequent fall in prices. These are simply signs of an increase in the supply of bonds for sale without a commensurate increase in demand. However, reports emerging from the corporate bond market last spring signaled a more fundamental problem: The market was becoming illiquid, in the sense that it was becoming harder and more costly for investors to trade at prevailing prices.

In a recent paper, five other economists and I attempted to quantify the deterioration in market liquidity in the corporate bond market during the COVID-19 crisis.[3] We measured the cost that dealers were charging for customers to buy and sell corporate bonds—also known as the bid-ask spread—under two trading arrangements.[4] The first type of trade, called a risky-principal trade, occurs when a dealer trades directly and immediately with a customer: The dealer purchases bonds from a customer who wants to sell, absorbing the bonds onto its own balance sheet; subsequently, the dealer draws down its inventory of bonds by selling to a customer who wants to buy. The second type of trade, called a riskless-principal or agency trade, occurs when a dealer

acts as a middleman and simply finds another customer to take the other side of the trade. These trades are typically less attractive for customers, since they have to wait while a dealer finds a counterparty, but more attractive for dealers, since they don't have to use their own balance sheet to facilitate the trade.

Measuring the cost of these two types of trades, along with the fraction of each type that occurs, provides a multidimensional assessment of market liquidity: We can learn about both the cost that customers are paying to trade and the speed at which they are trading. When we plot bid-ask spreads for risky-principal and agency trades from mid-February through May 2020, we see that the cost of executing a risky-principal trade increased dramatically in March, by more than 200 basis points, whereas the cost of agency trades increased more modestly (Figure 3). When we plot the fraction of trades executed as agency trades, we see that customers responded to the increase in the relative cost of immediate risky-principal trades by substituting toward slower agency trades (Figure 4). Hence, at the height of the pandemic-induced crisis in the corporate bond market, not only did it get more expensive for customers to trade, but it also took more time for them to trade.

What Caused the Deterioration in Market Liquidity?

While a variety of factors contributed to the sudden evaporation of liquidity in the corporate bond market in March 2020, two simultaneous developments appear to have played an outsized role. First, there was a dramatic increase in the quantity of bonds customers were trying to sell—that is, there was a surge in the demand for liquidity. At the same time, there was a decrease in dealers' willingness to absorb these bonds onto their own balance sheets—that is, there was a reduction in the supply of liquidity.

On the demand side, the ramifications of the pandemic for corporate profits, and the expectation that some corporate debt would be downgraded to a riskier rating, motivated many investors to decrease their exposure to the corporate bond market. Leading the way were mutual funds that invest in corporate bonds; these funds were forced to sell a portion of their corporate bond holdings as investors pulled out their money in droves. Economists Antonio Falato of the Federal Reserve, Itay Goldstein of the University of Pennsylvania, and Ali Hortaçsu of the University of Chicago report that the average corporate bond fund experienced cumulative outflows of approximately 9 percent of net asset value in February and March of 2020.

However, as noted above, a surge in selling pressure alone is not sufficient to cause a market to become illiquid. Indeed, in a well-functioning market, dealers would "lean against the wind," alleviating unusual selling pressure by increasing their holdings of the security. In this sense, dealers are supplying liquidity to the market: Their willingness to hold a larger inventory of securities implies that the security itself is more liquid.

However, regulatory requirements put in place after the 2007-2009 financial crisis likely made it more costly for dealer-banks to hold assets like corporate bonds on their balance sheets. As a result, when the pandemic-induced crisis hit last year, these dealer-banks were less willing to absorb the bonds for sale and supply liquidity. In fact, as selling pressure surged between March 5 and March 23, the dealer sector as a whole didn't absorb any of the immense selling pressure, on net, coming from the investor sector (Figure 5).

