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NO. 986
SEPTEMBER 2021

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Nina Boyarchenko | Caren Cox | Richard K. Crump |
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Abstract

The Federal Reserve introduced the Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF) in response to the severe disruptions in corporate bond markets triggered by the COVID-19 pandemic and subsequent economic shutdowns. The Corporate Credit Facilities (CCFs) were designed to work together to restore functioning of credit markets, with an overarching goal of facilitating credit provision to the non-financial corporate sector of the U.S. economy. This paper provides an overview of the CCFs, including detailing the facilities' design, documenting their operations and usage, and describing their impact on corporate bond markets.

Key words: Federal Reserve, corporate bond markets, corporate credit facilities, PMCCF, SMCCF, Federal Reserve lending facilities

Boyarchenko, Cox, Crump, Danzig, Kovner, Shachar, Steiner: Federal Reserve Bank of New York (emails: nina.boyarchenko@ny.frb.org, caren.cox@ny.frb.org, richard.crump@ny.frb.org, andrew.danzig@ny.frb.org, anna.kovner@ny.frb.org, or shachar@ny.frb.org, patrick.steiner@ny.frb.org). This paper was prepared for an upcoming issue of the *Economic Policy Review* and a related New York Fed conference, "Implications of Federal Reserve Actions in Response to the COVID-19 Pandemic." The authors thank Michael Fleming, Darren Gersh, Kevin Henry, Catherine Kung, Shrilaxmi Satyanarayana, and an anonymous referee for comments and contributions. Some sections of this paper are based on Boyarchenko, Kovner, and Shachar (2020a) and *Liberty Street Economics* posts Boyarchenko, Kovner, and Shachar (2020b) and Boyarchenko et al. (2020). Dorinda Ma provided research assistance.

This paper presents preliminary findings and is being distributed to economists and other interested readers solely to stimulate discussion and elicit comments. The views expressed in this paper are those of the author(s) and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System. Any errors or omissions are the responsibility of the author(s).

To view the authors' disclosure statements, visit https://www.newyorkfed.org/research/staff_reports/sr986.html.

THE PRIMARY AND SECONDARY CORPORATE CREDIT FACILITIES¹

Nina Boyarchenko, Caren Cox, Richard K. Crump, Andrew Danzig, Anna Kovner, Or Shachar, and Patrick Steiner

The COVID-19 pandemic sparked selling across an unprecedented array of asset classes. We examine market dysfunction in the corporate bond market and measures implemented by the Federal Reserve with the support of the U.S. Treasury to ensure access to capital markets credit for U.S. corporate bond issuers.

In March 2020, the primary corporate bond markets seized up, raising concerns about access to credit for employers dependent on debt capital markets to fund their operations. As uncertainty increased about the pandemic, prices of corporate bonds, even those of investment-grade issuers, plummeted. Yield spreads relative to Treasury securities increased across the credit spectrum, with an average increase of approximately 250 basis points (bps) for investment-grade bonds and 550 bps for high-yield bonds. In the last two weeks of March 2020, mutual funds and exchange-traded funds (ETFs) specializing in corporate bonds experienced almost \$200 billion in outflows. Measures of liquidity such as bid-ask spreads deteriorated dramatically, reaching levels not seen since the Global Financial Crisis (GFC). These market dislocations saw a sharp increase in the pricing of investment-grade issues, with new issuance approaching interest rates at more than 50 bps above the secondary market yields of bonds of the same issuers (approximately double the usual new issue concession). High-yield corporate bond issuance halted entirely between March 4 and April 16, 2020. There were more than \$9.6 trillion in corporate debt securities outstanding as of the end of 2019. These corporate bonds represent the majority of U.S. corporate debt.²

On March 23, 2020, the Board of Governors of the Federal Reserve System (the Board) announced several interventions to respond to the economic and market dislocations triggered by the pandemic and subsequent economic shutdowns.³ These included the Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF), together the Corporate Credit Facilities (CCFs). The CCFs were designed to work together to support market functioning for corporate bonds and syndicated loans, with an overarching goal of facilitating credit provision to the nonfinancial corporate sector of the U.S. economy. The CCFs were authorized under Section 13(3) of the Federal Reserve Act. The SMCCF commenced ETF purchases on May 12, 2020, and bond purchases on June 16, 2020. The PMCCF became operational on June 29, 2020, but no qualified borrower ever expressed the need to consummate an issuance with that facility's support. The SMCCF wound down purchases to a minimal level at the end of July 2020 and ceased purchases as of December 31, 2020, after making total purchases of \$14 billion. The Board announced the wind-down of the SMCCF portfolio on June 2, 2021, and it was completed by August 31, 2021.

The goal of the CCFs was to support market liquidity and the availability of credit for large employers by providing a backstop to U.S. issuers of investment-grade corporate debt. The facilities worked together to reassure issuers and investors that firms would be able to roll over their maturing bonds and issue new debt, stabilizing the financial markets' ability to extend credit to U.S. businesses of good credit

quality. The continued ability to issue debt enabled companies to continue to employ workers and to fund investment in working capital, investment that was increasingly required by the pandemic-related shutdowns. In addition to supporting access to capital markets, in many cases the facilities also supported bank lending by reducing liquidity demands at banks, where many bond issuers had pre-emptively drawn down their revolving credit lines. At the extreme, even solvent corporations could be forced to default on their obligations if they could not refinance maturing debt, a catastrophe that was avoided through the restoration of bond market functioning.

This paper offers an overview of the CCFs, their design, and their impact on corporate debt markets. In Section 1 we explain the role of bonds as a source of funding for U.S. corporations as well as events that led up to the dislocations in these markets and ultimately to the creation of the facilities. Section 2 presents operational information on the PMCCF and SMCCF and explains how the facilities worked in concert to support U.S. companies. Section 3 describes the impact of the facilities on the corporate bond market and its functioning, while Section 4 details moral hazard concerns related to official sector support of capital markets. We conclude in Section 5.

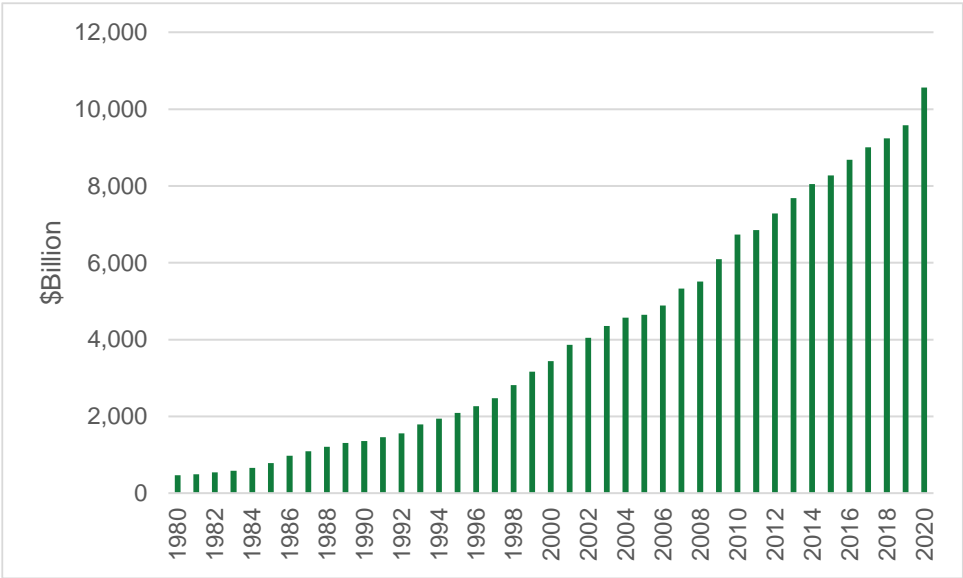
1. BACKGROUND ON CORPORATE BONDS

1.1 Overview of Corporate Bond Markets

Overall market size

The U.S. corporate bond market is one of the largest fixed income markets in the world and represents more than two-thirds of total debt funding provided to U.S. nonfinancial corporations. Chart 1 plots the time series of U.S. corporate bonds outstanding. The amount of U.S. corporate bonds outstanding has grown every year since 1980, with an average annual growth rate of 8 percent. While U.S. corporate bond issuers are large in terms of total assets, they do not all have ready access to equity financing through public markets: As of the end of 2019, firms without publicly traded equity represented more than a third of outstanding corporate bonds by amount.

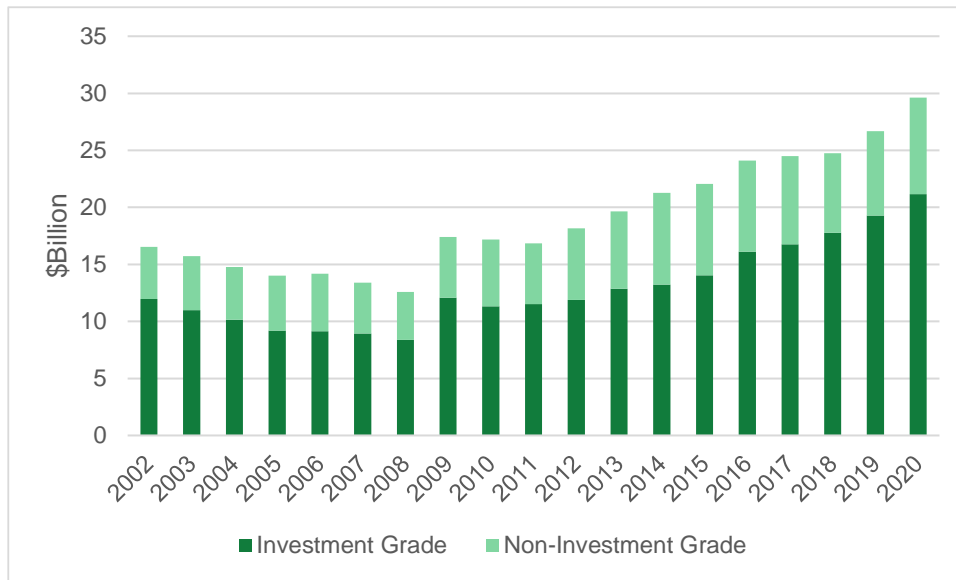
Chart 1 U.S. Corporate Bonds Amount Outstanding



Source: SIFMA. Includes U.S. financial and nonfinancial corporations, including bonds issued both in the U.S. and in foreign countries (not included are bonds issued in foreign countries by foreign subsidiaries of U.S. corporations). SIFMA considers bonds, notes, debentures, mandatory convertible securities, long-term debt, private mortgage-backed securities, and unsecured debt in its report of amount outstanding.

The secondary market for corporate bonds has historically been over the counter, with investors interacting with dealers. Chart 2 reports the annual average daily trading volume since the advent of the Trade Reporting and Compliance Engine (TRACE). Overall trading volume has increased steadily since the GFC. Despite being a relatively smaller share of issuance, non-investment-grade issues have represented roughly a third of secondary market trading over time.

Chart 2 Publicly Traded U.S. Corporate Bonds Daily Trading Volume

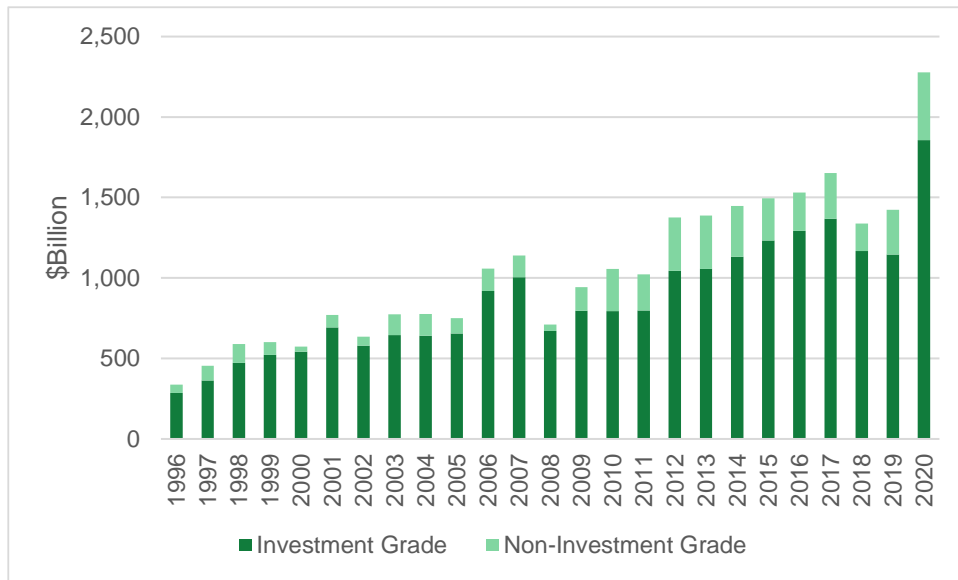


Source: SIFMA. Includes U.S. financial and nonfinancial corporations, including bonds issued both in the U.S. and in foreign countries (not included are bonds issued in foreign countries by foreign subsidiaries of U.S. corporations).

