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Article

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An overview of the Fed's new credit policy tools and their cushioning effect on the COVID-19 recession



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ABSTRACT

The economics literature lacks articles that provide a broad roadmap—let alone a logical explanation—of the new set of Federal Reserve policy tools that were created to counter the COVID-19 recession. This study provides an overview of the motivation for these new credit-easing programs—namely to damp feedback mechanisms and channels that would otherwise amplify the downturn and impede a subsequent recovery. The study then briefly assesses the impact of the new policy tools and addresses the risks they might pose. In addition, the new credit easing tools are put into historical context through a discussion of their development as part of the Fed's evolving and expanding role in countering financial crises.

In response to the COVID-19 pandemic outbreak in March 2020, the Federal Reserve vastly expanded its balance sheet and created new facilities to prevent a free fall in key credit markets. The Fed's dramatic response was salient in preventing the U.S. economy from falling into a prolonged depression comparable to the 1930s. Early in the downturn, economic activity worsened from the effects of shutdowns, the need to reallocate resources across sectors, uncertainty, wealth effects, and widespread financial distress. Fig. 1 shows how the initial rise in unemployment was quickly tempered.

The re-application of tools created to deal with the Global Financial Crisis of 2007–09 (GFC) and the use of new tools greatly expanded the Fed's reach into areas long denied to central banks, especially credit policy to alleviate distress in the non-bank financial and real sectors. In this paper, we describe the actions taken by the Fed in an historical context. The novel tools developed in 2020 harken back to the 1930s and in a sense, we are 'Back to the Future'. The new tools also crossed a fine line that had been a tenet of postwar central bank policy—the distinction between monetary policy and credit (aka fiscal policy).

In response to the pandemic, the Fed reemployed three types of unconventional tools it created in the Great Recession. First, to restore liquidity it not only expanded the maturity of discount loans to banks and the types of eligible collateral, but also extended liquidity lending to nonbanks. Second, to circumvent the zero-bound limit on the short-term federal funds rate, the Fed resumed using unconventional macro-tools, namely quantitative easing and forward guidance, to lower long-term Treasury and mortgage interest rates. However, these were insufficient in the Great Recession, so the Fed created a third set of tools that combined aspects of acting as lender of last resort (LOLR) in money markets and credit-easing policy. Because top-rated firms were unable to raise short-term funding by issuing commercial paper, the Fed created the Commercial Paper Funding Facility (CPFF) through which it bought commercial paper and restored the normal functioning of this market (Duca, 2013a).¹ In a similar response, because top-rated bank and non-bank lenders were unable to securitize business, consumer, and commercial real estate loans, the Fed created the Term Asset-backed Liquidity Facility, which bought AAA-rated asset-backed securities that funded

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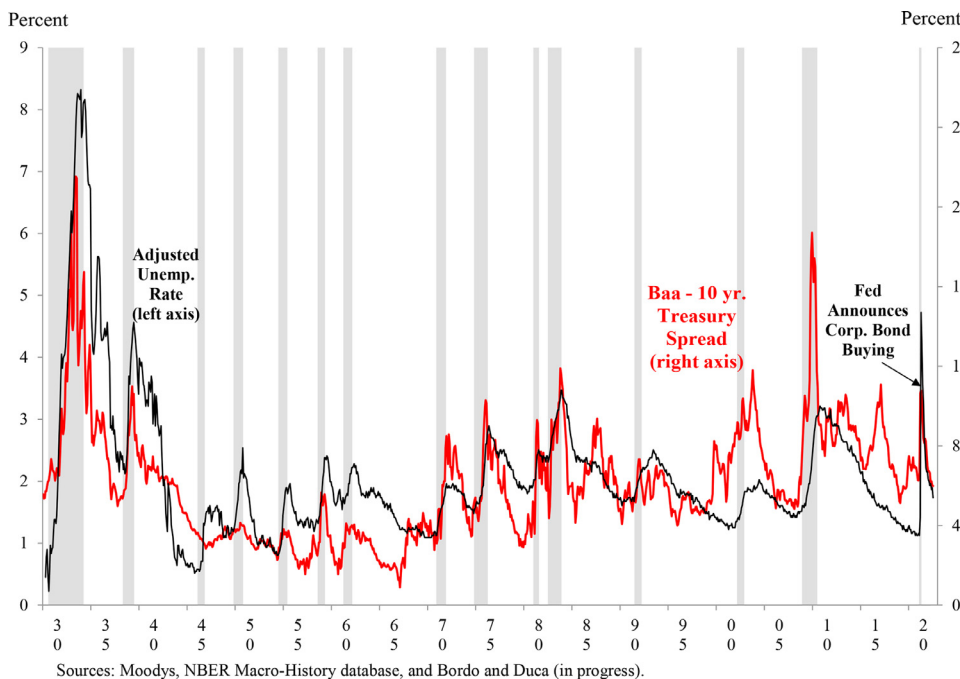


Fig. 1. Yield spread between corporate baa-rated and 10 year treasury bonds rise with insured unemployment rate until the fed announced its corporate bond facilities (Sources—Federal reserve board, moody’s, and authors’ calculations).

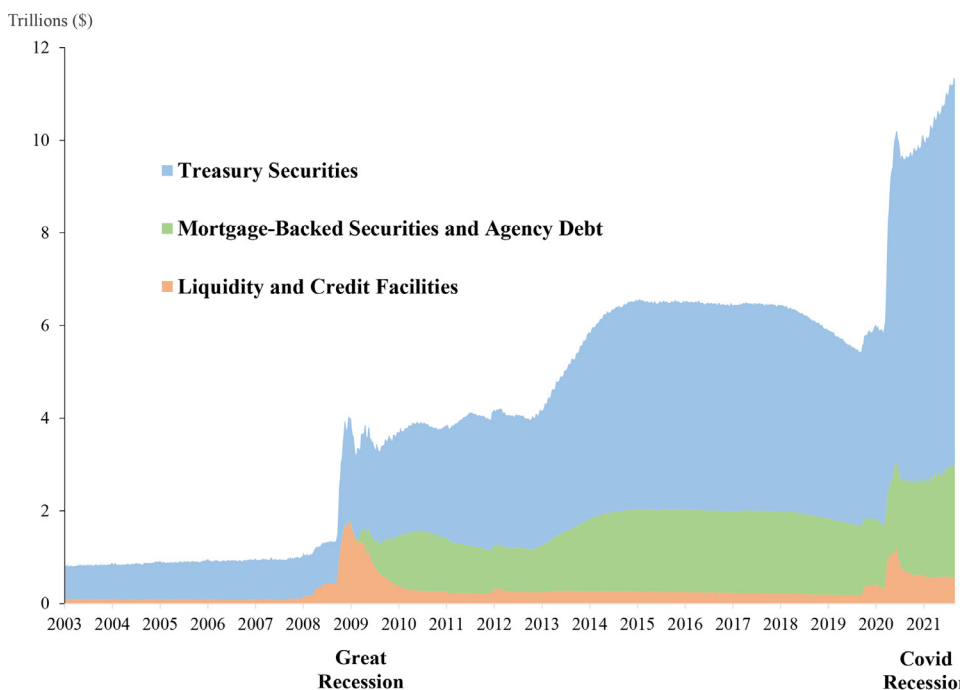


Fig. 2. Fed aggressively expands balance sheet to counter another financial crisis and recession.

such loans (Agarwal, et al., 2010). These actions marked an extension of liquidity to shadow banks that lent to relatively safe borrowers.

The use of these tools in the last two recessions entailed major expansion of the Fed’s balance sheet. Indeed, at the start of the last two downturns the Fed greatly increased its holdings of Treasury securities—shown in blue in Fig. 2—with a larger response during the COVID-19 downturn. It also more quickly expanded its holdings of mortgage-backed securities—the green area. In both recessions, the Fed increased

assets in its liquidity and credit facilities—shown in orange. While the volume of such assets has been smaller in the COVID-19 recession, the balance sheet does not tell the whole story.