*See **Postcrisis Regulations and Balance Sheet Costs**.*

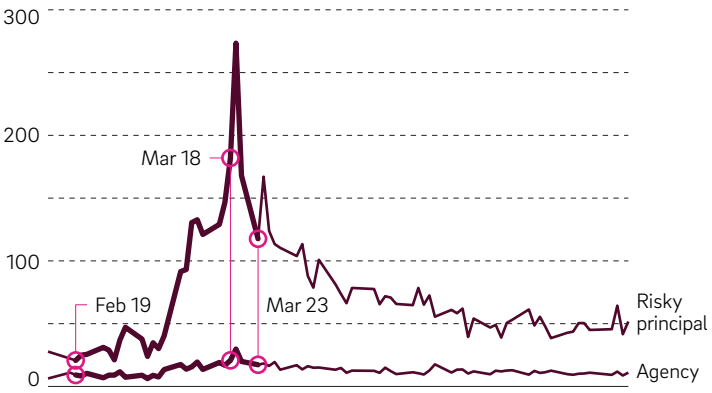
To summarize, two key forces behind the rapid deterioration in trading conditions in the U.S. corporate bond market were an increase in the demand for liquidity, coupled with a decline in the willingness of dealers to supply liquidity.

FIGURE 3

Before the Fed's Interventions, Risky-Principal Trades Became More Expensive

The cost of slower agency trades increased more modestly.

Bid-ask spread, basis points (bps), February 14 to May 30, 2020



Source: TRACE corporate bond data set combined with the Mergent Fixed Income Securities Database (FISD).

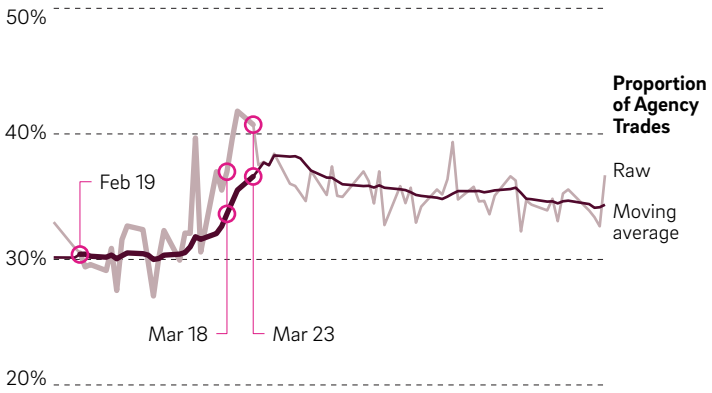
Note: The bid-ask spread is the cost that dealers charge customers to buy and sell corporate bonds.

FIGURE 4

Customers Responded to the Increase in the Cost of Risky-Principal Trades by Switching to Agency Trades

The cost of slower agency trades increased more modestly.

Percentage of trades executed as agency trades, February 14 to May 30, 2020



Source: TRACE corporate bond data set combined with the Mergent Fixed Income Securities Database (FISD).

When combined, these two forces can create a dangerous "illiquidity spiral": As assets get harder to sell to dealers, they become less valuable and riskier for investors to hold. Then, as investors' appetite for these bonds dwindles, dealers become even more concerned about buying them, since dealers know that if they buy these bonds, they have to either leave the bonds on their balance sheet for a long time or sell them at a loss. Facing the prospects of such a spiral—with rapidly falling bond prices and, hence, rapidly increasing borrowing rates for U.S. firms—the Federal Reserve decided to intervene.

The Fed Intervenes

The Fed responded to the turmoil in financial markets with a variety of measures (Figure 6). Early in the crisis, on March 3, the Federal Open Market Committee (FOMC), using its traditional lever for easing monetary policy, dropped the target for the fed funds rate by 50 basis points. Then, on March 15, the FOMC decreased the target rate by another 100 basis points, to essentially zero, and announced that it would use its full range of tools to support the flow of credit to households and businesses.

Among the many tools that the Fed chose to employ, three policies were most likely to affect liquidity in the corporate bond market, either by reducing investors' desire to sell their bonds or by increasing dealers' willingness to absorb these bonds onto their balance sheets.