Primary market issuance and pricing

U.S. corporate debt has been growing steadily over the past twenty-four years, with investment-grade firms representing the majority of corporate bond issuance as shown in Chart 3. More generally, when investment-grade companies work with their underwriters to issue debt in the primary market, price-setting discussions begin with reference to the traded prices of that company’s own debt as well as the prices of debt of similar companies in the secondary market. The underwriters then approach potential investors to build a book of interest for that debt and settle on a market-clearing issuance price. Owing to both demand and supply factors, primary market issuance slows during periods of market distress. On the demand side, underwriters may become unwilling to intermediate in the primary market if they are unsure of their ability to place issues, especially those from riskier borrowers during market downturns. On the supply side, since both secondary market spreads and primary-secondary spreads increase during periods of market stress, opportunistic issuance—that is, issuance by firms not facing imminent rollover financing needs due to maturing bonds—decreases. Secondary market conditions play a crucial role in the determination of the funding costs of new issuances and their quantity.

Chart 3 U.S. Corporate Bond Issuance

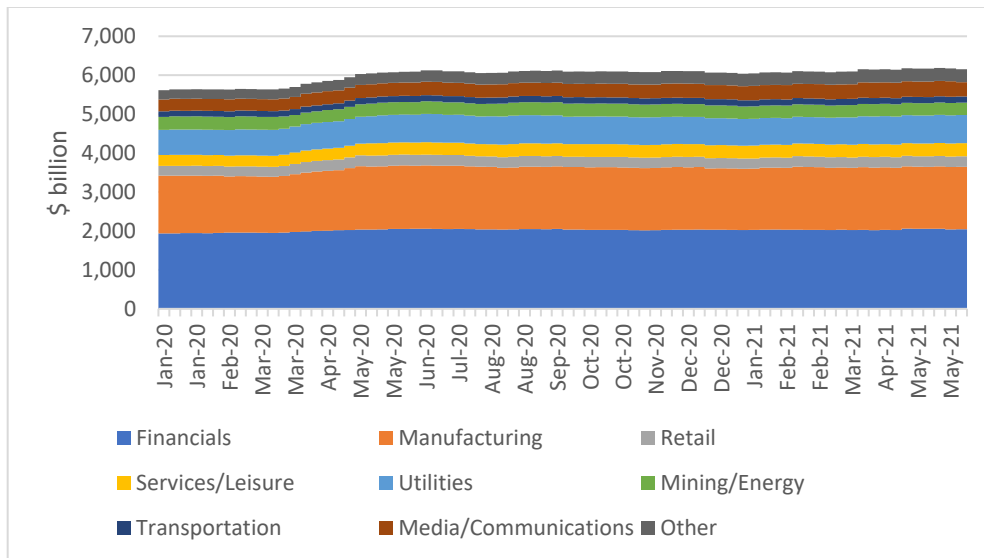


Source: SIFMA. Includes U.S. financial and nonfinancial corporations, including bonds issued both in the U.S. and in foreign countries (not included are bonds issued in foreign countries by foreign subsidiaries of U.S. corporations). SIFMA issuance includes all corporate debt, medium-term notes (MTNs), and Yankee bonds, but excludes all issues with maturities of one year or less and CDs.

U.S. corporate bond market entering the pandemic

At the start of the pandemic, the U.S. corporate bond market had almost \$10 trillion of corporate bonds outstanding. Chart 4 plots the amount outstanding across major industry classifications. Roughly two-thirds of investment-grade amounts outstanding had been issued by nonfinancial corporations, with the manufacturing and utilities sectors the largest issuers. Thus, disruption in the corporate bond market during March 2020 had the potential to affect nonfinancial corporations significantly.⁴

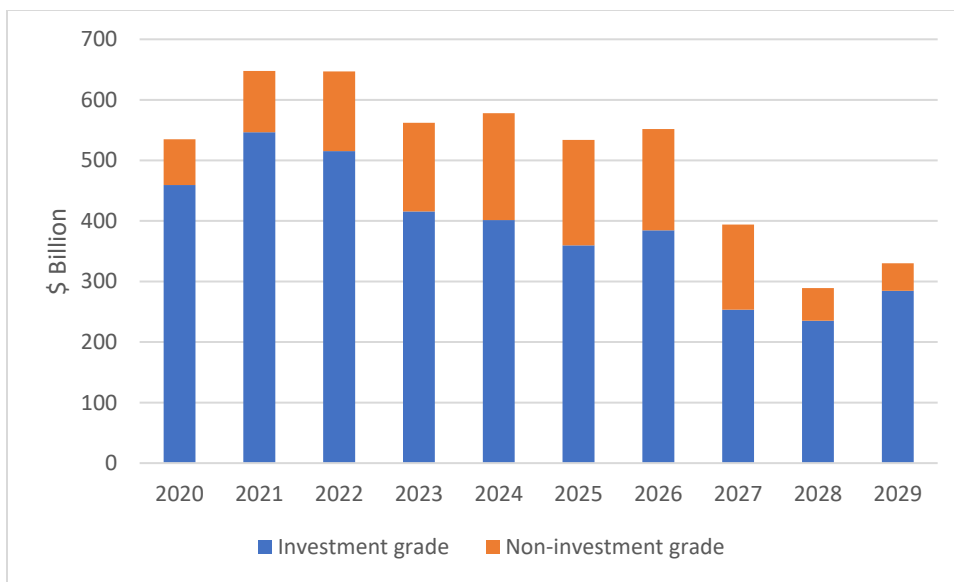
Chart 4 Industry Mix of Investment-Grade Corporate Bonds Amount Outstanding



Source: Authors' calculations using Mergent FISD. Investment-grade is determined at the issue level based on ratings from the top three nationally recognized statistical rating organizations (NRSROs): S&P, Moody's, and Fitch. The chart shows only the universe of nonconvertible USD-denominated investment-grade bonds issued by U.S.-domiciled companies with standard bond characteristics. The sector of each bond is determined by the industry code of the issuer that is reported by Mergent FISD.

Another way of evaluating the potential impact of the March 2020 disruption in the corporate bond market is through the lens of corporate bonds outstanding that were due to mature in the near term. Chart 5 plots the amount outstanding as of December 2019 scheduled to mature in each year from 2020 to 2029. The chart shows that a quarter of all investment-grade amounts outstanding were scheduled to mature by the end of 2021. Thus, the direct impact of a freeze in corporate bond markets—that is, the inability of issuers to roll over maturing debt—could have been very large.

Chart 5 Rollover by Year as of 12/31/2019



Source: Authors’ calculations using Mergent FISD. Investment-grade and non-investment-grade are determined at the issue level based on ratings from the top three nationally recognized statistical rating organizations (NRSROs): S&P, Moody’s, and Fitch. The chart shows only the universe of nonconvertible USD-denominated investment-grade bonds issued by U.S.-domiciled companies with standard bond characteristics.

To gauge the potential broader economic impact of this rollover risk, we examine the subset of U.S. corporate bond issuers with publicly traded equity and financial statement information in Compustat. We identified 358 companies with bonds that were due to mature in 2020 or 2021, representing approximately 70 percent of employees and capital expenditures of all Compustat firms. If companies were unable to refinance those bonds, their inability to repay may have led to an immediate default on all their debt obligations, through the operation of cross-default provisions in the underlying debt, in turn potentially triggering a cascade of defaults throughout their supply chain. In the extreme, firms with a total of \$2.2 trillion in public bond claims could have entered bankruptcy if cross-default provisions had been invoked. These companies employed more than 21 million people and spent more than \$1.1 trillion on capital expenditures in 2019. This does not count the employees of their suppliers, who would have been affected as well.

In addition to financing themselves in debt capital markets, many U.S. corporate bond issuers have lines of credit from banks or syndicates of banks. These lines of credit represent a significant source of funding, although generally not one large enough to refinance outstanding bonds. Significant drawdowns of credit lines were also seen at this time, as borrowers sought to ensure maximum liquidity (Acharya, Engle, and Steffen 2021).

The potential impact of bankruptcies would likely be large; estimates in the academic literature put the deadweight losses from bankruptcies at about 10 percent of company value. For example, in the financial crisis, Hortaçsu et al. (2013) find that when General Motors was at risk of defaulting, the possibility of such risk reduced demand for new GM cars and the price of used GM cars. The implications of financial distress can be negative for firm value even without default: Almeida and Philippon (2007) estimate the cost of financial distress for BBB-rated issuers at 4.5 percent of firm value. While the U.S.

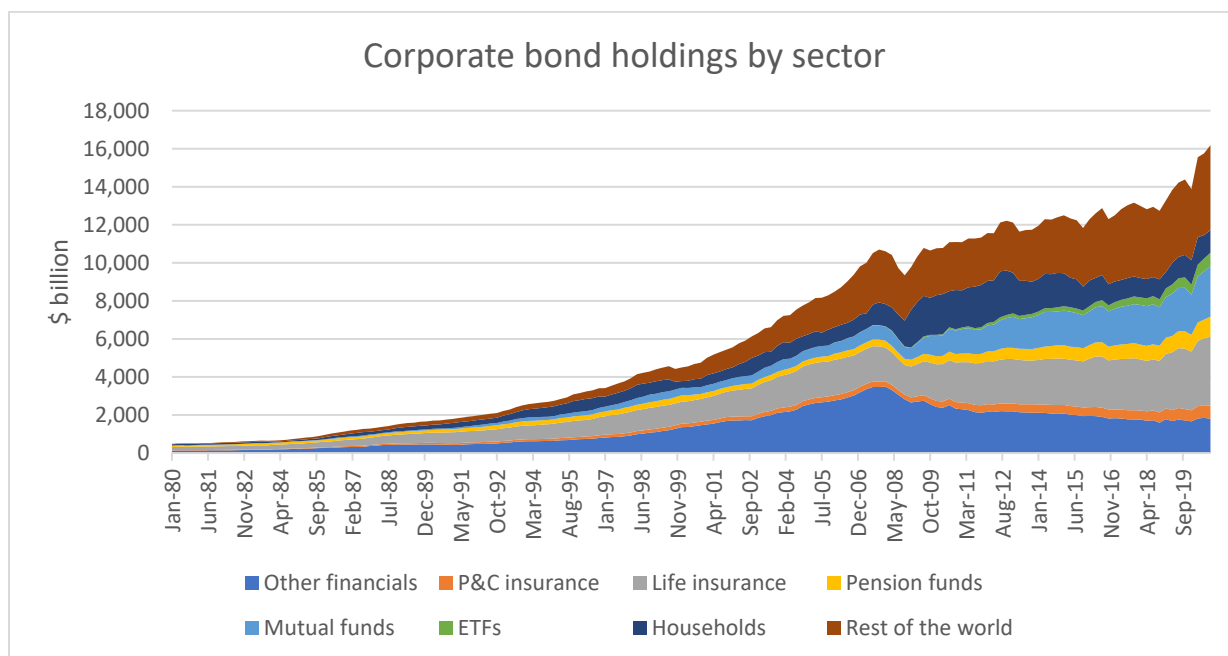
historically has an efficient bankruptcy system to reorganize companies, the system has limited capacity, and if many companies defaulted simultaneously, reorganization would be less efficient.