Our review of recent studies fills a gap in the literature by focusing on the nature and efficacy of the new set of Federal Reserve policy tools created to counter the COVID-19 recession.² While the swings in the U.S. economy were largely driven by COVID-19-related shutdowns

¹ In the Great Depression, the Fed did not intervene in this way and there was a major meltdown of the commercial paper market, which did not recover for decades (Duca, 2013b).

² Clarida et al. (2021) provide a roadmap and a timeline of various Fed actions ranging from conventional monetary policy, quantitative easing, forward guidance, and providing liquidity throughout the financial system. Our overview is more focused on direct Fed support to nonfinancial.

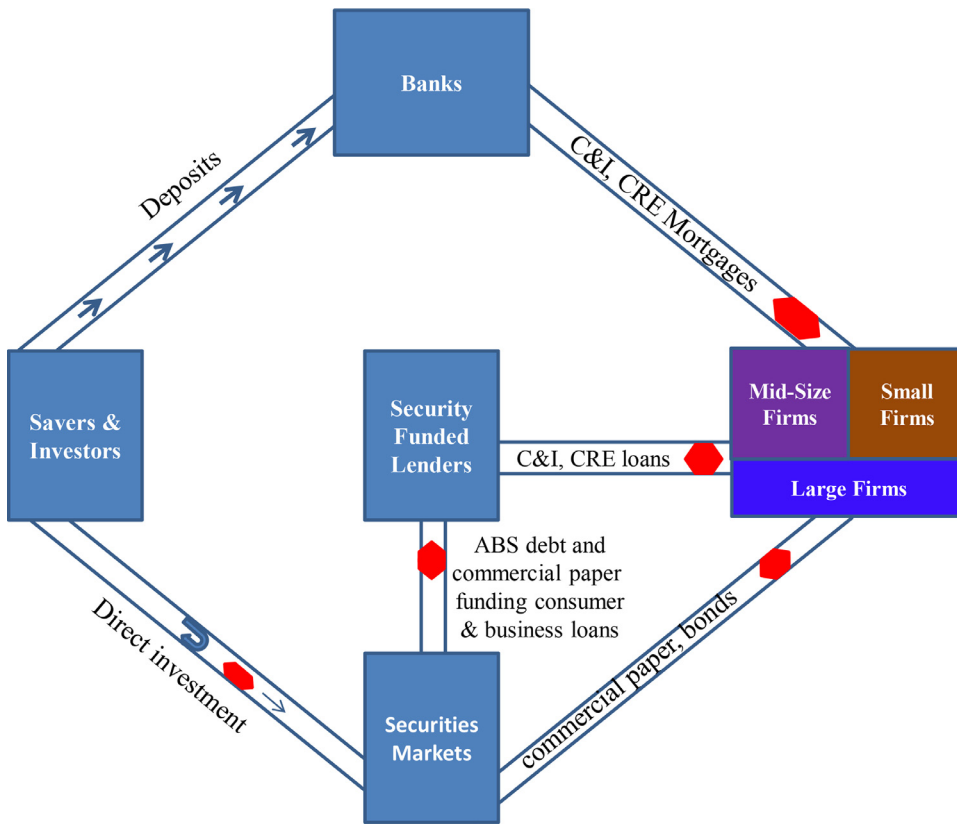


Fig. 3. Financial flows to nonfinancial businesses were blocked in the global and COVID financial crises.

and re-openings for firms and activities, the evidence indicates that the credit policy interventions (especially in the corporate bond market) played a role as well. An overarching finding is that these new programs helped avoid both an amplification of the economic downturn and some of the financial frictions that impeded the recovery from the Great Recession. This was evident in a sudden halt to widening of the corporate bond spreads and further tightening of credit standards. Another major finding is that the nature of Fed interventions has been broader and had more far-reaching effects during the COVID-19 recession in primarily two respects. First, the Fed greatly expanded the ways in which it directly financed nonfinancial firms during a crisis by going beyond directly supporting commercial paper issuance—a new tool that it introduced to address the Great Recession. A timeline of these “credit easing” actions is provided in Appendix A. Second, the provision of direct financing sought to support firms of all sizes, not just the largest, which benefited from direct interventions in the commercial paper and corporate bond markets.

The next section of our study briefly assesses evidence on the impact of the new policy. Section III then puts the new credit easing tools into historical context by discussing their development as part of the Fed’s evolving and expanding role in countering financial instability. Also addressed are the potential downside risks—mainly moral hazard—that these interventions may pose.

1. Credit-easing tools revive finance for firms and state & local governments

The tools used by the Fed to address the Great Recession were inadequate for the COVID-19 downturn because firms and municipal governments became less able to issue securities, and small and midsize firms lost access to bank loans at a time when they needed credit to survive the pandemic and a restart of the broader economy. As depicted in Fig. 3, external finance usually flows from savers and investors—the left box—to small, midsize, and large nonfinancial firms—the right-most

box. Starting from the top, deposits by savers and investors fund banks, which in turn make commercial and industrial (C&I) and commercial real estate (CRE) loans to small and midsize firms, for whom banks are their main source of external credit. At the bottom, savers and investors also directly invest in securities, of which directly issued commercial paper and corporate bonds provide the main source of external funds to large firms. In the middle of Fig. 3, short- and long-term securities also fund nonbank financial firms, which in turn make loans/ leases to firms of different sizes.

But in financial crises, two factors can block these financial arteries. First, investors can become too risk averse or private securities may seem too risky, which blocks finance to large firms from commercial paper and bond markets. Similarly, state and local (municipal) governments can lose access to debt markets if their tax revenues are threatened—such as the prospect of diminished sales tax revenue during COVID-19 shutdowns. For example, a wave of redemptions by household investors triggered large fire sales of corporate and municipal bonds by mutual funds that fueled a liquidity crisis in the municipal bond market in March and early April (see Li, O’Hara, and Zhou, 2020, and O’Hara and Zhou, forthcoming). In addition, security funded lenders (e.g., finance companies) were unable to raise funds by issuing asset-backed debt. Second, lenders feared loan losses or losing liquidity, making them less willing to lend. In early 2020, all three sources of external finance became blocked at a time when investors were unwilling to buy private debt and intermediaries were unwilling to lend to many private firms. Addressing these blockages required new credit-easing tools for two reasons. First, internal sources of finance for firms dried up as profits turned to losses and as they lost access to external finance. Second, the blockages could not simply be treated by using open-market operations to lower Treasury and mortgage interest rates and by providing discount loans and pure liquidity support to lenders. Consequently, to revive the flows of finance, the Fed created three new credit-easing tools for businesses and similarly also started a new credit easing program for state and local governments.