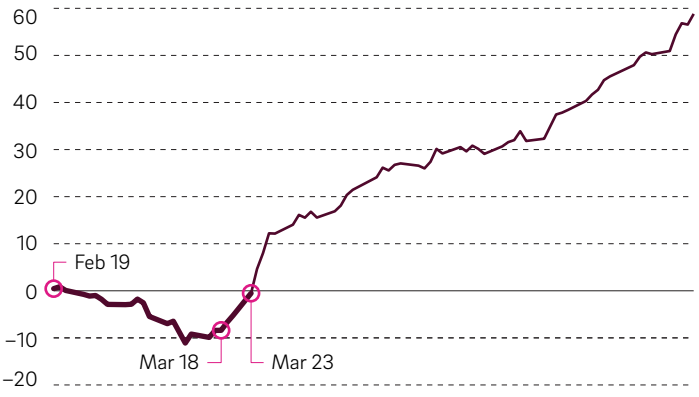
First, the Fed assumed the role of "lender of last resort" by introducing a number of facilities that made it easier and less costly for dealers to borrow funds. In particular, on the evening of March 17, the Fed announced that it would revive the Primary Dealer Credit Facility (PDCF). Originally introduced in 2008, the PDCF offered collateralized overnight term lending to primary dealers starting on March 20.[5] By allowing dealers to borrow against a variety of assets on their balance sheets, including

FIGURE 5

Before the Fed's Intervention, Dealer Banks Were Reluctant to Buy Bonds

This fueled the liquidity crisis.

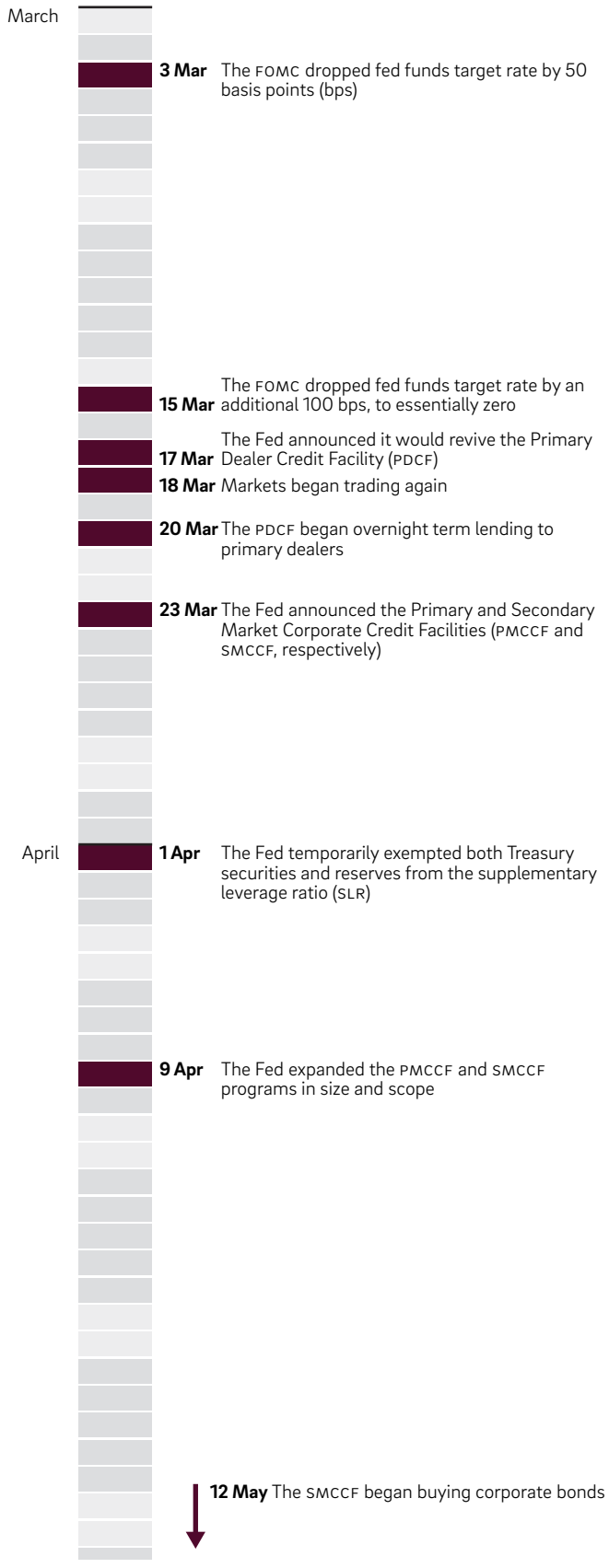
Cumulative inventory of corporate bonds held by dealer banks, billions of dollars, February 19 to May 30, 2020



Source: FINRA market sentiment tables.

