DOI: 10.1002/soej.12498

SYMPOSIUM ARTICLE

Southern Economic Journal WILEY

The Federal Reserve's response to the COVID-19 contraction: An initial appraisal

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Abstract

We provide an initial assessment of the Federal Reserve's policy response to the COVID-19 contraction. We briefly review the historical episode and consider the standard textbook treatment of a pandemic on the macroeconomy. We summarize and then evaluate the Fed's monetary and emergency lending policies through the end of 2020. We credit the Fed with promoting monetary stability while maintaining that it could have done more. We argue that the Fed could have achieved stability without employing its emergency lending facilities. Although some facilities likely helped to promote general liquidity, others were primarily intended to allocate credit, which blurs the line between monetary and fiscal policy. These credit allocation facilities were unwarranted and unwise.

KEYWORDS

COVID-19, credit allocation, Federal Reserve, lending facilities, monetary policy

JEL CLASSIFICATION

E52; E58; P16

The economic contraction beginning in March 2020 was the sharpest on record. Growing fears of a pandemic followed by stay-at-home orders and other restrictions on businesses and consumers prompted a huge decline in economic activity. The unemployment rate jumped to 14.7% in April 2020. Annualized real gross domestic product (GDP) per capita, which stood at

$58,490 in 2019-Q4, fell to $57,691 in 2020-Q1 and $52,387 in 2020-Q2—an annualized growth rate of −24.7%. For comparison, the annualized growth rate from 2007-Q4 to 2009-Q2, a peak-to-trough known as the Great Recession, was just −3.7%.

The nature of the downturn also differed significantly from the previous recession. "There's nothing fundamentally wrong with the economy," Federal Reserve (Fed) Chair Jerome Powell (2020a) said in a March 26th interview. "Quite the contrary, the economy performed very well right through February. [...] This is a situation where people are being asked to step back from economic activity, close their businesses, stay home from work. So, in principle, if we get the virus spread under control fairly quickly, then economic activity can resume. And we want to make that rebound as vigorous as possible."

The Fed took bold steps to support the recovery. In what follows, we provide an initial assessment of the Fed's policy response. We briefly review the historical episode and consider the standard textbook treatment of a pandemic on the macroeconomy in Section 1. We summarize the monetary and emergency lending policies pursued by the Fed in Section 2. In Section 3, we evaluate the Fed's actions. We consider the extent to which the Fed might be said to have promoted monetary stability, whether its emergency lending facilities were warranted, and what, if any, consequences are likely to follow from these facilities. In brief, we credit the Fed with promoting monetary stability while maintaining that it could have—and, given its mandate, should have—done more. It could have achieved something approximating monetary stability without employing its emergency lending facilities. Although some of its facilities likely helped to promote general liquidity, others were primarily intended to allocate credit, which blurs the line between monetary and fiscal policy. These credit allocation facilities were unwarranted and unwise.

1 | THE COVID-19 CONTRACTION

In early 2020, the SARS-CoV-2 virus originating in Wuhan, China began to spread to other countries. The World Health Organization (WHO) identified four confirmed cases outside of China on January 20 (WHO, 2020c). By March 1, confirmed cases outside of China had risen to 7,169 (WHO, 2020a). They ballooned to 24,727 by March 15 (WHO, 2020b) and continued to rise thereafter. As cases outside of China increased, so too did the fear of a global pandemic.

The growing fear of a pandemic appears to have prompted U.S. consumers and businesses to change their behavior. Luther (2020a) documents this behavioral response by analyzing several visits-and-length-of-stay activity indices produced by Google (2020). Beginning around March 8, residential activity increased and transit station activity decreased, suggesting those in the United States were limiting unnecessary trips outside the home. Workplace activity declined beginning around March 11, as many transitioned to remote work, while retail and recreational activity started to fall around March 13. Grocery and pharmacy activity, which had picked up in late February, remained elevated through mid-March, presumably because people were making preparations for an extended stay at home. By March 22, it too had fallen below the baseline.

[1]The effect of these policies appears to be small relative to the behavioral response discussed above. Goolsbee and Syverson (2020) find that, while overall consumer traffic fell by 60 percentage points, legal restrictions account for a mere 7% point decline. Luther (2020b) reaches a similar conclusion, but acknowledges that people might have returned to more routine levels of activity thereafter had they been permitted to do so.