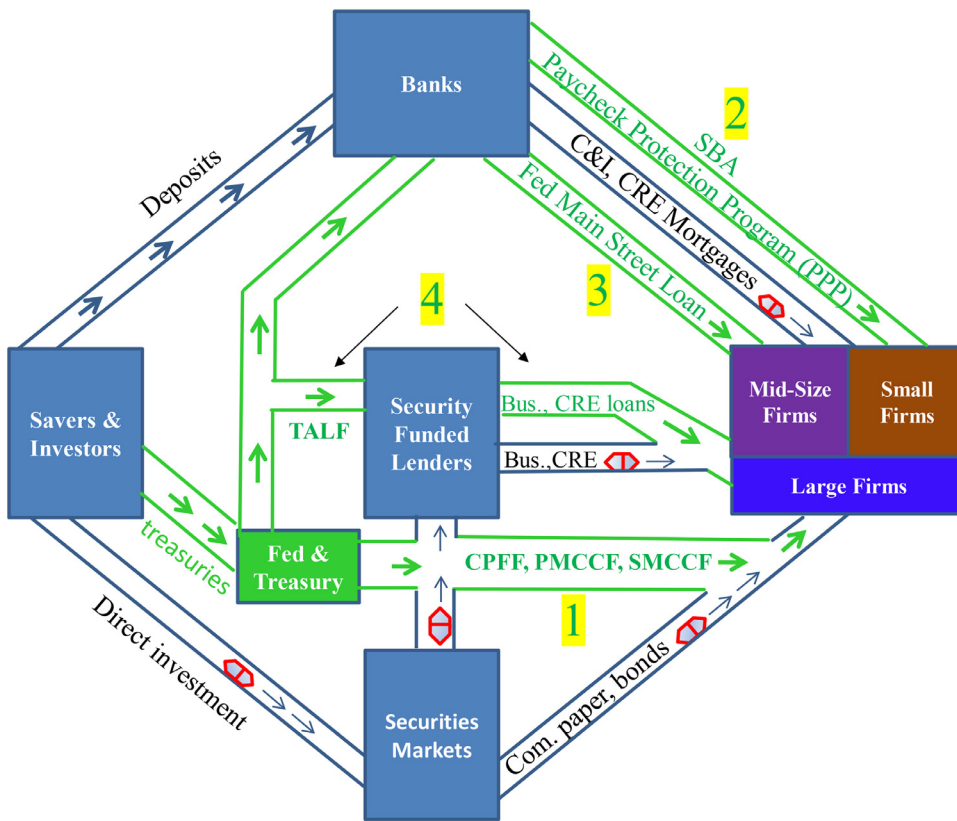


Fig. 4. Fed actions to restore financial flows to businesses of different sizes.

1.1. Reviving corporate bond finance

The first set of tools addressed problems facing issuers of corporate bonds. In late March 2021, the Fed announced the creation of two facilities (the Primary and the Secondary Corporate Credit Facilities, PMCCF and SMCCF) that would offer to buy both newly issued and seasoned investment-grade corporate bonds that met eligibility criteria (mainly regarding credit quality and maturity) subject to some limits. Although the Fed did not explicitly set any cap, this had the effect of capping corporate bond spreads at their elevated March levels and prevented them from rising much further. Combined, the CPFF, PMCCF, and SMCCF enabled large firms to access securities market financing (see channel number 1 in Fig. 4).

Although the take-up under the facilities has been modest, as backstops they had large effects on bond yield spreads. By unclogging blockages in the flow of finance (labeled 1 in Fig. 5), the announcements of the corporate and municipal bond programs prevented further increases in the cost of credit for entities that directly raised funds in the open market or acted as security funded financial intermediaries. Using difference-in-difference and regression discontinuity approaches, Boyarchenko et al. (2020), D’Amico, Kurakula, and Lee (2020), and Gilchrist, et al. (2020) identify Fed’s announcements of the corporate bond facilities for investment-grade debt (March 23) and the extension of the facility to some downgraded “fallen angel” firms (April 9) had a greater impact on bond yield spreads and returns for eligible bonds than for debt with other credit ratings. The first study shows how the better functioning of secondary markets improved relative to primary markets by lowering the benchmark yields, from which primary securities are priced, and by making dealers more willing to place issues. Boyarchenko et al. (2020) and Gilchrist, et al. (2020) find larger effects for debt with maturities closer to those bought by the two bond facilities than for longer maturities. Boyarchenko et al. (2020) find that the facility improved the functioning of the primary and secondary corporate bond markets, and led to declines in expected defaults and increased

bond issuance. They estimate that the yield-lowering effects of the corporate bond buying programs are greater for industries less directly and negatively affected by COVID-19. Recognizing the potential for different effects across maturities, D’Amico, Kurakula, and Lee (2020) analyze the returns on exchange-traded funds (ETFs) invested in bonds that were eligible versus those that were ineligible for purchase by the SMCCF. This study attributes the improved functioning of the secondary market to the reduction in the tail risk of eligible issuers arising from the SMCCF. They partly gauge the impact of these programs in terms of total bond returns. Gilchrist, et al. (2020) couch the benefits in terms of interest rate effects, finding that the announcement of the SMCCF on March 23 lowered eligible yields by 20 basis points (bps) compared with ineligible yields. Moreover, the announcement of the PMCCF on April 9 had an additional 10 bps reduction effect in the differential between eligible versus ineligible bonds.

O’Hara and Zhou (forthcoming) and Kargar et al. (2020) take a different tack by focusing on what affected liquidity in the bond market during the pandemic’s onset. O’Hara and Zhou (forthcoming) find that securities dealers had become much less willing to hold inventories to aid the matching of buyers and sellers, which pushed up bid-ask spreads and liquidity premiums on eligible (investment grade) versus ineligible (high yield bonds). They provide evidence that the announcements of the Fed corporate bond buying programs reversed this initial widening of liquidity premiums. They characterized the Fed as becoming the “market maker of last resort.” Coming to a slightly different conclusion, which emphasizes a larger role for an increase in demand for dealers to hold securities, Kargar et al. (2020) show how two factors initially pushed liquidity premiums higher. First, sellers of corporate bonds increased their demand for dealers to purchase bonds from them before dealers could find bond buyers. This increased pressure on dealers to hold more securities in inventory. Second, and at the same time, securities dealers became less willing to hold bond inventories to facilitate sales. Both effects pushed up liquidity premiums and thereby, spreads. Kargar et al. find the announcement of the Fed corporate bond buy-

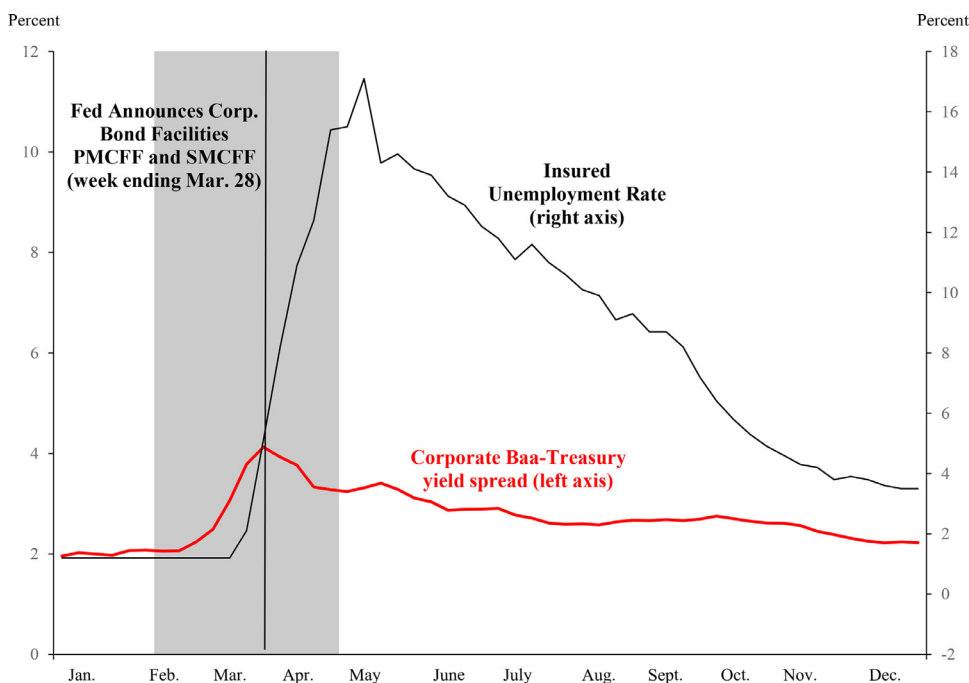


Fig. 5. Baa-rated corporate stopped moving with the unemployment rate until the fed announced new corporate bond facilities (Sources—Federal Reserve Board, Moody’s, and authors’ calculations).

ing program reduced bond sellers’ demand for dealer liquidity and, to a lesser extent, also helped partially restore dealer willingness to supply liquidity. This fits with evidence from the aforementioned studies that the Fed programs were effective in quelling a rise in the liquidity premiums on corporate bonds.

On the other hand, [Nozawa and Qui \(Forthcoming\)](#) find little effect of the programs on liquidity spreads between eligible and ineligible bonds. Instead, they find the Fed’s corporate bond facilities reduced credit risk premiums on eligible relative to ineligible bonds, with the differential effect partly diminishing in subsequent weeks. Essentially, the announcement of the programs *initially* pushed down investment grade yields on eligible bonds relative to yields on ineligible junk bonds, and later induced some downward pressure on junk bond yields that closed some of the gap between junk and investment grade yields. The results of [Nozawa and Qui \(Forthcoming\)](#) suggest that the programs may have effects beyond those captured by near-term announcement effects.