Holders of corporate bonds

In addition to serving as a major source of funding for U.S. corporations, U.S. corporate bonds are also an important investment vehicle for a wide variety of investors. The majority (60 percent) of U.S. corporate bonds are owned by U.S. residents, according to data from the Treasury International Capital System. These holdings are held both indirectly, through life insurance or mutual funds, and directly, by households and pension funds, with fixed income comprising approximately 20 percent of public pension assets.

Chart 6 plots how corporate bond holdings by different types of investors have evolved over time. The chart shows that insurance companies and, in particular, life insurance companies hold an increasingly large fraction of corporate bonds outstanding. Similarly, mutual fund holdings have risen since the GFC. ETFs are a relative newcomer to the market; although their share of the market has increased noticeably over the last fifteen years, ETF holdings represent less than 4 percent of the amount outstanding. Mutual funds and ETFs engage in significant liquidity transformation, offering daily liquidity to their investors despite holding a pool of corporate bonds that may not always be readily available to trade on a daily basis. This liquidity transformation, particularly in the case of mutual funds, means that there can be a first mover advantage for fund investors, creating risks of fire sales in these markets since early sellers may receive higher prices for their shares. Thus, an additional benefit of the CCFs is that by reducing the potential for widespread defaults, the facilities may have avoided shocks to the pensions and other investments of American workers saving for retirement.

Chart 6 Corporate Bond Holdings by Different Sectors of the Economy



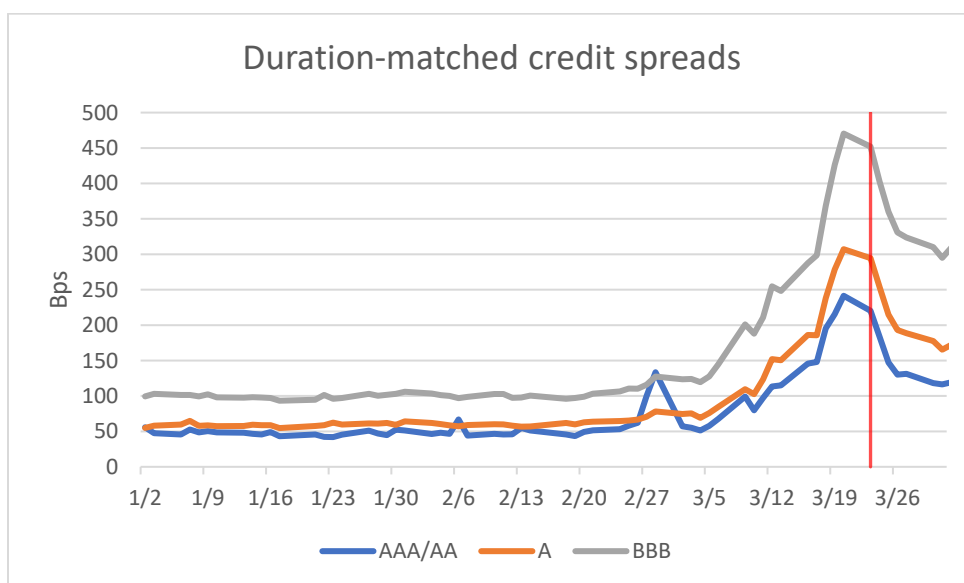
Source: Flow of Funds of the U.S., Table L.213 "Corporate and foreign bonds." Note that "households" includes hedge funds.

1.2 Market Dislocations in Response to COVID-19

Prior to the COVID-19 pandemic, credit spreads were at historical lows and overall market conditions were buoyant.⁵ In early March 2020, conditions started to deteriorate, with measures of liquidity and cross-market pricing indicating notable market disruption and credit spreads increasing.

Chart 7 plots the evolution of average duration-matched credit spreads—that is, the spread between the priced yield on a corporate bond and the yield on an off-the-run Treasury security with a comparable cash-flow profile—for three subcategories of investment-grade bonds. Across all three categories, spreads increased precipitously at the beginning of March. Overall, between February 20 and March 21, spreads on AAA/AA increased by 200 bps, spreads on A by 240 bps, and spreads on BBB by 370 bps. These one-month increases are comparable to the worst spread changes observed during the GFC.

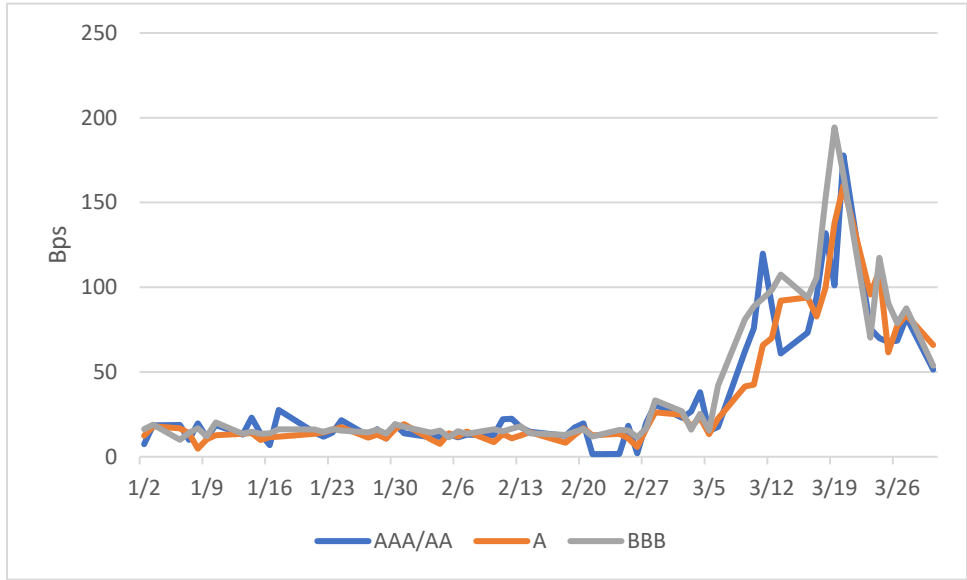
Chart 7 Investment-Grade Duration-Matched Credit Spreads



Source: Authors' calculations using dealer-to-customer transaction prices from TRACE. "AAA/AA" includes bonds rated AAA, AA+, AA, and AA- by S&P, Moody's, or Fitch. When ratings from multiple agencies are available, we use the plurality rating rule to construct a composite bond-level rating. "A" includes bonds rated A+, A, and A-. "BBB" includes bonds rated BBB+, BBB, and BBB-.

Bid-ask spreads, the difference between the price at which a dealer sells to and buys from a customer, are a widely used measure of liquidity because they represent the transaction cost to buy or sell a security. These spreads spiked in March to levels not seen since the GFC. Chart 8 shows that bid-ask spreads for investment-grade bonds widened rapidly at the beginning of March across all investment-grade bonds. The average bid-ask spread of investment-grade bonds increased from 15 bps in February to more than 160 bps at the March peak.

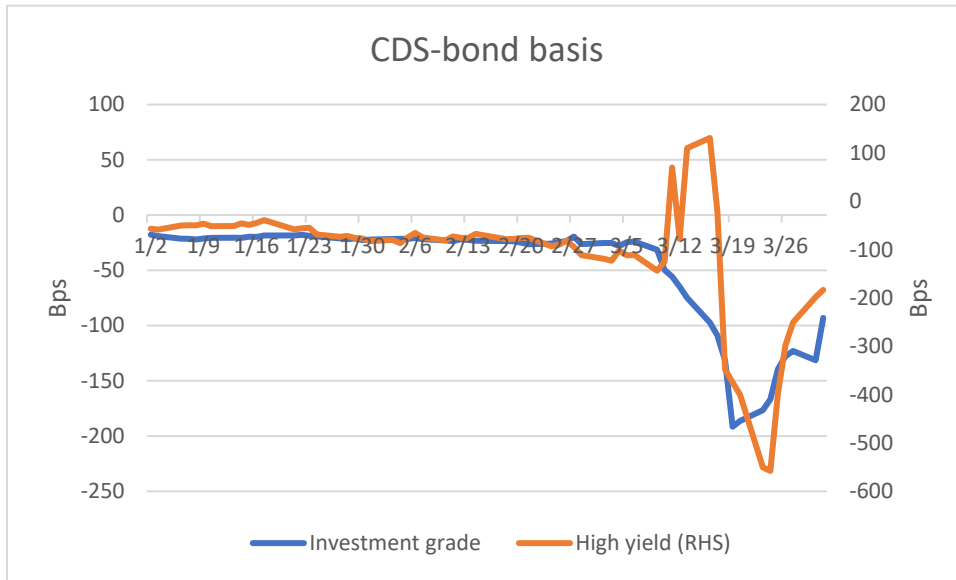
Chart 8 Bid-Ask Spreads (Basis Points of Interest Rate Spreads)



Source: Authors' calculations using dealer-to-customer transaction prices from TRACE. "AAA/AA" includes bonds rated AAA, AA+, AA, and AA- by S&P, Moody's, or Fitch. When ratings from multiple agencies are available, we use the plurality rating rule to construct a composite bond-level rating. "A" includes bonds rated A+, A, and A-. "BBB" includes bonds rated BBB+, BBB, and BBB-.

Corporate bonds are linked to other markets for credit risk, such as the credit default swap (CDS) market. The CDS-bond basis compares the price of a bond to the price of selling insurance against default from a derivative contract. Theoretically, the CDS-bond basis should be close to zero, and over the past fifteen years, the median basis has been -19 bps for investment grade (IG) and -42 bps for high yield (HY). A negative basis generally suggests that buying exposure to credit risk through bonds is cheaper than obtaining exposure through CDS. Periods when prices for the same financial risk are different across markets are symptomatic of poor market functioning, and Chart 9 shows that during the pandemic-related market disruptions, the basis widened substantially to reach levels of around -175 bps for IG bonds (and -550 bps for HY bonds) on March 23. For comparison, IG and HY CDS-bond bases reached -274 bps and -720 bps, respectively, during the 2007-09 financial crisis (Choi, Shachar, and Shin 2019).

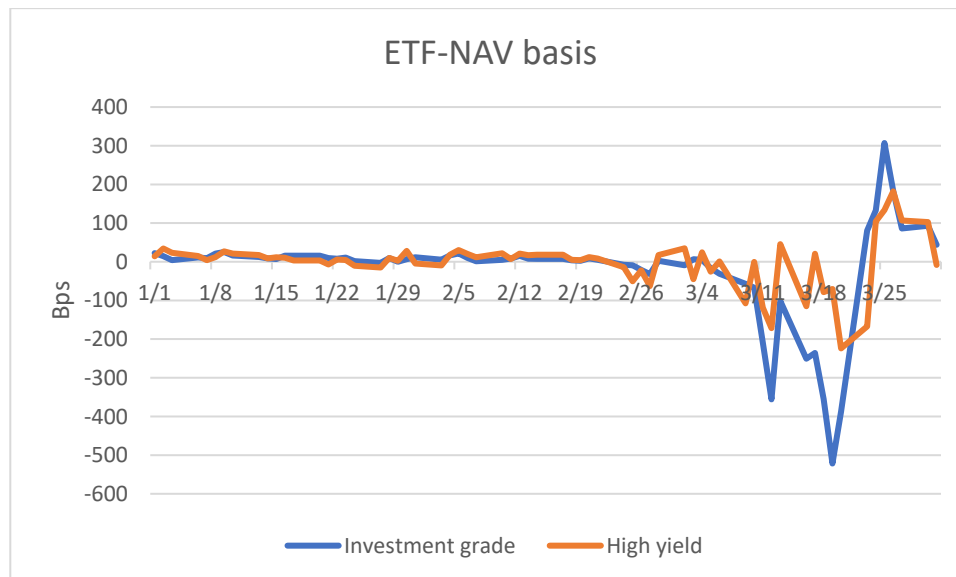
Chart 9 CDS-Bond Basis



Source: JPMorgan Chase. The CDS-bond basis is the difference between the CDS spread and the implied spread on a bond with the same maturity.