FIGURE 6

Corporate Bond Market Timeline During the COVID-19 Crisis



corporate bonds, the PDCF was designed to reduce the costs associated with holding inventory and intermediating transactions between customers.

Second, to ease the panic and restore liquidity in the corporate bond market, on March 23 the Fed announced the Primary and Secondary Market Corporate Credit Facilities (PMCCF and SMCCF, respectively). According to the initial announcement, these facilities would allow the Fed, for the first time, to directly purchase investment-grade corporate bonds issued by U.S. companies, as well as exchange-traded funds (ETFs) that invested in similar assets. On April 9, these corporate credit facilities were expanded in both size and scope, allowing the Fed to also purchase some lower-rated corporate debt.[6] By stepping in as a (potentially large) buyer of corporate bonds, the Fed could ameliorate the risk of the illiquidity spiral described above by reducing investors' desire to sell their bonds and increasing dealers' willingness to buy them.

Finally, to relax dealers' balance sheet constraints and reduce the cost of providing intermediation services, on April 1 the Fed temporarily exempted both Treasury securities and reserves from the supplementary leverage ratio (SLR).[7] Although this exemption was primarily intended to increase liquidity in the Treasury market, the effects would clearly extend to the corporate bond market, since dealers would be more willing to absorb corporate bonds onto their balance sheets if there were less risk of violating the SLR.

How Markets Responded to the Fed's Intervention

After the Fed's various interventions were announced, the price of corporate bonds rebounded and credit spreads fell significantly, with an especially noticeable improvement after the March 23 announcement of the corporate credit facilities (Figure 2). At the same time, measures of market liquidity recovered. For example, the cost of trading immediately via risky-principal trades declined by more than 100 basis points (Figure 3), and there was a corresponding shift away from slower agency trades (Figure 4). Perhaps the starkest evidence of an improvement in liquidity provision comes from the sharp change in dealers' willingness to absorb inventory onto their balance sheets (Figure 5). Between March 18 and the end of May, dealers increased their net holdings of corporate bonds by more than $60 billion, thus doubling their precrisis holdings.

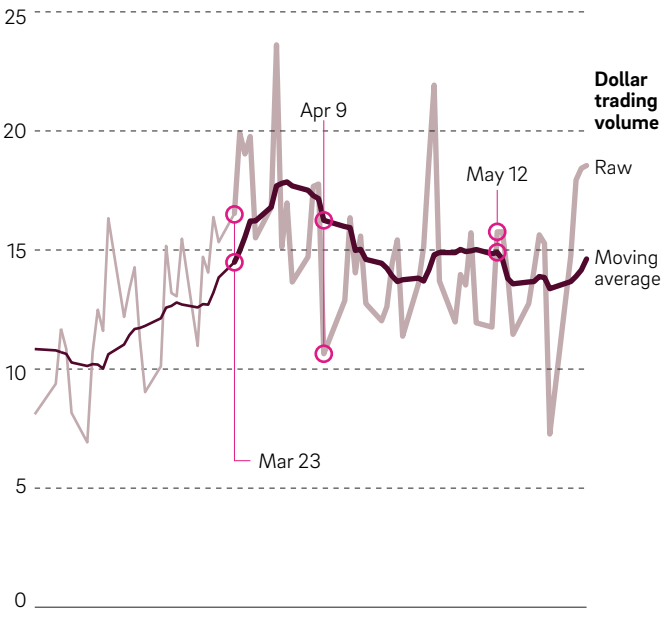
These observations establish the coincidence of key interventions and improvements in market liquidity, but they do not establish that the Fed's interventions caused an improvement in market liquidity. To study the causal relationship between policy and market conditions more closely, my coauthors and I exploited the eligibility requirements of the Fed's corporate credit facilities to perform a difference-in-differences regression.