Complementing the aforementioned studies finding near-term bond market effects that are important for establishing causality, [Bordo and Duca \(2020, 2021\)](#) provide a more historical approach. Using several decades of data—some dating back to the Great Depression—they examine how Fed announcements of corporate and municipal bond buying programs prevented deteriorating economic activity from further widening corporate and municipal bond yield spreads over Treasury yields, respectively, as illustrated in [Fig. 1](#) for the corporate Baa-Treasury spread. Since at least [Friedman and Schwartz \(1963\)](#), this spread has been used as an indicator of financial crises, bank panics, and swings in the macro-economy. This is especially the case in the credit and financial frictions literature, most prominently in studies by [Bernanke \(1983\)](#), [Bernanke, Gertler, and Gilchrist \(1996, 1999\)](#), [Bordo \(2008\)](#), [Mishkin \(1991\)](#), and [Mishkin and White \(2002\)](#). From 1970 to the start of the Great Recession, the spread between yields on Baa corporate and 10-year Treasury bonds averaged 2% points. The spread typically widens to 3 to 4% in recessions due to greater risk aversion and as investors demand higher corporate bond returns to compensate for the elevated default risk. For these reasons, the spread is positively correlated with the unemployment rate.

In the Great Recession, the spread widened to 6%, due in part to the downturn but also to sharply rising risk premiums that occur during financial crises. As illustrated in [Fig. 5](#), spreads rose with

the weekly unemployment rate during the early COVID-19 period until the Fed announced it would buy corporate bonds. Afterward, the unemployment rate kept surging, but the spreads stopped rising and ebbed—in contrast to the pre-COVID-19 equilibrium relationships that would have predicted much higher spreads in April and May ([Bordo and Duca, 2020](#)). These time-series estimates are consistent with the more detailed, difference-in-difference analyses of [Boyarchenko et al. \(2020\)](#), [D’Amico, Kurakula, and Lee \(2020\)](#), and [Gilchrist, et al. \(2020\)](#), which provide evidence from one historical episode.

Beyond the bond market, declines in Treasury yields and the capping of corporate-Treasury spreads have, by limiting the rise in the equity risk premium, bolstered stock prices, which fell less than they did in the Great Recession. Conceptually, this can be seen in the Federal Reserve Board Model of the U.S. economy (“FRBUS”). In this multi-equation econometric model, stocks are priced based on a linearization of the Gordon Growth model of equity prices in which equity risk premium rises with the real BBB corporate bond yield.³ [Bordo and Duca \(2020\)](#) find that the new Fed corporate bond programs prevented a further 2–4% point spike in corporate spreads in spring 2020. In the workings of the FRBUS model, this helped prevent more severe declines in stock prices in early spring 2020 that would have otherwise depressed consumer spending and helped prevent increases in risk premiums from pushing up the user cost of business investment. Using the FRBUS framework, [Bordo and Duca \(2020\)](#) estimate that by forestalling increases in the corporate-Treasury bond yield spread, the new corporate bond programs prevented a further decline of 1 to 2% points in the mid-2021 level of real GDP.⁹

Taking a different approach, [Sims and Wu \(2020\)](#) modify a DSGE framework that contains a financial intermediation sector, to examine differences in the impact of quantitative easing (“Wall Street QE”) and credit easing, which they coin as “Main Street QE”. In their framework,

³ Specifically, the long-run equity risk premium in FRBUS rises 0.64%age points with each 1%age point rise in the real BBB corporate bond yield. S&P’s BBB rating is roughly equivalent to Moody’s Baa rating category, which [Bordo and Duca \(2020\)](#) used to analyze the impact of the Fed’s new corporate bond programs.

⁹ See [Duca and Murphy \(2013\)](#) for a counter-factual simulation of what a similar bond-buying program might have achieved during the Great Recession.

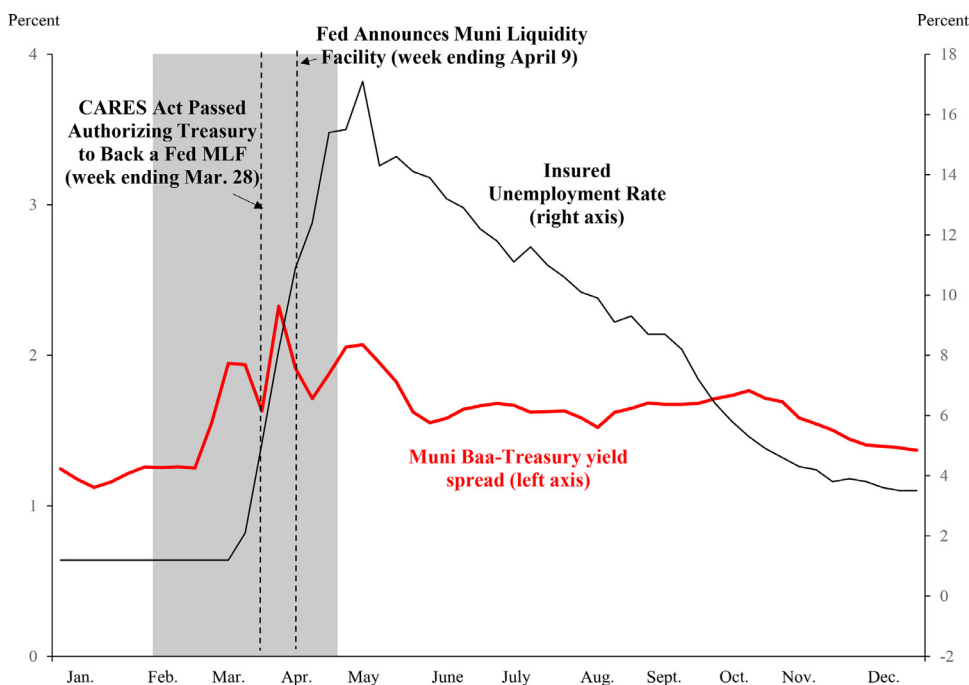


Fig. 6. Muni-Treasury spread had moved with the unemployment rate until announcements made about the municipal liquidity facility (Sources—Federal Reserve Board, Moody’s, and authors’ calculations).

when intermediaries face binding leverage constraints, both tools are effective in stimulating or reviving economic activity. However, when nonfinancial firms encounter a binding cash flow constraint and banks do not face binding leverage constraints, only “Main Street QE” is effective, in contrast to ineffective “Wall Street” QE (large purchases of long-term Treasuries and mortgage-backed securities). In their view, bank leverage constraints were binding and firm cash flow constraints were not in the Great Recession. This implies that “Wall Street” QE could work. In contrast, they portray bank leverage constraints as not being binding and firm cash flow constraints not as binding in the COVID-19 recession, which would imply that credit easing would be effective, but not conventionally defined (“Wall Street”) QE.

While their basic theoretical model makes sense and is a nice contribution to the literature, Sims and Wu’s (2020) interpretation of the Great and COVID-19 recessions understates the role of cash flow constraints in pre-pandemic recessions. This is suggested by the large cyclical swing in corporate spreads surrounding the Great Recession when the Fed extensively used “Wall Street QE.” Furthermore, formal empirical studies have found roles for firm-level credit constraints in pre-Great Recession downturns (Carpenter, Fazzari, and Petersen, 1994, and Bernanke, Gertler, and Gilchrist, 1996), the Great Recession (Duygan-Bump, Levkov, and Montriol-Garriga, 2015), and recessions in general (Lian and Ma, 2020).