Policymakers also took actions to limit activity.[1] California imposed the first state-level stay-at-home order on March 19, with 20 other states issuing similar orders in the week that followed. By April 8, 42 states had imposed stay-at-home orders (Mervosh *et al*., 2020b).[2] Many of those in the remaining eight states were nonetheless subject to local stay-at-home orders or other restrictions on activity.[3] Then, when state and local governments began relaxing restrictions on activity, they did so gradually and, in some cases, reversed course along the way (Mervosh *et al*., 2020a). Alaska and Georgia were the first states to end stay-at-home orders on April 24.[4] But restaurants, bars, gyms, and retail shops were prevented from operating at full capacity until May 22 in Alaska; restaurant capacity restrictions were lifted on June 16 in Georgia, though bars were still subject to capacity restrictions. Other states—including California, Colorado, Illinois, Michigan, New York, and Texas—initially took steps to reopen but then backtracked as cases climbed.[5]

In a standard textbook macroeconomic model, the COVID-19 pandemic and corresponding restrictions on activity is best treated as a temporary reduction in total factor productivity.[6] While physical and human capital are essentially unchanged, those stocks are less capable of producing valuable goods and services than they were prior to the pandemic. The presence of SARS-CoV-2 reduces our ability to produce relatively safe restaurant meals, business flights, and pleasure cruises, among many other goods and services. Restrictions on activity, when binding, prevent us from employing physical and human capital in the most economically productive way known. Hence, the likely macroeconomic consequences of the shock are temporarily reduced real output, employment, labor hours, capital utilization, real wages, and real rental rates. In the absence of changes in aggregate demand, the price level will temporarily rise above trend.

Of course, the depth and duration of the downturn prompted by a temporary negative total factor productivity shock depend on the magnitude and duration of the shock. A relatively small disturbance will tend to yield a relatively small downturn. A relatively short disturbance will tend to be followed by a relatively swift recovery.

The COVID-19 pandemic and corresponding restrictions on activity was an incredibly large shock to the economy, the duration of which remains to be seen. The hope was that the pandemic would quickly subside—due to learned strategies for mitigating the spread, rising summer temperatures, introduction of a vaccine, or herd immunity—and the corresponding restrictions on activity would be lifted, resulting in a more-or-less V-shaped recession where the economy rebounds quickly and completely. The concern was that the pandemic and corresponding restrictions would last so long that many businesses would fail, prompting a costly reallocation of physical and human capital. Since reallocating these resources takes time,

[2]McCannon and Hall (2021) find that, in the United States, less economically free states imposed stay-at-home orders sooner than more economically free states.

[3]Oklahoma's Governor Stitt issued a safer-at-home order, which required those over 65 or suffering from serious underlying medical conditions to stay home, while at least three counties in Utah and the town of Jackson, Wyoming imposed stay-at-home orders (Mervosh *et al*., 2020b).

[4]Oklahoma also reopened on April 24 but, as noted above, its safer-at-home order was more limited than orders imposed in other states.

[5]On political economy issues related to COVID-19, see Boettke and Powell (2021); Bylund and Packard (2021); Choutagunta *et al.* (2021); Coyne *et al.* (2021); March (2021); Storr *et al.* (2021); Redford and Dills (2021).

[6]For example, see chapter 32 of Cowen and Tabarrok (2021). Sims (2012) considers total factor productivity shocks in a New Keynesian model.

[7]Luther and McElyea (2018) discuss the potential for output to be permanently reduced. O'Shaughnessy (2011) offers an earlier survey of the relevant literature.

widespread business failures would likely result in a longer-duration U-shaped recession—and might result in a permanent reduction in the level of output.[7]

Although the COVID-19 pandemic and corresponding restrictions on activity is first and foremost a temporary reduction in total factor productivity, it might also generate a decline in aggregate demand if monetary policy fails to stabilize nominal spending. Aggregate demand might decline for several reasons, including a flight to more liquid assets, a collapse in consumer confidence, or a decrease in investment spending due to increased uncertainty. If aggregate demand were to decline as well, real output would fall by more than is warranted by the temporary negative shock to total factor productivity. The economy would not merely be producing less in this case; it would be producing less than its potential.