FIGURE 1 (REVISITED)

After the Fed's Interventions, Trading Volume in Corporate Bonds Stabilized...

This reflects an easing in selling pressure.

Trading volume, billions of dollars, February 14 to May 30, 2020



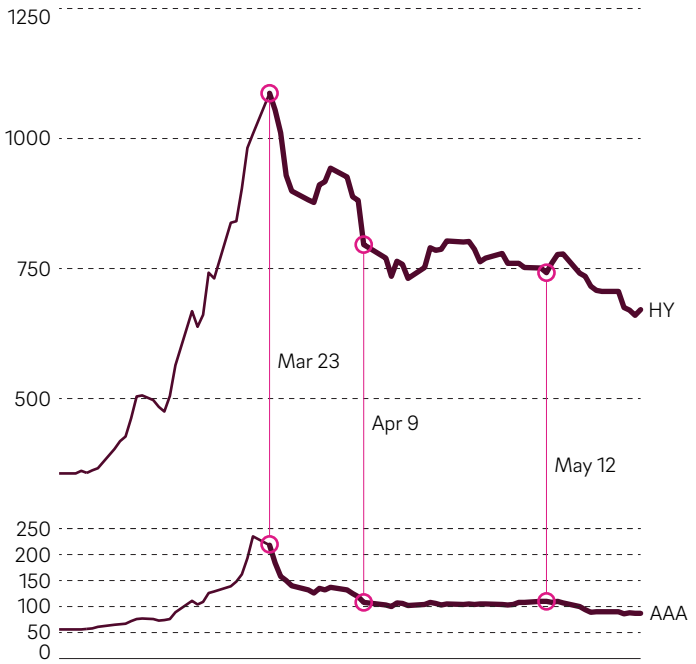
Source: TRACE corporate bond data set combined with the Mergent Fixed Income Securities Database (FISD).

FIGURE 2 (REVISITED)

...Interest Rates on Bonds Fell as Their Prices Stabilized...

Prices recovered for both lower- and highly rated bonds, but not fully.

Credit spread between corporate bonds and a risk-free security (a Treasury) in basis points, high-yield (HY) bonds and AAA-rated bonds, February 14 to May 30, 2020



Source: ICE Data Indices (ICE BofA AAA U.S. Corporate Index Option-Adjusted Spread and ICE BofA U.S. High Yield Index Option-Adjusted Spread, both available on Federal Reserve Economic Data [FRED], St. Louis Fed).

When the SMCCF was announced, the term sheet specified certain eligibility requirements for bonds to be purchased by the Fed. These requirements included an investment-grade credit rating and a maximum maturity of five years. The difference-in-differences approach attempts to isolate the causal effect of the Fed's bond-purchasing program by studying the differential behavior of bid-ask spreads before and after the announcement of the SMCCF for two groups of bonds: those eligible for purchase (the treatment group) and those ineligible (the control group). We found that immediately after the March 23 announcement, bid-ask spreads for risky-principal trades declined by about 50 basis points more for bonds that were eligible to be purchased by the SMCCF than for otherwise similar but ineligible bonds. Later, when the program was expanded in both size and scope—and other policies were introduced, such as the relaxation of the SLR—the cost of trading all bonds declined.

Interestingly, despite the significant improvements in the corporate bond market after the Fed's interventions, trading conditions did not fully return to their precrisis levels. Even in June 2020, the cost of risky-principal trades and the fraction of agency trades remained above the levels observed in January 2020. Hence, it appears that market liquidity did not fully recover, even after markets had calmed.

Lingering Questions

Given the expansive approach of the Federal Reserve during the height of the mid-March turmoil—in which a variety of distinct interventions were announced and implemented in a short period of time—it's difficult to isolate the effect of each program, and thus difficult to assess which interventions were most effective and why. However, policymakers need to understand the frictions that generated illiquidity and identify the policies that eased these frictions. In particular, what are the conditions that can generate large, sudden surges in selling pressure after an adverse event such as the outbreak of COVID-19? And which regulations prevent dealers from absorbing this selling pressure?