1.2. Reviving municipal bond finance

In early spring 2020, state and local governments had difficulty issuing new bonds and faced higher spreads of municipal over Treasury bond yields. To deal with stresses in the municipal (muni) bond market, the CARES Act, which became law on March 27, 2020, authorized funding for a U.S. Treasury equity stake to cover a Federal Reserve program backstopping muni bonds. As shown in Fig. 6, muni yield spreads dipped as the law took effect, but then ticked up the next week, peaking in early April. Spreads then dipped in the week of April 9 when the Fed announced the creation of the Municipal Liquidity Facility (MLF) through which it would buy newly issued municipal bonds that funded pandemic-related expenses subject to eligibility criteria. The Fed explicitly announced that it would offer to buy eligible bonds at credit-rating based spreads, which were generally about 1% above normal spreads.

This pricing can be viewed as akin to a Bagehot, 1873 penalty rate on lender-of-last resort provisioning of short-term liquidity in crises. The MLF was intended to be a backstop, to help calm market conditions and allow state and local governments to access municipal financing to continue to provide essential services such as health care during a pandemic.⁴

Several studies formally provide evidence that the announcement of the MLF lowered muni spreads. In an event study, Bi and Marsh, 2020 assess the impacts of early MLF-related announcements on muni liquidity and credit risk premiums. Using data on a type of collateralized muni bond (prefunded bonds), they find that the negotiation and passage of the CARES Act lowered liquidity premiums on prefunded bonds in a range between 28 and 68 bps, with a further reduction of 17 bps when the Fed announced the creation of the MLF. Using a difference-in-difference approach, Haughwout, Hyman, and Shacher (2021) estimate that for eligible municipalities, the MLF lowered municipal bond yields by about 72 bps. The authors did this by comparing yields on the debt of municipalities that were eligible to sell bonds to the MLF versus yields on debt issued by other municipalities. This magnitude is close to the sum of impacts of the CARES Act passage and Fed MLF announcements found by Bi and Marsh, 2020. Also reassuring are estimates from an event study by Li and Lu (2020). Using county and state level data, they estimate that the Fed’s announcement of the MLF lowered municipal yields by about 69 basis points, controlling for county fixed and week time effects, and for time variation in the frequency of COVID-19 deaths and cases.

In a time-series study using data from the 1970s to 2021, Bordo and Duca (2021) estimate that the MLF forestalled large increases in muni spreads by as much as 3 to 4% points on a monthly basis. Their counterfactual exercise assumes that, absent the MLF, further increases in the unemployment rate after early April would have otherwise pushed up muni spreads higher, as past behavior suggested. Their estimates are based on how the MLF acted to cap muni spreads ahead of a further

⁴ Also contributing to near-term funding pressures on state and local governments was the postponement of the federal income tax filing deadline from April 15 to July 15, 2020. Because most state and local governments with income taxes use calculations based on federal provisions, the normal inflow of net income tax revenue in April was delayed to July that year.

worsening of the economy, consistent with the cap-like features of MLF pricing matrices. These considerations, which are hard to incorporate in difference-in-difference or event study frameworks that can better establish causality, may account for Bordo and Duca's (2021) larger estimated effects and suggest that the four reviewed studies of the MLF's effect on municipal bond finance complement each other.

The broader, macroeconomic effect of the MLF is likely modest. Haughwout, Hyman, and Shacher (2021) estimate that the MLF helped to limit declines in state and local government employment, but these pale in comparison to estimates of the Paycheck Protection Program's (PPP) effect on total employment. Also, the interest savings from the MLF on state and local government budgets is small relative to GDP (Bordo and Duca, 2021).⁵ Such calculations omit how the MLF may have addressed a tail risk to the financial system. Indeed, there have been several instances when correlated waves of state and local government debt distress posed systemic risk, such as the economic and financial downturns of the 1780s-early 1790s, early-1840s, 1870s, mid-1890s, and 1930 (see Bordo and Duca, 2021).⁶ In the spring of 2020, there were emerging signs of a correlated deterioration in state and local government finance. The combination of federal fiscal support to states, along with the creations of the PPP program and the MLF may have prevented municipal debt distress from escalating and posing systemic risk to the financial system.

1.3. Two new tools to revive lending to small and mid-sized firms

The pandemic-related shutdowns and decline in the economy threatened the survival of many firms. Against this backdrop, in early spring 2020 a credit crunch emerged: Banks had tightened their credit standards for approving and pricing loans in response to fears of a large downturn and potential credit losses. As reported in the April Senior Loan Officer Opinion Survey (Fig. 7), about 40% of surveyed banks reported tightening their credit standards on commercial and industrial loans to small firms and to mid- and large-sized firms. To help businesses and households survive the pandemic, as part of the \$2.3 trillion CARES Act, the Congress created the PPP. It provided subsidies to small firms—in the form of Small Business Administration loans originated by banks—to avoid laying off employees. As noted by Decker et al. (2020), 33.8 million firms and entities covering 51% of all employees were eligible to borrow from the PPP program. Estimates of how many jobs were preserved by the PPP differ, ranging from 1.4 to 3.2 million by Autor, et al. (2020) to 18.6 million by Faulkender, et al. (2020). Bartik, et al. (2020) estimate that the PPP program increased the marginal survival rate of small firms by a notable 9% to 22%, with rough inferences based on estimates of the number of jobs saved per PPP loan favoring the higher aggregate jobs-saving figure of Faulkender, et al. (2020).

The first funding of PPP loans (\$350 billion) was quickly used, but a second round was not (over \$100 billion was unused at expiration). One reason was uncertainty if firms that borrowed earlier could borrow again. Another factor was delays in implementing the PPP program (Doniger and Kay, 2021), frequent rule changes to the PPP program (General Accounting Office 2020), and public criticism of firms for borrowing that made banks and firms reluctant to participate. A fourth

⁵ In a related study, Wei and Yue (2020) find that the cost of variable rate finance and of short-term debt to state and local governments (each 1/20 the size of the muni bonds) was higher in the GFC, and that financial distress during the pandemic was ameliorated by the Fed expanding its Money Market Mutual Fund Facility to make discount loans to banks and muni money market funds.

⁶ Debt problems in the 1780s-early 1790s involved state debt from the American Revolutionary War and those in the 1840s stemmed from earlier state financing of canals, State debt financing of railroad development contributed to waves of bankruptcies in the mid-1870s and mid-1890s. Unexpected and severe economic downturns also played a role in those episodes, as well as in the Great Depression.

plausible reason was the banks' uncertainty whether they could fund a possible surge in PPP loan requests.

Partly to address the fourth and other more general impediments to the PPP program, the Fed created a third set of new credit-easing tools aimed at restoring small and mid-sized firms' access to bank loans. The Fed enhanced the appeal of originating PPP loans by offering attractive discount loans. In early April, the Fed announced that through its new Paycheck Protection Program Loan Facility (PPPLF), it would provide discount loans to banks at near zero interest using PPP loans as collateral valued at par (100%) as the PPP loans were fully guaranteed by the SBA.

The Fed also announced the creation of its Main Street Loan program, through which it would buy eligible bank loans to mid-sized firms that were too large to qualify for PPP loans and too small or less well established to issue investment-grade bonds. Since these actions entail credit risk and the Dodd-Frank Act restricted the Fed's ability to use its section 13(3) powers to react to crises, the Fed did so only with the approval and explicit backing of the Treasury against losses. These two bank loan programs were conceived and designed to help reopen the flow of finance from banks to small and mid-sized firms (labeled by numbers 2 and 3, respectively, in Fig. 4). To the 25% share of employees at all firms that benefitted from the corporate (14%) and municipal (11%) bond programs, the PPP (which the PPPLF supports) added another 51.1%. Further, adding in the firms that were eligible for Main Street Lending programs increased the total to 97.5% (Decker, et al., 2020).⁷

Despite helping to broaden the umbrella of support to more firms, the Fed's Main Street Lending and PPPLF may have had effects that are harder to discern than those of the bond market programs. Perhaps reflecting challenges with starting the two bank loan programs, there is evidence that the COVID-19 credit crunch worsened for a while after the Fed announced the two programs in early April. Indeed, even a larger shares of banks reported having tightened their credit standards on loans to small business loans in the June 2020 Federal Reserve Senior Loan Officer Survey (70%) than in the April 2020 survey (40%). And a sizable share of surveyed banks (30%) tightened their credit standards in the last quarter of 2020. This continued tightening could plausibly owe, in large part, to the poor near-term economic outlook and high uncertainty in mid-2020. Indeed, it was not until COVID-19 vaccinations became widely available in the first quarter of 2021 that some of the 2020 tightening was partially reversed. But, according to industry reports, some of the delay in alleviating the credit crunch was related to uncertainty that firms and banks perceived about the PPP and Main Street Lending programs and also to impediments to enacting the PPP—as supported by evidence in Doniger and Kay, 2021.