If the COVID-19 shock amounts to a temporary decline in total factor productivity, there is no scope for monetary policy to improve matters. The sole macroeconomic problem in the case of a temporary negative total factor productivity shock is that those engaged in production are less productive. Expansionary monetary policy might boost output, but it will not make them more productive and, hence, will not improve social welfare. Contractionary monetary policy, which might be aimed at preventing prices from rising faster than the Fed's stated 2% target, would only exacerbate the downturn. Hence, the best the Fed can do in response to such a shock is to provide monetary stability. It can prevent aggregate demand from declining by providing general liquidity to stabilize nominal spending. And, if the downturn prompts a financial crisis, it can step in as a classic lender of last resort a la Bagehot (1873) to ensure credit markets continue to provide sufficient liquidity to the broader economy.

To accept that there is no scope for monetary policy to improve matters in response to a temporary negative total factor productivity shock and that the Fed should focus exclusively on providing monetary stability does not require one to deny any role for policy to improve matters in response to such a shock. As noted above, a pandemic might cause otherwise viable businesses to fail if not countered by policy; and the failure of those businesses would result in a costly reallocation of physical and human capital when the pandemic subsides and restrictions are lifted. If, instead, policy efforts help those otherwise viable businesses survive the pandemic, the costs of reallocating the resources they employ can be avoided. And, if the cost of helping those otherwise viable businesses survive is less than the costs avoided, society is made better off. Similar arguments might be made for providing temporary relief for low-income or disproportionately affected households. Still other policies, like funding vaccine research or widespread test-and-trace efforts, might be beneficial to society, as well.

There are many policies one might consider to limit the costs of a pandemic, but those policies are not the proper function of an independent central bank. They are fiscal policies. To the extent that they should be conducted, they should be conducted by the fiscal authority, not the monetary authority. Indeed, tasking the Fed with such efforts seems likely to reduce its focus on promoting monetary stability and undermine its political independence. The former means it will be less likely to wield its monetary policy-making powers appropriately in the current crisis. The latter risks reducing future economic growth in the United States by allocating a larger share of credit through the political process.

2 | THE FED'S RESPONSE

In March 2020, Fed officials began taking steps to address the economic problems caused by the COVID-19 pandemic and corresponding restrictions on activity. Its actions, to date, can be

divided into two distinct categories: monetary policy and emergency lending policy. By monetary policy, we refer to its efforts to influence the yield curve and general level of economic activity. By emergency lending policy, we refer to its efforts to extend credit to specific banks, businesses, municipalities, states, or other sectors of the economy. We review both types of policies in this section.

2.1 | Monetary policy

In order to meet the increased demand for general liquidity, the Fed lowered interest rates and took steps to ensure banks would continue to lend. Specifically, it reduced the rate of interest it pays on reserves (IOR), federal funds rate target range (FFR), and discount rate (DR). It also expanded repurchase operations, engaged in quantitative easing, and relaxed regulatory constraints. In August, it revised its Statement on Longer-Run Goals and Monetary Policy Strategy in an effort to anchor long run expectations.

The Fed has been operating in a floor system since October 2008 (Dutkowsky and VanHoose, 2017; Dutkowsky and VanHoose, 2018a; 2018b; Selgin, 2018, 2020a). As such, its primary monetary policy tool is the IOR (Ireland, 2019; Williamson, 2019).[8] By raising IOR relative to market rates, the Fed discourages financial institutions from lending reserves since they stand more to gain (in a risk-adjusted, after-cost sense) by leaving their funds on reserve at the Fed. By lowering IOR relative to market rates, the Fed encourages financial institutions to lend and, correspondingly, hold fewer excess reserves.

As Figure 1 illustrates, the Fed had been slowly reducing its IOR since May 2019. IOR was cut four times between April and December 2019, from 2.40% to 1.55%. The Fed nudged its IOR up to 1.60% in late January 2020, before the global pandemic was well anticipated.[9] As the global slowdown became apparent, the Fed slashed its IOR. An initial cut of 50 basis points to 1.10% on March 4 was almost immediately followed by a 100 basis points cut on March 16. It has held IOR at 0.10% since March.