Likewise, the ETF-NAV (net asset value) basis captures the difference between the traded price of an ETF and the market value of its holdings. A negative ETF-NAV basis suggests that it is cheaper to buy credit risk exposure through an ETF share than to buy the underlying basket of securities (Pan and Zeng 2019). Chart 10 shows that during the March 2020 dislocations, the average ETF-NAV basis for ETFs specializing in investment-grade bonds fell below -5 percent, indicating extreme mispricing between the more liquid ETF shares and their less liquid bond holdings. In comparison, the ETF-NAV basis for ETFs specializing in investment-grade bonds fell below -9 percent in September 2008.⁶

Chart 10 ETF-NAV basis



Source: Bloomberg. AUM-weighted average of ETF-level ETF-NAV basis in each category.

Generally, these breakdowns of arbitrage relations provide further evidence of market dislocation. Although it is hard to normatively conclude which market is dislocated, generally both CDS and ETF markets are considered more liquid than the corporate bond market, in particular when thinking about exposure to a basket of bonds.

2. OPERATIONAL DESIGN

2.1 CCF and Other Federal Reserve Announcements

On March 23, 2020, the Board of Governors of the Federal Reserve System announced the Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF). The announcement included term sheets for both facilities that outlined key terms and applicability, which are described in Section 2.3.

At the same time, the Federal Reserve announced a number of other actions, including:

- (1) purchasing Treasuries and agency securities, including residential and commercial mortgage-backed securities;
- (2) establishing the Term Asset-Backed Securities Loan Facility (TALF);
- (3) establishing the Primary Dealer Credit Facility (PDCF);
- (4) expanding the Money Market Mutual Fund Liquidity Facility (MMLF) to include a wider range of securities, including municipal variable-rate demand notes (VRDNs) and bank certificates of deposit; and
- (5) expanding the Commercial Paper Funding Facility (CPFF) to include high-quality, tax-exempt commercial paper as eligible securities and reducing the pricing of the facility.

In addition, the federal government approved approximately \$3 trillion in spending in the first half of 2020 through the Coronavirus Preparedness and Response Supplemental Appropriations Act (March 6, 2020); the Families First Coronavirus Response Act (March 18, 2020); the Coronavirus Aid, Relief, and Economic Security (CARES) Act (March 27, 2020); and the Paycheck Protection Program and Health Care Enhancement Act (April 24, 2020). The CARES Act included approximately \$0.45 trillion in capitalization for the Federal Reserve lending facilities.

2.2 CCF Design and Operation

The SMCCF and PMCCF were designed to work together in primary and secondary markets to ensure that U.S. companies would have access to funding. The SMCCF purchased corporate bonds as well as U.S.-listed ETFs whose investment objective was to provide broad exposure to the U.S. corporate bond market and creditworthy U.S. companies. The purchase of ETFs was motivated by a desire to act quickly to stabilize secondary markets and thereby ensure access to credit in the primary market. As soon as was feasible, the facility switched purchases to individual purchases of bonds. By providing a backstop, the facility sought to reduce the risk that corporate bonds trading in the secondary market would be susceptible to fire sales. This would allow secondary market prices to better signal a firm's fundamental cost of credit rather than the impact of market dysfunction, thus facilitating price signals for primary markets as well. In addition, seasoned bonds compete against newly issued bonds for private investors' funds; so lower secondary market yields decrease borrowing costs for businesses.

The PMCCF acted as a backstop for companies funding themselves when they sought to refinance soon-to-be-mature debt. In so doing, corporations and their investors could have confidence that the issuer would not be forced into financial distress, including bankruptcy, by a temporary disruption to capital markets. If investors and customers became uncertain about a company's ability to refinance its bonds, they might amplify distress by pulling back from the company, making it even more difficult to finance operations. He and Xiong (2012) document this concern by showing that deteriorating market liquidity exacerbates rollover risk. When debt investors require compensation for liquidity risk, a firm can be pushed into default even if it is otherwise solvent. The resultant financial distress can create a vicious cycle.

The Corporate Credit Facilities LLC (CCF LLC) was a special purpose vehicle (SPV) formed on April 13, 2020, to facilitate the PMCCF and SMCCF. The Federal Reserve Bank of New York is the CCF LLC's managing member responsible for managing the day-to-day operations of the facilities. The U.S. Treasury, as the preferred equity member, provided equity capital at inception of \$37.5 billion, which represented one-half of the U.S. Treasury's committed capital of \$75 billion.⁷ The equity capital was provided pursuant to appropriations under the CARES Act and was available to cover losses that might be realized by the CCF LLC in excess of the profits earned on the CCF LLC's holdings. The equity capital would otherwise be returned to the U.S. Treasury, along with a distribution of 90 percent of profits, once all the assets have been sold and all loans and other obligations have been paid off at the end of the CCFs. By leveraging Treasury equity 10:1 for investment-grade assets, the committed capital of the SPV could support up to \$750 billion in asset purchases fully funded with discount window loans.⁸ The initial allocation of this equity commitment was \$50 billion to the PMCCF and \$25 billion to the SMCCF.

2.3 Eligibility of Corporate Debt

Credit quality

The facilities were generally limited to credits that were investment grade as of the announcement of the facility. This approach is consistent with the principles of the Federal Reserve's traditional role as lender of last resort to solvent borrowers with liquidity needs, providing credit backstops to borrowers that would generally have had no solvency concerns, but for the pandemic. Since non-investment-grade credits were generally not eligible, direct support to companies that were already highly leveraged entering the pandemic shock was limited. This had the disadvantage of reinforcing the existing cliff between investment-grade and non-investment-grade credits, but the advantage of limiting moral hazard concerns related to corporate leverage, since more levered borrowers were unable to take advantage of the facilities directly. Eligibility status was set at the date of announcement of the facility, meaning that issuers that were subsequently downgraded (sometimes known as "fallen angels"), for example, were still eligible if they had been rated at least BB-/Ba3 as of the purchase date. While the inclusion of fallen angels increased the credit risk of the assets in the SPV, these issuers were eligible because of the unusual shock presented by the pandemic, where many issuers were likely to have been downgraded as a direct result of the shock.

Requiring that credits be investment grade necessitated a methodology for determining what issues met the requirement. Since the Federal Reserve does not maintain its own credit rating system, it relied on the major external nationally recognized statistical rating organizations (NRSROs), which provide ratings for corporate bond issuers.⁹ Issuer ratings were used given their close relationship to the overall financial health of the issuer rather than issue-specific features such as collateral pools, structural

seniority, or unique guarantor arrangements. In the SMCCF, ratings updates were reviewed regularly to ensure ongoing eligibility. The PMCCF required updated ratings on new issues.

The SMCCF included a guideline that the preponderance of its ETF holdings had a primary investment objective of exposure to investment-grade corporate bonds, with the remainder having a primary investment objective of exposure to U.S. high-yield corporate bonds. ETFs were also monitored for credit quality to ensure that they did not include a material portion of defaulted or near-default assets.

Maturity

The expectation that the COVID-19 shock represented a short-term economic shock motivated limiting the corporate bonds that are eligible for the facilities to those with relatively short-term maturities. Bonds acquired under the PMCCF and SMCCF were subject to maturity limitations of four years in the PMCCF and five years in the SMCCF. An added benefit of setting maturity limits for corporate bonds as an eligibility criterion is that the assets would naturally mature, allowing the Federal Reserve, should it so choose, to exit the corporate bond portfolio without having to actively sell such bonds in secondary markets. The four-year limit for the PMCCF reflects an attempt to offer maturities beyond the likely extent of the pandemic, while the five-year limit for the SMCCF reflects the tenor of the preponderance of outstanding bonds.

Assets held by ETFs were not subject to these same maturity limits since there was not a large enough universe of ETFs with only short maturity assets. However, the average tenor of underlying debt was a consideration in ETF selection.

U.S. domicile and industry

Limitations on borrowers were broadly aligned with CARES Act requirements, focused on U.S. employers, and excluded noncorporate entities and those owned by governments, both domestic and foreign. Institutions that could access CARES Act funding directly or those that borrowed through other programs such as the Main Street Lending Program were generally not eligible for the PMCCF. In addition, although debt issued by banks and bank holding companies makes up almost 30 percent of the corporate bond market, given such entities' direct or indirect access to other Federal Reserve liquidity measures, the bond assets issued by such firms were not eligible for the CCFs. Since there were no existing ETFs that excluded banks or exclusively purchased bonds of U.S.-domiciled issuers, the SMCCF instead targeted ETFs that most closely matched the spirit of the mandate. However, a monthly review was conducted to determine whether holdings of bonds that were not individually eligible for the CCFs exceeded identified thresholds.

2.4 CCF LLC Credit Risk

The combination of issuer credit rating requirements, the retained profits from earnings on the CCF holdings, and the equity capital provided by the U.S. Treasury provided the requisite comfort to the Federal Reserve Bank of New York that it would be "secured to [its] satisfaction," as required by Section 13(3) of the Federal Reserve Act. While the overall facility contemplated a 10:1 ratio of assets to equity, lower-quality assets such as fallen angels and high-yield bonds would require greater equity, applying a ratio of 3:1 to 7:1 for fallen angel bonds, high-yield ETFs, and high-yield bonds. The leverage ratio in the

facilities was validated through analysis of credit migration and losses for bonds, as well as market risk movements for ETFs. The analysis required assumptions on: (1) worst-case default probabilities, (2) recovery rates in case of default, (3) cash flows while default does not occur, and (4) holding horizon.

One of the important aspects of modeling worst-case default probabilities is recognizing that different credit ratings experience defaults at different rates. Based on historical data from 1981-2018, AAA firms have never defaulted within one year of being rated AAA, while BBB firms have an average 0.17 percent probability of defaulting within a year ([S&P 2018 Annual Global Corporate Default And Rating Transition Study](#)). These differences in default rates are amplified at longer horizons and in periods of stress. The analysis used the rating-level worst-observed default probability term structures (using data from 1981 to 2018) to project rating-level losses. In addition, the analysis considered alternative worst-case default probability scenarios, such as a multiplicative increase in the default probability term structure, as well as scenarios that featured credit rating slippage to account for the unprecedented nature of the pandemic shock. Recovery rates were also based on worst historical cases, using the lowest recovery rates priced in CDS auctions, and assumed that the bond portfolio would be held to maturity.¹⁰

For ETFs, the analysis required all of the above assumptions that inform the projected credit losses from the underlying bond portfolio, as well as assumptions on the market value of the ETF shares themselves. Two approaches were considered to evaluate the market value risk: one based on the overall historical worst ETF share depreciations over a fixed holding period, and the other based on a conditional projection of the bottom 5th percentile of ETF share depreciations over the same holding period.¹¹

ETFs were reviewed on a weekly basis to ensure that they did not own a material amount of defaulted or near-defaulted assets. If an ETF was found to include a significant amount of defaulted or near-defaulted assets, it was restricted from purchases until the proportion of low-quality positions was reduced. Since ETFs generally rebalance monthly, funds tended to eliminate problem assets in a short period of time.

The facilities also limited risk through position limits. The maximum amount of outstanding bonds and loans of any issuer that would have borrowed from the PMCCF could not exceed 130 percent of such issuer's maximum outstanding bonds and loans on any day between March 22, 2019, and March 22, 2020. Additionally, the maximum amount of instruments that the PMCCF and the SMCCF combined could purchase with respect to any eligible issuer was capped at 1.5 percent of the combined potential size of the facilities (or \$11.25 billion). The maximum amount of bonds that the SMCCF could purchase in the secondary market of any eligible issuer was also capped at 10 percent of the issuer's maximum bonds outstanding on any day between March 22, 2019, and March 22, 2020, and the SMCCF could not purchase shares of an ETF in excess of 20 percent of that ETF's outstanding shares. These limits also ensured that the facilities would not become a dominant holder of the bonds of any company, which would be a concern in a potential reorganization.