Despite delays and modest borrowing under the two programs, the Fed's PPPLF discount program and Main Street Lending program may have had a backstop effect, making banks more willing to lend to small and mid-sized firms. Using bank call report data, Anbil, et al. (2021) estimate the impact of the PPPLF by comparing the PPP loan volume of banks using the facility with those that did not. They document that the former originated more than twice the volume of PPP loans than the latter. To circumvent the endogeneity problem that many banks may have jointly decided to originate PPP loans and to fund them with discount loans, the authors instrument the use of the PPPLF program. They substitute actual PPPLF use with a measure of whether a financial intermediary has borrowed from the Fed's discount window and from the Federal Home Loan Bank system. Using this instrument and other controls, they estimate that the share of banks making PPP loans doubled from 5 to 10% through the establishment of the PPPLF. In addition, they found that smaller banks were more apt than larger banks to use the

⁷ The corporate facilities likely bolstered the stock prices of public firms who employ about one-third of private sector workers (Davis, et al., 2006) and boosted the consumer spending of the half of U.S. households that own stock. In addition, many firms use the Baa corporate rate as a benchmark interest rate for calculating the weighted cost of capital used in assessing investment projects.

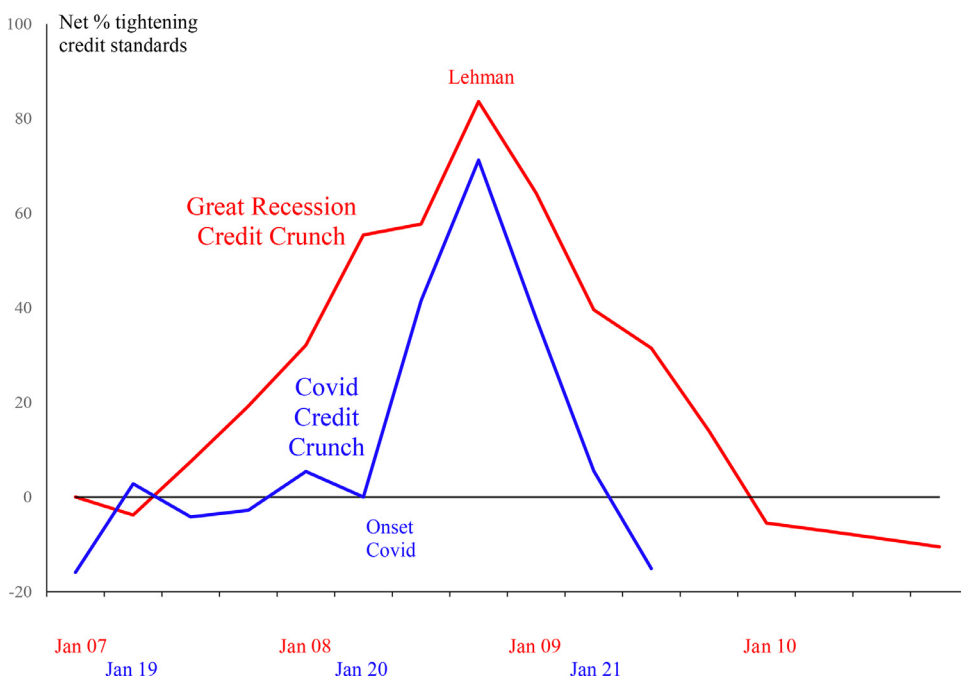


Fig. 7. Banks tightened credit standards on C&I loans to small firms to a lesser extent in the COVID recession than in the great recession (Source—Board of Governors of the Federal Reserve System).

facility when making PPP loans and found evidence that larger banks were induced to make more PPP loans by a backstop effect—that is, the existence of potential liquidity via the PPPLF was the incentive. [Beauregard, Lopez, and Spiegel \(2021\)](#) also found evidence of a positive effect of the PPPLF. Using call report data on bank characteristics and past behavior to forecast loan growth, they found that the growth rate of small business lending was much higher than predicted at small banks in the first six months of the pandemic. Small business lending was also stronger than forecasted—but to a lesser extent—at mid-sized banks followed by large banks.

With respect to small business lending at banks, the credit supply tightening phase of the COVID-19 recession was shorter and less severe than in the Great Recession, as shown in [Fig. 7](#). To a large extent, this likely owes to differences in the factors driving the two recessions and the more abrupt decline in and sharper recovery from the COVID-19 recession. Indeed, the COVID-19 recession was driven by the onset of the pandemic (see [Powell, 2020](#)), and the fast recovery was largely induced by the unwinding of shutdowns in the summer of 2020 and later by the speedy adoption of vaccines in early 2021. This pattern differs from prior recessions that were driven by more typical real, monetary, and financial forces. That said, and nevertheless, there is evidence that the PPPLF likely bolstered small business lending.

While sizable quantities of loans were made under the PPP program, few were under the Main Street Lending program. One reason is that the former was heavily subsidized, with the Treasury paying the loans on behalf of eligible businesses that retained their employees for much of the early pandemic. A second reason was that, in keeping with the spirit of its 13(3) powers, the Fed tried to avoid underpricing the terms of credit for loans supported by the Main Street Lending program (see [Saksa, 2020](#)). To induce greater use and coverage of the Main Street Lending programs, the Fed eased eligibility requirements several times (see the timeline in [Appendix A](#)). For these and other reasons, it may take time for researchers to amass and analyze data to assess how much the Main Street Lending program helped restore finance to mid-sized businesses (intervention number 3 in [Fig. 5](#)). In terms of this chart, the evidence is clearer that the Great Recession-era Term Asset-Backed Securities Loan Facility (TALF) helped restore the ability of nonbanks to make consumer and small business loans as stressed by [Agarwal, et al. \(2010\)](#) and [Campbell, et al. \(2011\)](#), (intervention number 4 in [Fig. 5](#)).

2. The evolution of the fed's role in countering financial instability

There has been a long debate in central banking circles as to where to draw the line between protecting the payments system and the financial intermediaries that provide the means of payment (which can be viewed as a public good) and the rescue of non-bank entities. The traditional view is that the rescue (or bailout) of non-bank entities should be regarded as credit policy, a form of fiscal policy, which involves picking winners and losers. Such policy, it is argued, should be provided by the duly elected fiscal authorities and not by the central bank (see [Goodfriend, 2014](#)). [Plosser \(2017\)](#) maintains that credit policies risk politicizing the actions of the central bank and threaten its independence from the fiscal authorities.⁸

The line between monetary and credit policy was first crossed in the mid-1930s when the Fed invoked 13(3) powers under the Emergency Relief and Construction Act of 1932 to provide limited loans to nonfinancial and nonbank financial firms. During World War II the Fed provided support to essential war industries ([Hackley 1973](#), p. 144). But in subsequent decades, Fed credit policy fell into disuse.