In accordance with operating a floor system, the Fed correspondingly reduced its FFR. The upper and lower bounds of the FFR are presented in Figure 2 along with the effective FFR. The Federal Open Market Committee cited "evolving risks to economic activity" posed by the coronavirus when it voted to reduce the FFR by 50 basis points, to between 1.00 and 1.25%, on March 3 (Board, 2020b). It issued a longer statement on March 15, when it reduced the FFR to between 0 and 0.25%. Specifically, it acknowledged that the "coronavirus outbreak has harmed communities and disrupted economic activity in many countries, including the United States" and that it believed the "effects of the coronavirus will weigh on economic activity in the near term and pose risks to the economic outlook" (Board, 2020c). With this in mind, it vowed to "monitor the implications of incoming information for the economic outlook, including information related to public health, as well as global developments and muted inflation pressures, and will use its tools and act as appropriate to support the economy." Fed officials have since indicated that the target will remain near 0% until the economy is back on track (Board, 2020e).

[8]The Fed set two distinct interest rates on reserves prior to March 2020: the rate paid on required reserves and the rate paid on excess reserves. However, these rates were equal over the relevant period. In March 2020, the Fed reduced reserve requirement ratios to zero, thereby classifying all reserves as excess reserves. With this in mind, we treat the Fed's IOR policy as if it were setting a single administered rate on reserves.

[9]President Trump restricted travel from China on January 31, 1 day after the Fed had raised its IOR. But, at the time, few expected what would follow. No deaths had yet been reported outside of China.

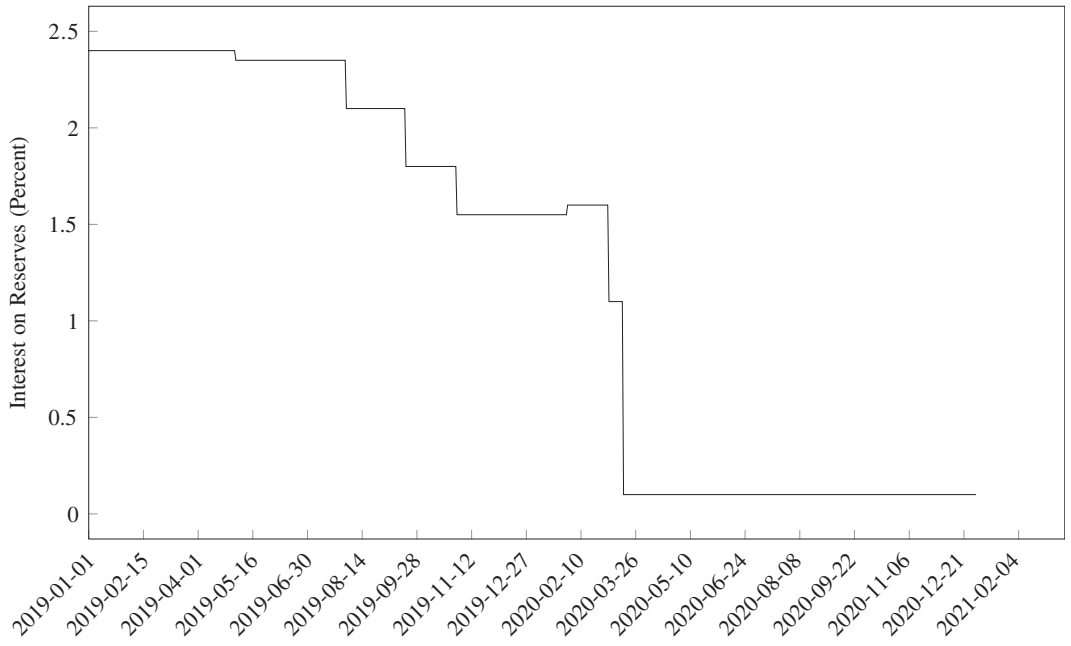

FIGURE 1 Interest rate paid on reserves
Source: Board of Governors of the Federal Reserve System