2.5 Avoiding Credit Allocation

All eligible issuers were able to access the PMCCF, meaning that credit was allocated by virtue of issuer demand and need. For the SMCCF, a broad market index of eligible issues and issuers was developed based on the outstanding universe of eligible bonds (see Section 2.6 for details). By hewing closely to an index of eligible bonds, the SMCCF ensured that it did not engage in credit allocation among different industries or issuers, since the industry mix of purchases closely reflected the industry mix of eligible

issuers. In addition, the Federal Reserve's publication of the index and the tracking of holdings against it provided transparency about the SMCCF.

The downside of this approach is that it meant that no additional support was provided to issuers or industries disproportionately affected by the COVID-19 shock. Further, many corporate bond investors are buy-and-hold investors, meaning that many eligible bonds, particularly of smaller issuers, were not actively traded, making it more challenging to match the index.

2.6 SMCCF Design and Operation

Overview

The SMCCF acquired assets through purchases of (1) ETFs owning investment-grade and ETFs owning non-investment-grade corporate bonds, and (2) individual corporate bonds. Prior to the establishment of the facilities, the Federal Reserve had not purchased corporate bonds. An investment manager (Blackrock Financial Markets Advisory) with experience in corporate bonds and ETFs was retained on an expedited basis to bring needed capabilities to the design and implementation of the CCF. Once the COVID-19 exigencies were past, some parts of the investment contract were bid out to a broader range of investment managers.¹²

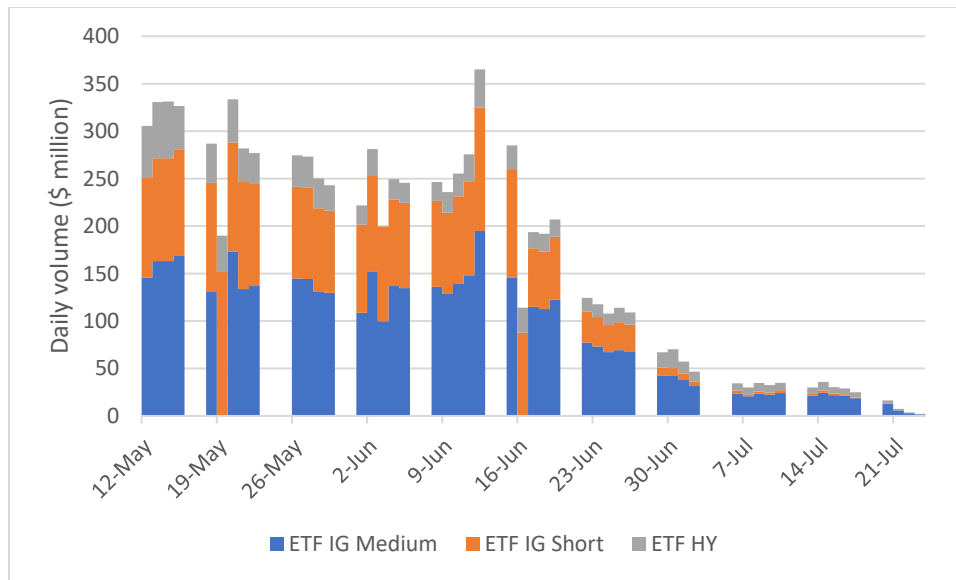
In order to accelerate purchases, initial purchases were made of ETFs, which offered significant advantages in terms of speed of execution and ready access to a diversified portfolio of corporate bonds. Purchases of ETFs commenced on May 12, 2020, and continued until July 23, 2020. Once operational capacity had been developed to purchase a broad market index of individual bonds in June, bond purchases gradually replaced ETF purchases. Over time, purchases were reduced in response to improving market conditions. The purchase of individual bonds commenced on June 16, 2020, and continued until the close of the SMCCF facility on December 29, 2020. For the first month and a half of the facility, the average pace of daily bond purchases was around \$125 million a day, with about 40 percent of purchases concentrated in AAA/AA/A-rated bonds and about 60 percent in BBB-rated and fallen angel bonds. Once corporate credit markets stabilized, the daily pace of purchases remained constant at approximately \$20 million per day, representing the minimum practical size for the program.

ETF purchases

Chart 11 shows the evolution of ETF purchases. ETFs that closed at a premium to NAV of greater than 1 percent (one standard deviation of price to NAV) were ineligible for purchase the following trading day.¹³ Intraday premiums to NAV were also checked at points during the day.

ETFs composed of high-yield bonds were included in ETF purchases, but for only a small portion of transactions, targeted at under 20 percent on any given day. This allowed for a smoothing of cliff effects at the IG/HY border and ensured that fallen angels affected by COVID-19 were supported.

Chart 11 ETF Purchases



Source: New York Fed. “IG Medium” refers to medium-duration funds and includes IGIB, LQD, VCIT, and USIG; “IG Short” refers to short-duration funds and includes IGSB, SLQD, SPIB, SPSB, and VCSH; “HY” includes ANGL, HYG, HYLB, JNK, SJNK, SHYG, and USHY.

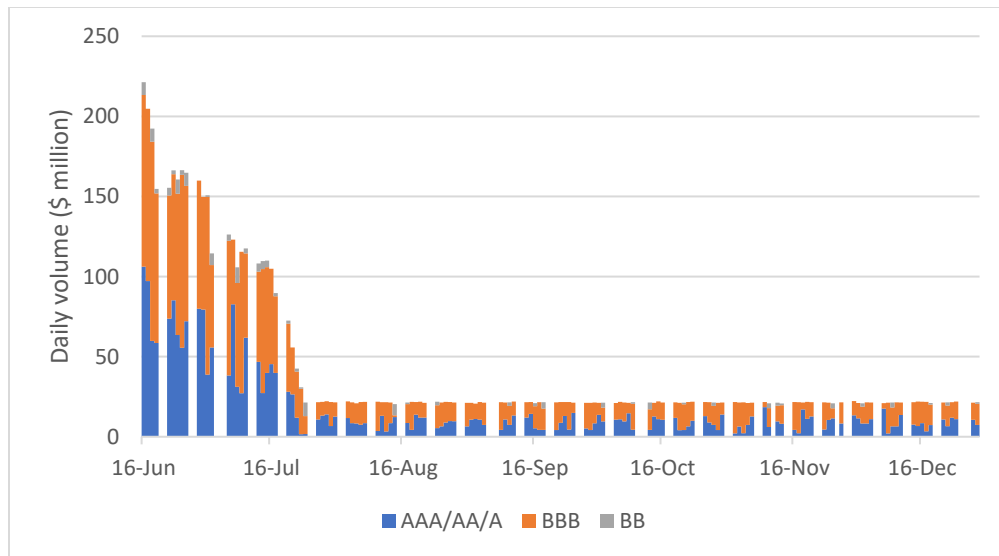
Individual bond purchases

Over the lifetime of the facility, purchases totaled \$5,791 million par value, with purchases of \$2,395 million of AAA/AA/A-rated-bonds, \$3,247 million of BBB-rated bonds, and \$149 million of BB-rated (fallen angel) bonds. Bonds in the consumer noncyclical and consumer cyclical sectors constituted the largest portion of purchases—\$1,206 million and \$907 million, respectively—and bonds with maturity of three and a half to five years totaled \$2,767 million, almost 50 percent of the purchases. Chart 12 shows the evolution of bond purchases over time, by sector and maturity.

Bond purchases were targeted to track a custom index, designed to mirror the universe of eligible bonds. The Broad Market Index (BMI) was created by regularly screening and updating the universe of corporate bonds for issues meeting eligibility requirements, including maturity, rating, currency, industry, and U.S. domicile and incorporation, as well as concentration restrictions. Once an eligible amount of debt was identified for each ultimate parent, the eligible amount was allocated across bond issues on a pro rata basis to identify the amount included in the BMI. After its creation ahead of the launch of bond purchases, the BMI was updated monthly, with individual bonds assessed for eligibility weekly. BMI bonds were categorized based on liquidity: Tier 1 (most liquid), Tier 2 (less liquid but still trading), and Tier 3 (least liquid and hard to find). Purchases were targeted to align over time with sector weights within the BMI, with secondary consideration given to purchasing all Tier 1 bonds and as many Tier 2 and Tier 3 issuers as possible, and to the ratings and maturity profile of the owned portfolio. The index was published at the end of each reporting period on the New York Fed’s website at the same time that the public release of Federal Reserve Act Section 13(3) reports to Congress were published on the Board’s website.

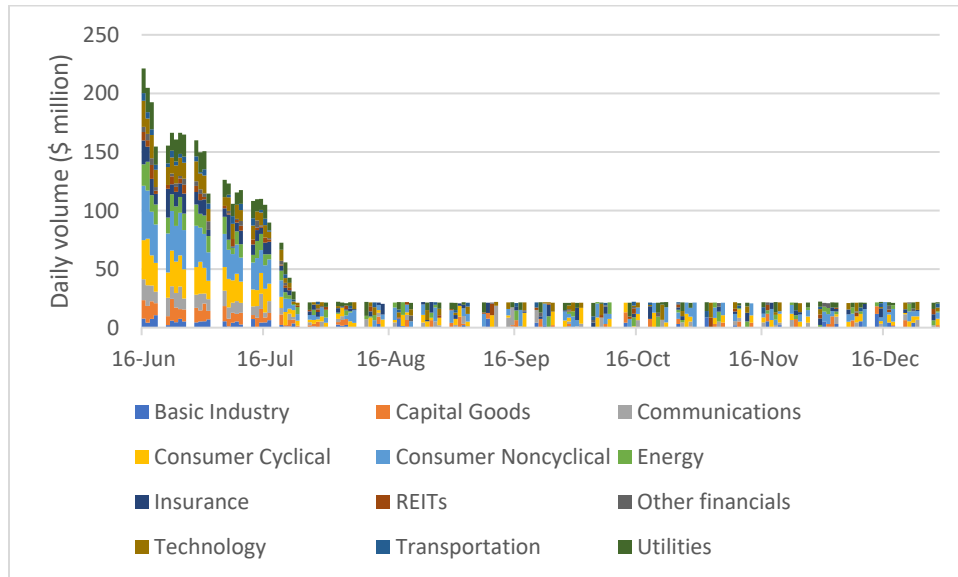
Chart 12 SMCCF Bond Purchases

(a) By rating



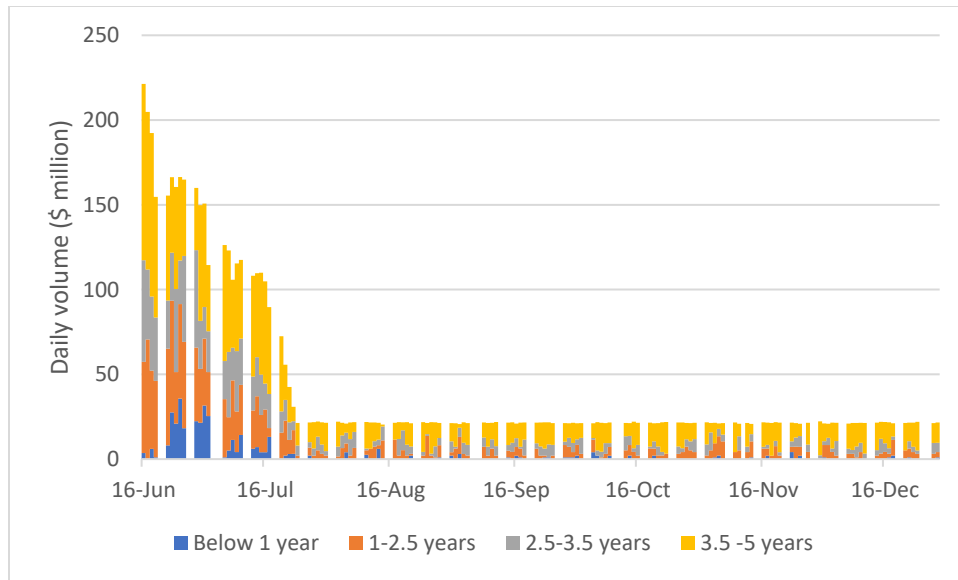
Source: New York Fed.