In the quiet thirty-five years after WWII, the Fed's financial policy actions were limited to providing short-term liquidity to member banks. In the 1970s financial instability reappeared, and a key intervention in the non-bank financial sector occurred when the Fed indirectly intervened through the New York money center banks to support the commercial paper market after the Penn Central railroad failed in 1970 ([Calomiris, 1994](#)). Federal Reserve lender of last resort actions, as opposed to credit policy, ramped up in the rescues of the Franklin National bank in 1974 and Continental Illinois in 1986. In this period, [Bordo \(1990\)](#) argues that the Fed shifted from Bagehot-rule lending to solvent but illiquid banks, towards lending to too-big-to-fail insolvent banks. By the late 1990s, less-regulated speculative funds had taken such large positions in assets that a possible disorderly collapse of a major hedge

⁸ Other advanced countries extensively used credit policy in the post WWII period. [Capie \(2010\)](#) describes the Bank of England's industrial policy in the 1950s to 1970s, when the Bank actually had considerable equity in a number of companies. [Monnet \(2018\)](#) provides an extensive study of the Banque de France's use of credit policy as its main policy tool in the post-WW II era.

fund (LTCM) threatened the stability of the financial system. To forestall such an event, the Fed helped orchestrate a life-boat rescue arranged by key commercial and investment banks of the hedge fund LTCM in 1998 (Edward, 1999). This evolution in how the Fed responded to financial instability reflects the rise of non-bank financial institutions (shadow-banking) and the need to stabilize an increasingly less commercial-bank centric financial system.

A decade later during the Global Financial Crisis, when the nonbank financial sector was much larger and more important, providing finance to households and firms, the Fed did more than just supply direct liquidity support to the short-term nonbank financial sector by aiding money market mutual funds and securities dealers. It also provided liquidity to top-rated nonfinancial actors by buttressing Aaa-rated asset-backed securities via the Term Auction Loan Facility (Agarwal, et al., 2010); A1/P1-rated commercial paper via the commercial paper funding facility (Duca, 2013a); and prime residential mortgages by instituting quantitative easing purchases of residential mortgage-backed securities.

To stem a potentially broader breakdown in the securities and loan markets during the COVID-19 recession, the Fed greatly expanded its emergency interventions into corporate and municipal bonds, as well as loans to small and mid-sized businesses and entities. This marked a further extension of emergency support to the nonfinancial sector beyond the expansion during the GFC. Thus, in a limited sense, the Fed has come back full circle to policies developed in the 1930s in directly supporting nonfinancial firms. And as some have argued, this has threatened the Fed's credibility to protect the monetary and financial system (Plosser 2017). It will be interesting to see whether once the Covid emergency is deemed over the Fed will return to its traditional role.

3. Conclusion

In contrast to how financial frictions worsened during the Great Depression (Bernanke, 1983, Bernanke, 1995) and delayed recovery from the Great Recession (Bernanke, 2018), the Fed created and quickly employed new credit easing tools to prevent financial feedback mechanisms (Bernanke and Gertler, 1990, Bernanke, Gertler and Gilchrist, 1996, 1999) from amplifying the direct effects of the COVID-19 pandemic. While it may take more time for researchers to evaluate the two new bank loan programs, at this point it appears that the backstop facilities for corporate and municipal bonds were highly successful at preventing deterioration of bond finance in the second and third quarters of 2020. These effects include preventing bond market distress from greatly worsening the downturn and likely alleviating some of the credit crunch in bank lending.

But in so doing, the Fed expanded its emergency role in crises by directly supporting non-financial firms and municipal governments, drawing on the needed backing of Treasury guarantees. These innovations, which harkened back to policies followed by the Fed in the 1930s and 1940s, reopened an old debate. The debate was whether the Fed should be conducting credit policy or whether that should be done by the fiscal authorities. The decision to cross this line, made under the duress of the pandemic, may have future consequences. Hetzel, 2020 argues that these include a potential threat to the Fed's independence from the fiscal authorities, which was won with the Federal Reserve Treasury Accord of February 1951. It also raises the issue of mission creep and Tinbergen's assignment principle of policy tools to policy goals. In addition, the precedent created by the programs could induce non-financial firms to depend on Fed support in future crises or downturns. Thus, despite providing benefits (mainly from bond backstops), the new credit tools are not a free lunch, and their costs and, hence, net benefits will depend on the moral hazard effects they induce (see Bordo (2014) and Calomiris et al., 2017). Partly to address such concerns and given the success of the new credit programs in preventing a full-blown financial crisis in spring 2020, the Treasury terminated the programs at year-end 2020. Nevertheless, an unanswered question is had all types of new credit policies not been implemented, would the Fed's other LOLR

and monetary policies have done as good a job? This may help address whether the benefits of new credit programs exceed the costs. Whatever the answer(s), the Fed's role in countering financial crises expanded further to address a most unusual downturn.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jge.2021.100013.

References

- Agarwal, Sumit, Barrett, Jacqueline, Cun, Crystal, De Nardi, Mariacristina, 2010. The asset-backed securities markets, the crisis, and TALF. *Econ. Perspect.* 34 (4), 101–115.
- Anbil, Sryia, Mark Carlson, and Mary-Frances Styczynski. 2021. "The effect of the PPPLF on PPP lending by commercial banks." FEDS Working Paper 2021-31.
- Autor, David, David Cho, Leland D. Crane, Mita Goldar, Byron Lutz, Joshua Montes, William B. Peterman, David Ratner, Daniel Villar, and Ahu Yildirmaz (2020). "An evaluation of the paycheck protection program using administrative payroll micro-data." Working Paper, MIT.
- Bagehot, Walter., 1873. *LombardStreet—A Description of the Money Market.* Henry S. King & Company, London.
- Bartik, Alexander W., Zoe B. Cullen, Edward L. Glaeser, Michael Luca, Christopher T. Stanton, and Adi Sunderam. 2020. "The targeting and impact of paycheck protection program loans to small businesses." NBER Working Paper 27623.
- Beauregard, Remy, Jose A. Lopez, and Mark M. Spiegel. 2021. "Small business lending during COVID-19." FRBSF Economic Letter 2020-35, Federal Reserve Bank of San Francisco.
- Bernanke, Ben S., 1983. Non-monetary effects of financial crises in the propagation of the great depression. *Am. Econ. Rev.* 71, 257–276.
- Bernanke, Ben., 1995. The macroeconomics of the great depression—A comparative approach. *J. Money Credit Bank.* 27 (1), 1–28.
- Bernanke, Ben S., 2018. The real effects of disrupted credit: evidence from the global financial crisis. *Brook. Pap. Econ. Act.* 49 (2), 251–342.
- Bernanke, Ben, Gertler, Mark, 1990. Financial fragility and economic performance. *Q. J. Econ.* 105 (1), 87–114.
- Bernanke, Ben S., Gertler, Mark, Gilchrist, Simon, 1996. The financial accelerator and the flight to quality. *Rev. Econ. Stat.* 78 (1), 1–15.
- Bernanke, Ben, Gertler, Mark, Gilchrist, Simon, 1999. The Financial Accelerator in a Quantitative Business Cycle Framework. In: *Handbook of Macroeconomics*, 1C. Elsevier Science, North-Holland, Amsterdam, pp. 1341–1393 edited by J. B. Taylor and M. Woodford.
- Bi, Huixin and W. Blake Marsh. 2020. "Flight to Liquidity or Safety? Recent Evidence from the Municipal Bond Market." Federal Reserve Bank of Kansas City Research Working Paper RWP 20-19. Bordo, Michael D. 2008. "An Historical Perspective on the Crisis of 2007-2008." NBER Working Paper 14569.
- Bordo, Michael D., 2014. Rules for a lender of last resort—An historical perspective. *J. Econ. Dyn. Control* 49 (C), 126–134.
- Bordo, Michael D. and John V. Duca. 2020. "How New Fed Corporate Bond Programs Dampened the Financial Accelerator in the Covid-19 Recession." NBER Working Paper 28097.
- Bordo, Michael D. and John V. Duca. 2021. "How the New Fed Muni Bond Program Capped Muni-Treasury Yield Spreads in the Covid-19 Recession." NBER Working Paper 28437.
- Boyarchenko, Nina, Anna Kovner, and Or Shachar. 2020. "It's What You Say and What You Buy—A Holistic Evaluation of the Corporate Credit Facilities." Federal Reserve Bank of New York Staff Report 935.
- Calomiris, Charles W., 1994. Is the discount window necessary? A penn central perspective. *Rev. Federal Reserve Bank of St. Louis* May: 31–55.
- Calomiris, Charles W., Holtz-Eakin, Douglas, Hubbard, R.Glenn, Meltzer, Allan H., Scott, Hal S., 2017. Establishing credible rules for fed emergency lending. *J. Financ. Econ. Policy* 9 (3), 260–267. <http://www.dallasfed.org/assets/documents/research/eclett/2009/el0902.pdf>.
- Campbell, Sean, Covitz, Daniel, Nelson, William, Pence, Karen, 2011. Securitization markets and central banking—An evaluation of the term asset-backed securities loan facility. *J. Monet. Econ.* 58, 518–531.
- Capie, Forrest., 2010. *The Bank of England, 1950s to 1979.* Cambridge University Press, New York.
- Carpenter, Robert E., Fazzari, Steven M., Petersen, Bruce C., 1994. Inventory investment, internal-finance fluctuations, and the business cycle. *Brook. Pap. Econ. Act.* 2, 75–138.
- Clarida, Richard H., Burcu Duygan-Bump, and Chiara Scotti. 2021. "The COVID-19 crisis and the federal reserve's policy response." FEDS Working Paper 2021-035, Board of Governors of the Federal Reserve System.
- D'Amico, Stephania, Vamidsar Kurakula, and Stephen Lee. 2020. "Impacts of the Fed Corporate Credit Facilities Through the Lenses of ETFs and CDX." Federal Reserve Bank of Chicago Working Paper 2020-14.