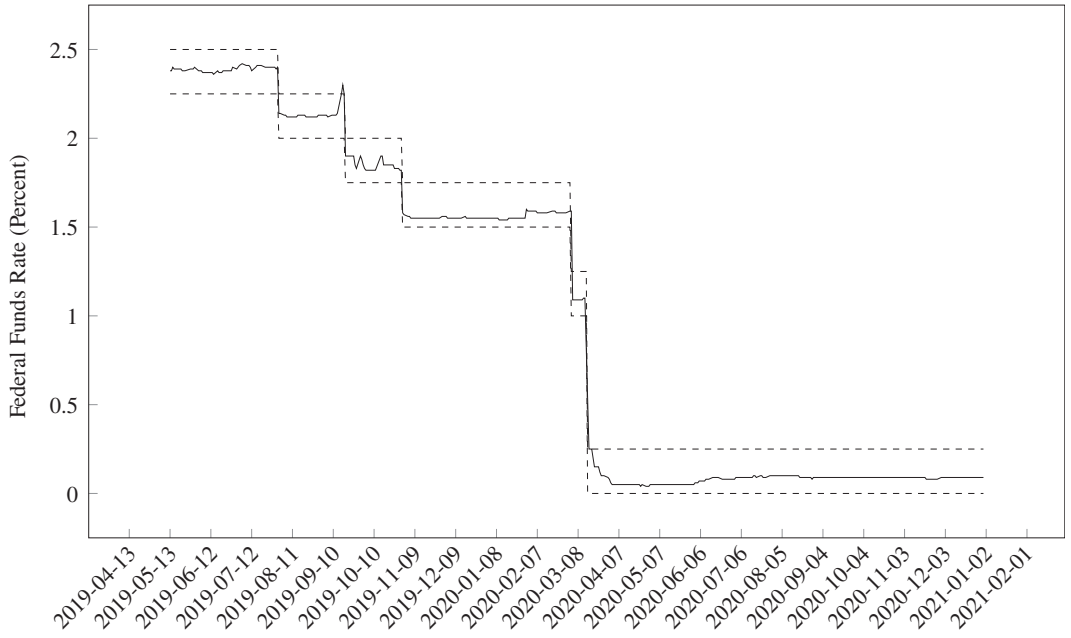

FIGURE 2 Effective federal funds rate and target range
Source: Federal Reserve Bank of New York

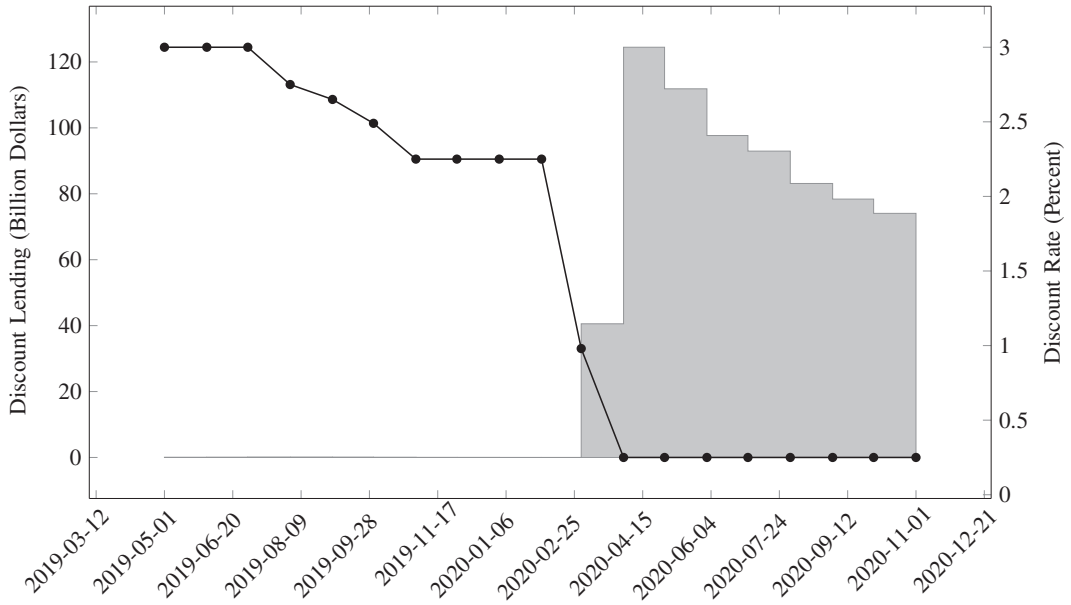

FIGURE 3 Discount rate and discount lending
Source: Board of Governors of the Federal Reserve System

The purpose of such "forward guidance" is presumably to lower longer-term interest rates, as well.