(b) By sector



Source: New York Fed. The sector is based on Bloomberg's classification.

(c) By maturity



Source: New York Fed.

Counterparty certification and requirements

U.S. broker-dealers that met specified requirements to become eligible sellers from whom eligible assets may be purchased served as trading counterparties for the SMCCF. To qualify as an eligible seller, a counterparty was required to, among other things, certify that it was solvent and was compliant with Sections 4003(c)(3)(C) and 4019 of the CARES Act, which required that the counterparty (1) was a business created or organized in the U.S. or under the laws of the U.S. and had significant operations in and a majority of its employees based in the U.S., and (2) satisfied the conflict-of-interest requirements in the CARES Act. The SMCCF initially identified primary dealers and affiliates of primary dealers as eligible sellers and added additional eligible sellers following due diligence, compliance, and other reviews.

Purchase pace

Generally, the purchase pace was designed to reflect market functioning concerns, with worse market functioning associated with more purchases. An index based on metrics of credit spreads, spread term structure, bid-ask spreads, and transaction costs was used along with qualitative factors to track market functioning versus a baseline measured in the twelve months prior to the crisis. In order not to disrupt typical market functioning, purchases were also based on a measure of average daily volumes. A daily score based on market functioning determined the daily purchase amount, maxing out at 30 percent of average daily trading value, with a framework that was updated over time. On July 23, 2020, the SMCCF ended ETF purchases, reflecting the fact that initial ETF purchases were based on expediency while individual bond purchases were better tailored to accomplish the program’s goals. Once market functioning had improved, purchases stabilized at a very low level (\$20 million par value of individual bonds), signaling ongoing support and a willingness to provide additional support if needed.

Using a daily index to determine the daily purchase pace has some drawbacks. First, it creates a perception of the ability to precisely measure market conditions and, in particular, market dislocations at very high frequencies. As discussed above, the secondary market for corporate bonds is over the counter, with limited daily trading activity for most bonds. Daily measures of bond market pricing and liquidity are either biased if based on actual traded prices or are based on non-firm quotes. In the former case, fluctuations in the traded universe will affect measures based on which bonds trade, leading to volatility and potentially bias. In the latter case, quotes may frequently be stale and then update rapidly as transactions occur, once again leading to excess volatility.

Second, focusing on features that can be plausibly measured at a daily frequency limits the set of quantitative metrics that can be considered. For example, daily fluctuations in primary market issuance and pricing are not really meaningful, since issuance is often lumpy and issuers may not have a strict preference over issuing on any individual day. This is a particularly salient drawback from the perspective of the credit facilities, since giving issuers access to credit was a key goal.

Third, the selection of metrics was targeted initially toward capturing the particular way in which market conditions deteriorated in March 2020, rather than being representative of historical periods of dislocation more broadly. In March 2020, the term structure of corporate credit spreads inverted, with the spreads on five-year bonds below those on three-year bonds. However, it is hard to say whether past periods of dislocation featured such inversions of the credit spread curve, since past periods did not have as much trading in and issuance of shorter-maturity bonds.

An alternative approach is to use lower-frequency (weekly) metrics to construct an aggregate index of market conditions for both the primary and the secondary markets. [Boyarchenko et al. \(2021\)](#) propose a measure of corporate bond market distress: the Corporate Bond Market Distress Index (CMDI). The CMDI takes a “preponderance of metrics” approach, incorporating a wide range of indicators, including measures of primary market issuance and pricing, secondary market pricing and liquidity conditions, and the relative pricing between traded and nontraded bonds. The authors argue that the CMDI provides a timely indicator of corporate bond market functioning without exhibiting some of the unappealing excessive fluctuations of individual metrics.

2.7 PMCCF Design and Operation

The PMCCF’s terms allowed for the purchase of both bonds at issuance and syndicated loans. The program was launched on June 29, 2020, for bonds; loans did not become available as part of the program over the course of the 13(3) authorization period.

The PMCCF was open to all eligible issuers who applied with eligible debt. The PMCCF was not designed to seek out any issuance or debt to purchase, nor did it do so. There were two different mechanisms by which the PMCCF could participate in bond issuance, with slightly different processes, pricing terms, and criteria for each; the two mechanisms are described below. In both mechanisms, (1) the PMCCF assessed issuers a 100 basis point upfront facility fee on the face amount purchased; (2) the issuer needed to meet certain eligibility requirements, sign certain certifications to that effect, and submit relevant transaction information; and (3) the issuer was required to sign a contingent purchase remedy side letter with the PMCCF.

Sole investor transactions

Under the first mechanism by which the PMCCF could participate in a transaction, referred to as a “sole investor” transaction, the PMCCF would purchase 100 percent of a bond issuance. For these transactions, PMCCF-specific terms needed to be incorporated into the issuer’s bond documentation, and the PMCCF determined the pricing of the new issuance. Both the PMCCF pricing methodology and the terms were nonnegotiable but were, however, intended to replicate market practices while reinforcing the backstop nature of the facility and protecting taxpayer money.

The pricing methodology for the sole investor transactions was designed to be issuer-specific and informed by market conditions. The methodology developed was rules-based, with prices based on the issuer’s own secondary market debt, adjusted for maturity. In cases where the issuer did not have secondary market debt, the rules-based framework would look to comparable issuers using several criteria, including, among other things, sector, similarly adjusted by tenor. The framework also included a ratings-based concession (or spread premium) to be consistent with market-based pricing where pricing concessions are typically higher for lower-rated issuers.

The pricing methodology was subject to caps and floors. These were intended to reflect the backstop nature of the facility, allowing borrowers access to funding if the market experienced extreme stress, but ensuring that the facility was not an attractive funding option when the market was closer to normal conditions. The caps and floors were set by ratings, with levels based on historical pricing of comparable U.S. issuers (three- to five-year maturity, excluding banks). For the caps, the level was set at around the 95th to 97th percentile of spreads to maturity-matched on-the-run Treasury securities, and the floors were set at or around the 50th percentile.

Sole investor transactions were required to incorporate certain terms and covenants in the issuer’s bond documentation.¹⁴ These terms, while varying slightly for investment-grade versus high-yield issuers, were intended to reflect prevailing market terms, to reinforce the backstop nature of the facility, and to offer protection for taxpayers. The terms were fixed to avoid bespoke negotiations with individual issuers.

For investment-grade issuers, terms included, among others, a negative pledge focused on principal properties, a related provision on sale-leaseback transactions, and a redemption right for a change in control that results in a downgrade below investment grade. Also, issuers were required to incorporate any more restrictive provisions of their most recently issued outstanding bonds or, if there were none, provisions of their most recent bank debt (other than financial maintenance covenants). To allow issuers to refinance in public markets, there was a market-standard make-whole call feature and an early par call (the latter available beginning three months prior to maturity).

For high-yield issuers, there were additional provisions, including limitations on indebtedness, dispositions, investments, fundamental changes, and transactions with affiliates. On capital distributions—specifically, cash dividends and share buybacks—ordinary distributions were allowed only in line with an issuer’s past practice. Market practice, with make-whole call provisions that ratcheted down to par call over the life of the notes, was also followed.

Co-investor transactions

The second mechanism by which the PMCCF could purchase debt, referred to as a “co-investor” transaction, was designed so that the PMCCF would purchase debt at issuance alongside other investors. Co-investor transactions allowed the PMCCF to purchase debt, up to 25 percent of a new issuance, which was intended to avoid “failed” deals in case of insufficient demand. The pricing and terms for co-investor transactions were the same for the PMCCF as for the other investors in the transaction, except that a 100 basis point fee would apply to the portion of the transaction that the PMCCF purchased. For the PMCCF to purchase debt from an issuer, the issuer and issuance needed to meet the facility’s eligibility criteria.

Program-specific documentation

In order to participate in the PMCCF, issuers and their underwriters were required to submit certain program-specific documentation, including submission of authorization forms, as well as certification forms (described below).

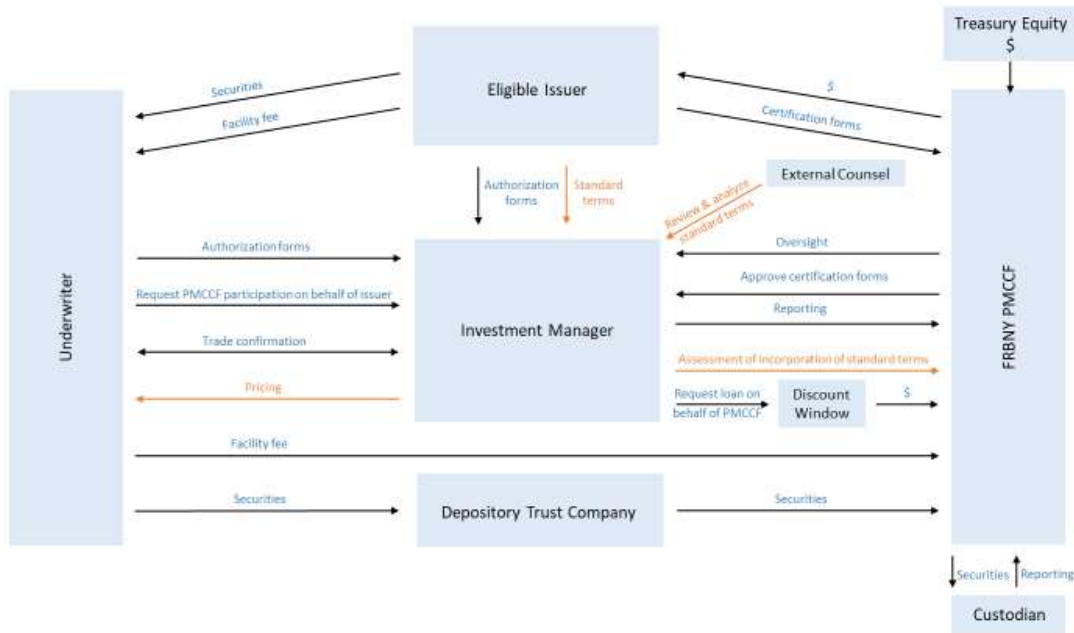
The Advance Certification packet included certification that the issuer (1) was created or organized in the U.S. or under U.S. law, with significant operations in and a majority of its employees in the U.S. and, where relevant, would adhere to the PMCCF’s requirements regarding restrictions on the use of proceeds; and (2) satisfies the conflict-of-interest requirements of Section 4019 of the CARES Act.

The Trade Date Certification packet included certifications provided by the issuer that it (1) was not insolvent and was unable to secure adequate credit (requirements of Regulation A), and (2) has not received specific support under the CARES Act.

Last, the CCF Letter Agreement was required to be executed and delivered by the issuer (or guarantor) as a condition of closing a deal. The CCF Letter Agreement effectuated the issuer’s (or guarantor’s) obligation to repurchase the bonds sold to the PMCCF in the event that the issuer knew there was a material misrepresentation in the certifications or the confirmations in the authorization forms, or the issuer breached the use-of-proceeds restriction (if applicable). The CCF Letter Agreement also required disclosure to other investors through the indenture, and that payouts under the CCF Letter Agreement to the PMCCF were not subject to distribution with other creditors.

The exhibit below provides an overview of the process flow for both sole investor and co-investor transactions and issuance to the PMCCF. The process flow represents both the operational aspects of a transaction (issuance of securities, trade confirmations, and so forth) and the program-specific requirements, such as review of certification documents and oversight of the investment manager. Nearly all of the processes were applicable to both sole and co-investor transactions, with a few additional items for sole investors, as described above, and shown in orange below. The investment manager additionally had responsibility for reviewing eligibility of the issuer, the issue itself, and the underwriter (these are not shown in the exhibit).