- Davis, Stephen J., Haltiwanger, John, Jarmin, Ron, Miranda, Javier, 2006. Volatility and Dispersion in Business Growth Rates—Publicly Traded versus Privately Held Firms. In: NBER Macroeconomics Annual 2006, 21. MIT Press, Cambridge, pp. 107–159.
- Decker, Ryan, Robert J. Kurtzman, Byron F. Lutz, and Christopher J. Nekarda. 2020. "Across the Universe—Policy Support for Employment and Revenue in the Pandemic Recession" FEDS Working Paper 2020-099. <https://doi.org/10.17016/FEDS.2020.099>.
- Doniger, Cynthia and Benjamin Kay (2021). "Ten Days Late and Billions of Dollars Short—The Employment Effects of Delays in Paycheck Protection Program Financing," *FEDS Working Paper 2021-003*. <https://doi.org/10.17016/FEDS.2021.003>.
- Duca, John V., 2013a. Did the commercial paper funding facility prevent a great depression style money market meltdown? *J. Financial Stab.* 9, 747–758.
- Duca, John V., 2013b. The money market meltdown of the great depression. *J. Money Credit Bank.* 45, 493–504.
- Duca, John V., Murphy, Anthony, 2013. Would a bagehot style corporate bond backstop have helped counter the great recession? *Econ. Lett.* 119 (3), 351–353.
- Duygan-Bump, Burcu, Levkov, Alexey, Montriol-Garriga, Judit, 2015. Financing constraints and unemployment—Evidence from the great recession. *J. Monet. Econ.* 75, 89–105.
- Edward, Franklin R., 1999. Hedge funds and the collapse of long-term capital management. *J. Econ. Perspect.* 13 (2), 189–210.
- Faulkender, Michael, Robert Jackman, and Stephen I. Miran. 2020. "The Job-Preservation Effects of Paycheck Protection Loans." Office of Economic Policy Research Paper 2020-01, U.S. Treasury.
- Friedman, Milton, Schwartz, Anna J., 1963. *A Monetary History of the United States 1867-1960*. Princeton University Press, Princeton.
- General Accounting Office. 2020. "COVID-19—Opportunities to Improve Federal Response and Recovery Efforts." GAO-20-625: June 25, 2020. <https://www.gao.gov/products/gao-20-625>
- Gilchrist, Simon, Bin Wei, Vivian Z. Yue, and Egon Zakrajšek. 2020. "The Fed Takes on Corporate Credit Risk—An Analysis of the Efficacy of the SMCCF." NBER Working Paper 27809.
- Goodfriend, Marvin., 2014. Lessons from a century of fed policy—Why monetary and credit policy NED rules and boundaries. *J. Econ. Dyn. Control* 49, 112–121.
- Hackley, Howard H. 1973. *Lending Functions of the Federal Reserve Banks—A History*. Board of Governors of the Federal Reserve System, Washington.
- Haddad, Valentin, Alan Moreira, and Tyler Muir. 2020. "When Selling Becomes Viral—Disruptions in Debt Markets in the COVID-19 Crisis and the Fed's Response." NBER Working Paper 27168.
- Haughwout, Andrew F., Benjamin G. Hyman, and Or Shacher. 2021. "The Option Value of Municipal Liquidity—Evidence from Federal Lending Cutoffs during Covid-19." Manuscript, Federal Reserve Bank of New York. Available at SSRN: <https://ssrn.com/abstract=3785577> or <http://dx.doi.org/10.2139/ssrn.3785577>.
- Hetzel L., Robert, 2020. COVID-19 and the Fed's Credit Policy. Mercatus COVID-19 Response Working Paper Series (July 2020) 1–52. <https://www.mercatus.org/publications/covid-19-economic-recovery/covid-19-feds-credit-policy>.
- Kargar, Mahyar, Benjamin Lester, David Lindsay, Shuo Liu, Pierre-Olivier Weill, and Diego Z' u' niga. 2020. "Corporate Bond Liquidity During the Covid-19 Crisis." NBER Working Paper 27355.
- Li, Tao and Jing Lu. 2020. "Municipal Finance During the COVID-19 Pandemic—Evidence from Government and Federal Reserve Interventions." Available at SSRN: <https://ssrn.com/abstract=3637636> or <http://dx.doi.org/10.2139/ssrn.3637636>.
- Li, Yi, Maureen O'Hara, and Xing Alex Zhou. 2020. "Mutual Fund Fragility, Dealer Liquidity Provisions, and the Pricing of Municipal Bonds." (November 11, 2020). Available at SSRN: <https://ssrn.com/abstract=3728943> or <http://dx.doi.org/10.2139/ssrn.3728943>.
- Lian, Chen, Ma, Yueran, 2020. Anatomy of corporate borrowing constraints. *Q. J. Econ.* 136 (1), 229–291.
- Mishkin, Frederic S., 1991. Asymmetric information and financial crises—A historical perspective. In: *Financial Markets and Financial Crises*. University of Chicago Press, Chicago, pp. 69–108 R. Glenn Hubbard (ed.).
- Mishkin, Frederic S. and Eugene N. White. 2002. "U.S. Stock Market Crashes and Their Aftermath— Implications for Monetary Policy." NBER Working Paper 8992.
- O'Hara, Maureen and Xing Alex Zhou. Forthcoming. "Anatomy of a liquidity crisis—Corporate bonds in the COVID-19 crisis." *J. Financial Econ.* (forthcoming).
- Nozawa, Yoshio and Yancheng Qiu. Forthcoming. "Corporate bond market reactions to quantitative easing during the COVID-19 pandemic." *J. Bank. Financ.*
- Plosser, Charles I. 2017. "The Risks of a Fed Balance Sheet Unconstrained by Monetary Policy." Hoover Economic Policy Working Paper 17102.
- Powell, Jerome H. 2020. "Current Economic Issues." Speech at the Peterson Institute for International Economics, Washington, D.C., May 13, 2020. <https://www.federalreserve.gov/newsevents/speech/powell20200513a.htm>
- Saksa, Jim, 2020. Congressional panel slams fed's main street lending program—Potential borrowers get better terms elsewhere. Roll Call. August 7 <https://www.rollcall.com/2020/08/07/congressional-panel-slams-feds-main-street-lending-program/>.
- Sims, Eric R. and Cynthia Wu, 2020. "Wall Street vs. Main Street QE." NBER Working Paper 27295.
- Wei, Bin, Yue, Vivian Z., 2020. The federal reserve's liquidity backstops to the municipal bond market during the COVID-19 pandemic. Policy Hub 2020-5. Federal Reserve Bank of Atlanta.