Though economists have not fully answered these questions, recent research is providing some clues. For one, the growing popularity of bond mutual funds over the last decade has enabled larger, more immediate surges in selling pressure during times of distress, since these funds are forced to liquidate their positions when investors withdraw their funds.[8] Hence, the Fed's March 23 announcement of the SMCCF—which calmed investors and reduced withdrawals from funds—appears to have played a key role in halting (and even reversing) the illiquidity spiral that began in the second week of March.[9]

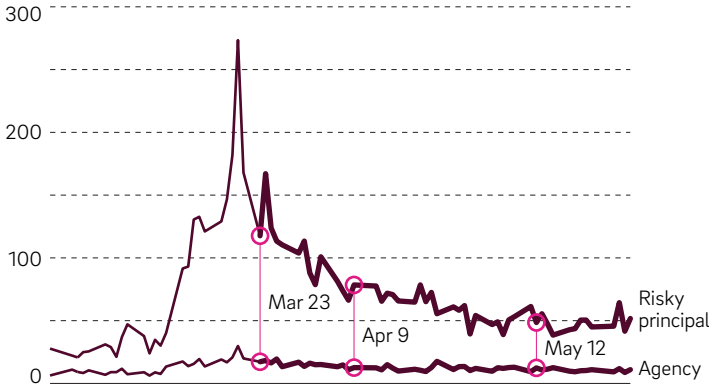
However, market liquidity had not fully recovered even months after the initial panic had passed, suggesting that lingering and important frictions could prevent dealers from "leaning against the wind" in future crises. Understanding the precise nature of these frictions and evaluating whether their costs (in terms of market liquidity) outweigh their benefits (in terms of financial stability) remain top priorities for future research.

FIGURE 3 (REVISITED)

...Risky-Principal Trades Became Cheaper...

This is a sign of improving market liquidity.

Bid-ask spread, basis points, February 14 to May 30, 2020



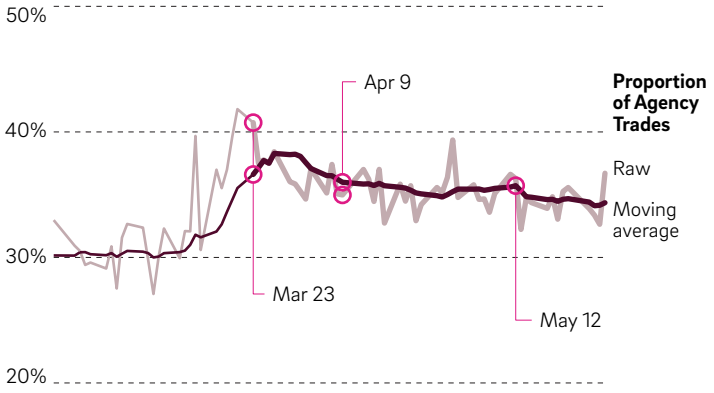
Source: TRACE corporate bond data set combined with the Mergent Fixed Income Securities Database (FISD).

FIGURE 4 (REVISITED)

...Fraction of Faster Risky-Principal Trades Increased...

This is another sign of improving market liquidity.

Percentage of trades executed as agency trades, February 14 to May 30, 2020

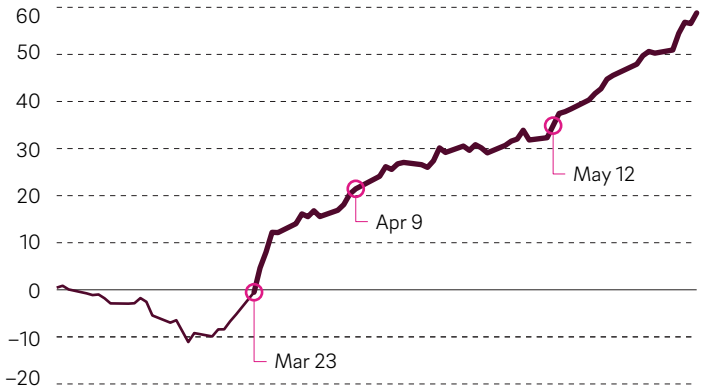


Source: TRACE corporate bond data set combined with the Mergent Fixed Income Securities Database (FISD).