Exhibit Issuance Process to the PMCCF



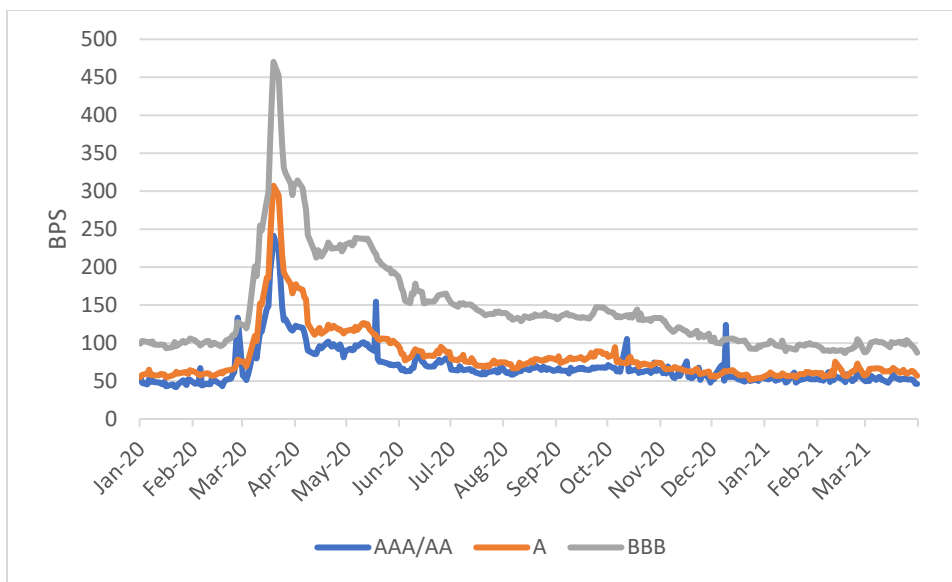
3. CCF ACTIVITY AND IMPACT ON THE CORPORATE BOND MARKET

In this section we review the impact that the facilities had on the corporate bond market through the lens of secondary market functioning and primary market issuance activity.¹⁵

3.1 Impact of the Facilities on the Secondary Corporate Bond Market

The announcement of the program had a dramatic effect on liquidity and pricing in the secondary market while also reigniting issuance in the primary market. Chart 13 plots the time series of duration-matched credit spreads on investment-grade bonds over 2020. In the first week following announcement of the facilities (from March 23 to March 30), credit spreads declined by around 110 bps for bonds rated AAA, AA, and A, and by 150 bps for BBB-rated bonds. These declines were unusually sharp, representing the lowest percentile of one-week changes for these rating categories.

Chart 13 Investment-Grade Duration-Matched Credit Spreads after Facilities Announcement



Source: Authors’ calculations using dealer-to-customer transactions prices from TRACE. “AAA/AA” includes bonds rated AAA, AA+, AA, and AA- by S&P, Moody’s, or Fitch. When ratings from multiple agencies are available, we use the plurality rating rule to construct a composite bond-level rating. “A” includes bonds rated A+, A, and A-. “BBB” includes bonds rated BBB+, BBB, and BBB-.

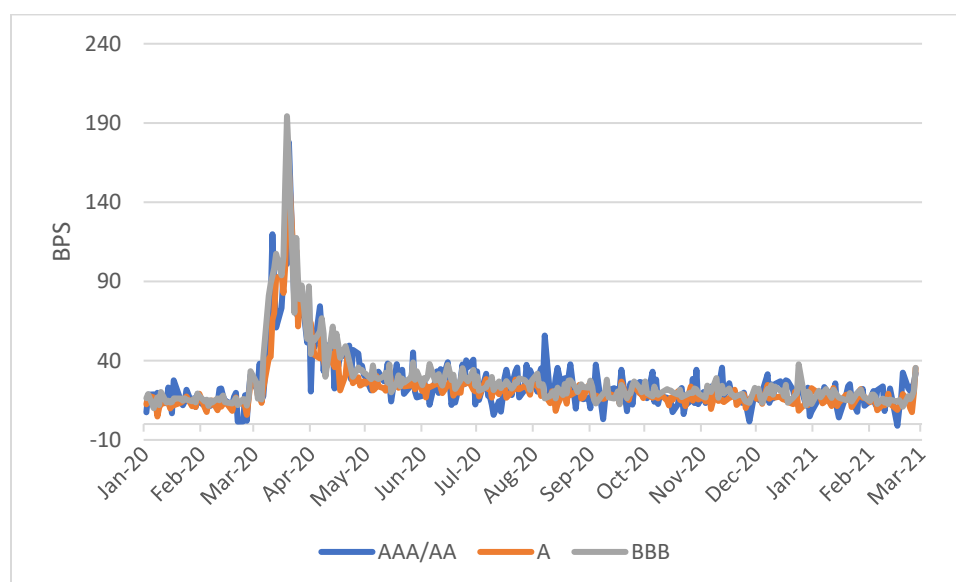
Despite these sharp declines after the initial announcement date, credit spreads returned to pre-pandemic levels sluggishly. In particular, the credit spread improvements slowed in the period between April 9 and May 12, but larger declines occurred once the facility began purchases. [Boyarchenko, Kovner, and Shachar \(2020a\)](#), using data on the Federal Reserve’s purchases of both individual bonds and ETFs, show that purchases of individual bonds had a larger impact on credit spreads than purchases of ETFs, controlling for market conditions at the time of the purchases. This suggests that the pass-through from improvements in ETF market conditions to corporate bond market conditions may not be as strong. Consistent with the low levels of purchases as of the fall of 2020 and the apparent recovery in market functioning, the announcement by the U.S. Treasury of the expiry of the facilities at year-end and the related request for the partial return of Treasury equity on November 19, 2020, did not appear to lead to increases in credit spreads.¹⁶

Following the consistent improvement in credit market conditions and the recovery of the flow of credit to the economy, the Federal Reserve Board announced on June 2, 2021, plans to exit the SMCCF portfolio. At the time of the announcement, ETF holdings, which have no fixed maturity, accounted for over half of the SMCCF portfolio and individual corporate bonds totaled approximately \$5 billion, with maturities into 2025. The sale of ETFs started on June 7 and the sale of cash bonds started on July 12. The June 2, 2021, SMCCF wind-down announcement had little effect on credit markets and the follow-up sales had no adverse impact on market functioning. The lack of market reaction might be due to the relatively small size of the SMCCF portfolio amid favorable credit market conditions. As of August 31, 2021, all of the SMCCF holdings had either matured or been sold.

Turning to secondary market liquidity, Chart 14 shows that the improvement in bid-ask spreads for investment-grade bonds was immediate following the announcement of the facilities. Bid-ask spreads for all three rating categories declined by approximately 100 bps between March 23 and March 30.

Unlike credit spreads, bid-ask spreads continued to improve past April 2020, and declined throughout the rest of 2020. Examining the effect of facility purchases on bond-level bid-ask spreads, [Boyarchenko, Kovner, and Shachar \(2020a\)](#) argue that ETF purchases had limited direct effect on bid-ask spreads, suggesting that SMCCF purchases of ETFs were covered by existing ETF shares rather than the creation of new ETF shares. As with credit spreads, the facility closing announcement on November 19, 2020, did not appear to lead to a deterioration in liquidity. With credit markets continuing to heal, there were also very minimal reactions to the Federal Reserve’s announcement in June 2021 of plans to sell the SMCCF holdings in a gradual and orderly manner.

Chart 14 Investment-Grade Bid-Ask Spreads after Facilities Announcement



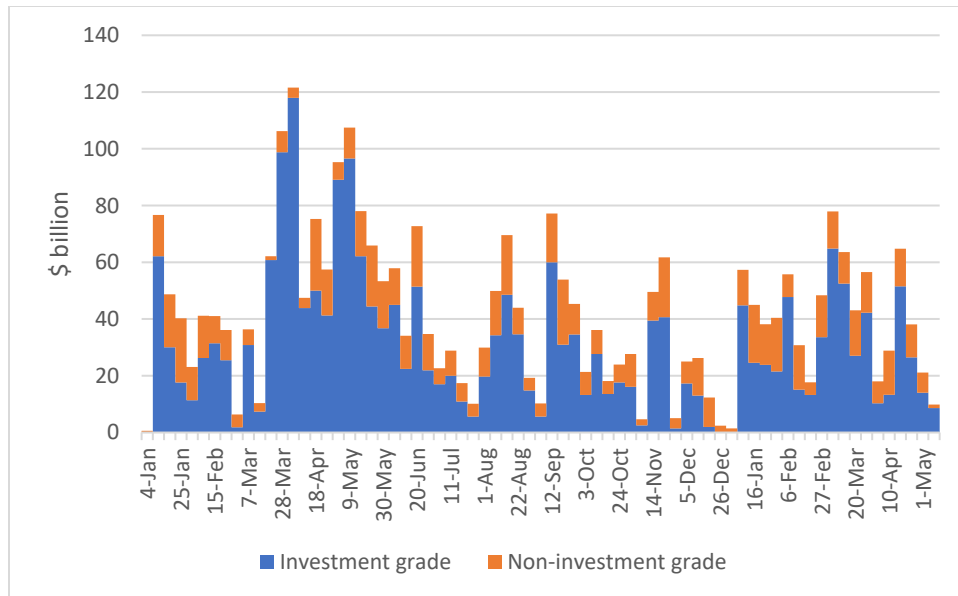
Source: Authors’ calculations using dealer-to-customer transactions prices from TRACE. “AAA/AA” includes bonds rated AAA, AA+, AA, and AA- by S&P, Moody’s or Fitch. When ratings from multiple agencies are available, we use the plurality rating rule to construct a composite bond-level rating. “A” includes bonds rated A+, A, and A-. “BBB” includes bonds rated BBB+, BBB, and BBB-.

3.2 Impact of the Facilities on the Primary Corporate Bond Market

As described in Section 1, both the ability of corporations to issue corporate bonds and the interest rates on newly issued bonds are linked to secondary market conditions. We now examine how primary market activity and pricing evolved following the announcement of the facilities.

Chart 15 plots the weekly volume of corporate bond issuances for investment-grade and non-investment-grade corporate bonds for 2020-21. Following the slowdown in issuance at the beginning of March for both rating categories, the announcement of the facilities on March 23 triggered a revival of issuance in the investment-grade market. Non-investment-grade issuance took longer to recover, and only really accelerated following the start of facility purchases on May 12. The high levels of issuance continued throughout the rest of the year (despite the standard summer slowdown), with overall investment-grade issuance in 2020 of \$1,856 billion and non-investment-grade issuance of \$421 billion, well above previous highs.

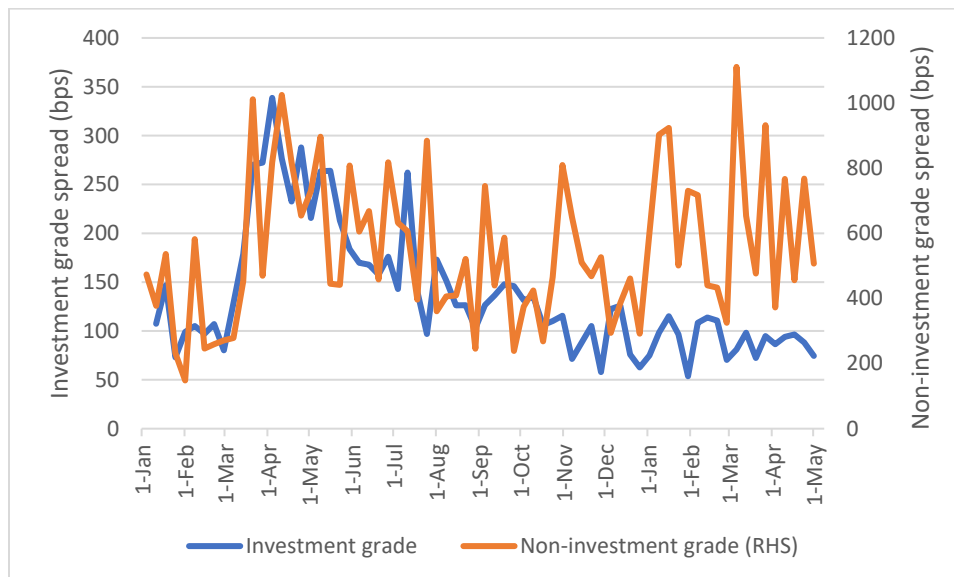
Chart 15 Weekly Volume of Corporate Bond Issuance



Source: Authors' calculations using Mergent FISD. Investment-grade and non-investment-grade are determined at the issue level based on ratings from the top three nationally recognized statistical rating organizations (NRSROs): S&P, Moody's, and Fitch.

Chart 16 shows, however, that while average primary market spreads to nearest-maturity on-the-run Treasury securities declined substantially for investment-grade bonds, improvements in primary market spreads for non-investment-grade bonds were less apparent. This may reflect the differential industry composition between investment-grade and non-investment-grade borrowers, as well as the differential investor base across the two rating categories.

Chart 16 Average Spread to Nearest Maturity On-the-Run Treasury Securities of Newly Issued Fixed Coupon Corporate Bonds



Source: Authors’ calculations based on issuance spread from Mergent FISD and on-the-run Treasury yields from Bloomberg. Investment-grade and non-investment-grade are determined at the issue level based on ratings from the top three nationally recognized statistical rating organizations (NRSRO): S&P, Moody’s, and Fitch.

Overall, both the announcement of the facilities and the subsequent purchases appear to have substantial positive effects on market functioning, from the perspective of both secondary market trading and primary market issuance.

3.3 Facilities and Intermediation

The improvement in market functioning since the announcement of the facilities provides evidence of the importance of the liquidity backstop, ensuring that these companies will have access to funding as long as they remain solvent. The facilities were also intended to increase the willingness of broker-dealers to intermediate in corporate bond markets. In this case, the expectation of Federal Reserve intervention would give dealers an incentive to continue to make markets in corporate bonds. Since market making may have ceased inefficiently in March 2020, this would represent a good kind of moral hazard.

Indeed, [Boyarchenko, Kovner, and Shachar \(2020a\)](#) study how intermediation by FINRA-registered dealers changed over the course of the spring of 2020. They show that the deterioration in market conditions during March was accompanied by a reduction in dealer activity in the secondary market, with non-bank-affiliated dealers reducing market making, particularly in riskier bonds. Following the facility announcement on March 23, net dealer positions in corporate bonds started to increase. However, non-bank-affiliated dealers only reentered the secondary market for non-investment-grade and longer-maturity bonds once the SMCCF began purchases on May 12. This suggests that while announcement of the facilities served to signal their function as a liquidity backstop, actual facility

purchases were required to induce intermediation in riskier bonds by dealers without access to more traditional Federal Reserve facilities. In related work, [O'Hara and Zhou \(2021\)](#) also argue that the Primary Dealer Credit Facility (PDCF) and the CCFs acted in concert to improve dealer funding conditions and provide a liquidity backstop to the corporate bond market. Approaching the question through the lens of customers in this market, [Haddad, Moreira, and Muir \(2021\)](#) suggest that the dislocations in the corporate bond, ETF, and CDS markets during March 2020 were potentially related to the liquidity needs of bond investors, again highlighting the “market maker of last resort” role of the facilities.

3.4 Implications

Given the dramatic effect of the announcement of the facility, it is natural to ask if the same results could have been achieved with a smaller facility or without the creation of the primary market facility. This is difficult to know, since the presence of liquidity often forestalls the run in the first place, meaning that the presence of the PMCCF could have bolstered investor confidence in issuers’ ability to refinance and thereby allowed the issuers to access public markets, even though the PMCCF was not accessed. Similarly, the SMCCF’s ability to purchase bonds, even if not used to its full capacity, was critical in returning the market to normal functioning.

4 MORAL HAZARD

The synchronized shock to global markets and the uncertainty related to the consequences of the pandemic and its associated shutdowns were truly exceptional circumstances, particularly the sudden and sharp realization of the shock and its economic and financial market implications. Like all 13(3) facilities, the CCFs were authorized by a vote of all Federal Reserve Governors, in response to “exigent and unusual circumstances,” and with approval from the Secretary of the Treasury. However, every official sector intervention raises concerns regarding moral hazard and the possibility of the slippery slope of investors and firms not internalizing risk appropriately and expecting interventions that, once used, can be called on again in response to even less exigent circumstances.

In the case of the CCFs, expectations that the Federal Reserve will again act as a lender of last resort to nonfinancial corporations could lead corporate debt issuers to take on more risk than they had previously. Similar to the Commercial Paper Funding Facility (CPFF), the CCFs were designed to lessen the possibility of moral hazard through limits to eligibility and penalty pricing of the PMCCF. While the Consolidated Appropriations Act, 2020 prohibits the restart of the CCFs as they are currently structured, it is possible that markets would nonetheless expect the CCFs to be reestablished in response to a tail shock that negatively affects corporate bond market functioning, similar to the way the CPFF was reestablished in response to the COVID-19 pandemic.

By limiting eligibility for the primary market facility to issuers that were investment grade at the time of the shock, the backstop of the facilities was available only for borrowers with relatively low credit risk. Therefore, it is hard to see how this intervention encourages leverage above levels that are consistent with investment-grade ratings. However, by taking advantage of the existing market infrastructure for credit risk evaluation and choosing to set an investment-grade eligibility bar, the facilities reinforce the investment-grade “cliff.” Specifically, while credit risk, as measured by historical default rates, is linear or exponential by credit rating, the facilities’ design reinforces the gulf in pricing between the riskiest level of investment-grade credit and the least risky below-investment-grade credit rating.

While purchasing ETFs was a novel intervention that facilitated a more expedient launch, the SMCCF's ETF purchases present additional moral hazard concerns. Structurally, there is a mismatch between the perceived liquidity of bond ETFs and the underlying liquidity of corporate bonds. ETF liquidity relies on ETF liquidity providers, including authorized participants (mostly large broker-dealers) that can create (or redeem) ETF shares by delivering bonds in exchange for shares to the ETF sponsor (or shares in exchange for bonds). When ETF prices rise above NAV, authorized participants have an incentive to create ETF shares by acquiring a subset of an ETF's bonds and delivering them to the sponsor in exchange for shares. As described in Section 1.2, in the bond market turmoil in 2020, bond ETF prices fell well below their NAVs and the resulting gap was not arbitrated away.¹⁷ By beginning bond market purchases through ETFs, the Federal Reserve stabilized the ETF market, and a side effect of improving corporate bond market functioning was an increase in ETF liquidity. Without such intervention, ETF investors would have incurred great losses when exiting their positions. Therefore, ETF purchases may have increased moral hazard by encouraging investors to ignore the potential for ETFs to become dramatically less liquid in the face of systemic shocks. As a result, rather than learning the true liquidity properties of ETFs, market participants may come to the wrong conclusions about future ETF liquidity in a shock—either because the data show the impact of the Federal Reserve's intervention or because investors incorrectly assume that future bond market interventions may occur through ETFs. By developing the broad market index and transitioning SMCCF purchases to direct corporate bond purchases, the Federal Reserve may mitigate moral hazard, should market participants surmise that any future interventions are less likely to require acting through ETFs. More broadly, increasing the liquidity of corporate bonds presents a moral hazard for all types of bond investors that engage in liquidity transformation.

5 CONCLUSION

The pandemic-related market disruptions were notable for the speed of the disruption and the breadth of affected markets. These widespread disruptions threatened American employers' access to debt capital markets. This led to the establishment of the CCFs, the first ever intervention in corporate bond markets by the Federal Reserve, extending its role as a liquidity provider of last resort. In this way, the CCFs were consistent with past Federal Reserve facilities that provided liquidity to support the American market-based financial system. The legal basis for the CCFs stemmed from Section 13(3) of the Federal Reserve Act, which allows the use of such a facility only in "unusual and exigent circumstances." The primary market facility was designed as a backstop, with penalty pricing, while the secondary market facility had a dramatic effect, supporting corporate bond markets with limited asset purchases. Its portfolio of purchased holdings peaked at \$14 billion, a tiny fraction of the market and less than 2 percent of its potential scale. Moreover, the algorithm for actual bond purchases was designed to avoid any influence on the allocation of credit across industries.

The lessons learned with regard to ensuring liquidity in debt markets can guide future policy discussions, in terms of the application for primary and secondary markets as well as the implementation that allows market support without credit allocation. The scale of the global disruption to financial markets was so unprecedented that the corporate credit facilities were a key part of a show of force by the Federal Reserve and the official sector, and one that reassured capital markets, allowing for minimal disruption

of credit to large employers. As Federal Reserve Chair Powell stated, “This was really a, we hope, once-in-a-lifetime situation,”¹⁸ and these rare circumstances are unlikely to be repeated.

NOTES

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²Source: SIFMA. SIFMA “U.S. Corporate Bonds” includes debt obligations of U.S. financial and nonfinancial corporations, including bonds, notes, debentures, mandatory convertible securities, long-term debt, private mortgage-backed securities, and unsecured debt. It includes bonds issued both in the U.S. and in foreign countries, but not bonds issued in foreign countries by foreign subsidiaries of U.S. corporations.

³Other interventions by the Federal Reserve are detailed in this volume, and key official sector announcements are described in Section 2.1.

⁴For an initial view on the reasons behind the corporate credit facilities, see ["The Primary and Secondary Market Corporate Credit Facilities."](#)

⁵For example, the [Corporate Bond Market Dislocation Index](#) (CMDI) was below the historical 5th percentile at the end of 2019.

⁶Comparing ETF-NAV basis dislocations in March 2020 with dislocations during the GFC is difficult, since the market for corporate bond ETFs was in its nascent stages in 2007–09, with both the number of ETFs and the assets under management (AUM) of existing ETFs much smaller than they were in 2020.

⁷Approximately \$23.6 billion was returned to the Treasury as an interim distribution when the facilities ceased purchasing eligible assets at year-end 2020.

⁸Purchases of non-investment-grade assets made at a lower leverage ratio reduce the notional capacity of the facilities.

⁹Initially, three rating agencies (Moody’s Investor Service, Inc., S&P Global Ratings, and Fitch Ratings) were recognized, with a requirement that where one issuer rating was available, that rating would be used, and if two or more were available, at least two issuer ratings must be eligible. Three additional NRSROs (DBRS, Inc., Kroll Bond Rating Agency and, only with respect to insurance companies, AM Best Ratings Services, Inc.) were added as major NRSROs for the CCFs, provided that the issuer had at least one investment-grade rating from one of the three original NRSROs. Since the original approach of using two ratings was retained, the longer list of eligible NRSROs meant that the best issuer ratings, rather than the average or lowest ratings, drove eligibility. While the initial facility design called for ratings at the issuer level, issue-specific ratings were also considered, with individual issues made ineligible in cases where they were rated lower than the issuer, a situation that generally reflects subordination or other adverse structural features. If an issuer was not rated, as often occurs after mergers or acquisitions, the rating of an eligible U.S. affiliate was used.

¹⁰Holding the bond portfolio to maturity incurs the greatest cumulative probability of losses due to default.

¹¹The second approach recognizes that market valuations may depend on overall economic conditions. The first approach is more conservative.

¹²Cash management services were bid out; however, given the cessation of purchases, the bidding out of other investment management services was halted for expediency.

¹³Corporate bond ETFs generally trade at a small premium to NAV.

¹⁴If there was a guarantor of the issuer, the standard terms would apply at the guarantor level.

¹⁵See prior analysis in ["The Impact of the Corporate Credit Facilities."](#)

¹⁶In addition, in July 2020, the Board extended the expiration date of the CCFs from September 30, 2020, to December 31, 2020. That date was not further extended.

¹⁷See [Todorov \(2021\)](#) for a discussion of ETF arbitrage.

¹⁸Q&A following National Association of Business Economists (NABE) speech on October 6, 2020.

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