FIGURE 5 (REVISITED)

...& Dealers Absorbed Assets onto Their Balance Sheets

Cumulative inventory of corporate bonds held by dealer banks, billions of dollars, February 19 to May 30, 2020



Source: FINRA market sentiment tables.

Postcrisis Regulations and Balance Sheet Costs

After the 2007–2009 financial crisis, a number of new regulations were introduced to strengthen the resilience of the banking sector. However, some of these regulations have arguably increased the cost for dealers of holding assets on their balance sheets and thus could have important consequences for liquidity provision in dealer-intermediated financial markets.

Perhaps the most important set of regulations is the 2010 Basel III framework, devised by the Basel Committee on Banking Supervision (BCBS). This framework includes both enhanced capital and new leverage-ratio requirements. For example, the BCBS introduced a liquidity coverage ratio (LCR), which requires banks to have enough high-quality liquid assets to cover potential outflows over a hypothetical 30-day period in which markets are experiencing stress. The Basel III framework also includes limits on leverage, including a supplementary leverage ratio (SLR) requirement, which ensures that a bank holding company's tier 1 capital is sufficiently large relative to its total leverage exposure, including both on-balance-sheet and off-balance-sheet exposures. In short, these types of requirements imply that banks need to hold more capital as their balance sheets expand, which is costly.

Another important set of regulations for U.S. dealer-banks derives from the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, which includes the so-called Volcker rule. Among other things, this rule prohibits banking entities from engaging in proprietary trading—that is, trading activities with their own accounts. Despite an exception for trading activities related to intermediating, or "market-making," in practice it can be difficult to distinguish between proprietary trading and market-making. Hence, if the Volcker rule reduced the incentive of regulated dealers to buy and sell bonds—since financial penalties would be incurred if this activity were deemed proprietary trading—then the Volcker rule could be responsible for decreased liquidity.[10]

In the academic literature, there are differing views on whether (and to what extent) these new regulations caused a decline in liquidity in the U.S. corporate bond market. In their study of a variety of price-based measures of market liquidity during "normal" trading conditions, University of California, Berkeley, economist Francesco Trebbi and Columbia Business School economist Kairong Xiao found very little effect of postcrisis regulations.[11] However, there is considerable evidence that after the implementation of these new regulations, markets appear less liquid (or less resilient) during periods of intense selling pressure. For example, several studies examine dealers' behavior in response to a large surge in selling pressure for nonfundamental reasons, such as when a bond must be sold by index funds because its maturity falls below a certain threshold.[12] Collectively, these studies find that the impact on prices during these episodes increased after the introduction of postcrisis regulations, and the effect is more pronounced at dealer-banks that are subject to regulation than at those that are exempt.

Notes

1 See Idzelis (2020).

2 For example, between March 5 and March 23, the S&P 500 index declined by more than 25 percent.

3 See Kargar et al. (forthcoming).

4 The price a dealer is willing to pay for an asset is called the "bid," while the price at which a dealer is willing to sell an asset is called the "ask." Hence, the difference or "spread" between the two prices is a natural measure of how much it costs to trade, and it is often used as a metric for market liquidity.

5 Primary dealers are trading counterparties of the New York Fed that intermediate markets for government securities, along with other fixed-income securities, including corporate and municipal debt.

6 Although announced on March 23, these facilities did not begin purchasing bonds until May 12.

7 These exemptions were extended first to bank holding companies and later to commercial bank subsidiaries.

8 See Falato et al. (2020), Ma et al. (2020), and Haddad et al. (forthcoming).

9 Boyarchenko et al. (2020) estimate that about one-third of the market's recovery can be attributed to the announcement of the PMCCF and SMCCF alone.

10 Bao et al. (2018) find that banks subject to the Volcker rule are less willing to provide liquidity during episodes in which investors are suddenly forced to sell corporate bonds.

11 Also see Adrian et al. (2017) and Anderson et al. (2017).

12 See Bao et al. (2018), Dick-Nielsen et al. (2019), Bessembinder et al. (2018), and Choi et al. (2019).

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