The Fed also reduced the rate it charges banks to borrow directly from the central bank, as tracked on the left vertical axis of Figure 3. Prior to March 2020, the DR had been set more-or-less in line with IOR. The DR exceeded the IOR by sixty to seventy basis points from April 2019 to February 2020.[10] When the Fed cut IOR to 1.10% on March 4, it made a corresponding cut in the DR to 1.75%. Its further cut in the IOR to 0.10% was accompanied with a cut of the DR to 0.25%, reducing the difference to just 15 basis points. The Fed also extended the maturity of the loans made through the discount window to 90 days (Board, 2020e).

The lower DR and extended maturity have led to a substantial increase in discount-window lending, as tracked on the right vertical axis in Figure 3. The volume of lending through the discount window increased from approximately $40 million to nearly $49 billion over the first quarter of 2020. In April 2020, the volume of discount-window lending peaked at $124 billion, and has gradually declined since. Despite this decline, the volume of discount lending through the discount window remains substantially higher than it was at the end of the first quarter of 2020. In August 2020, total borrowings by depository institutions from the Fed totaled $83 billion, nearly double the amount depository institutions borrowed from the Fed in March 2020.

In addition to lowering IOR, FFR, and DR, the Fed expanded its repurchase operations. The Fed uses repurchase agreements (repos) to ensure the effective FFR does not exceed the upper bound of the FFR. If the demand for reserves increases considerably, threatening the viability of the floor system, the Fed can temporarily inject liquidity by entering repos. It can then roll over these repos to satisfy longer-lasting changes in demand.

[10]The Fed's decision to raise IOR in January 2020 did not carry over to the DR, reducing the difference between the two rates from 70 to 65 basis points as it had been prior to September 2019.

Prior to the outbreak of COVID-19, the Fed had limited itself to making $100 billion in overnight repos and $20 billion in two-week repos. In early March, following a jump in the overnight repo rate, it increased these limits to $150 billion and $45 billion, respectively. By mid-March, the overnight limit was at $1 trillion and the Fed had pledged an additional $1 trillion, split equally, to make one-month and three-month repos.

With short-term rates near zero, the Fed revived its crisis-era policy of purchasing longer-duration securities known as quantitative easing (QE). Initially, Fed officials indicated that the central bank would purchase $500 billion in Treasury securities and $200 billion in government-guaranteed mortgage-backed securities. However, this program was expanded on March 23, 2020, when the Fed announced it would also purchase commercial mortgage-backed securities, and that these purchases would continue as long as necessary to "support smooth market functioning and effective transmission of monetary policy to broader financial conditions and the economy" (Board, 2020a). As with the other efforts described above, the Fed's decision to revive its QE policy was presumably aimed at lowering interest rates and thereby increasing the general level of economic activity.

The Fed made two regulatory changes to encourage banks to lend during the pandemic: it eliminated reserve requirements and temporarily relaxed regulations governing bank capital and liquidity. Reducing the reserve requirement (to zero, in this case) is typically thought to be expansionary. In a floor system, however, banks already hold excess reserves, so reserve requirements are not a binding constraint on their behavior. Hence, the Fed's decision to eliminate reserve requirements is unlikely to have much of an effect unless the Fed were to return to a corridor system, in which reserves are sufficiently scarce. Indeed, as Figure 4 demonstrates, the quantity of reserves in the banking system has increased substantially since the outbreak of COVID-19. Temporarily relaxing regulations that govern bank capital and liquidity would perhaps have more meaningful effects. These regulations, many of which were instituted following the global financial crisis, tend to discourage banks from lending by requiring that they hold specific assets deemed safe by the regulator. Relaxing them, therefore, has the potential to encourage bank lending.

Finally, in late August, the Federal Reserve revised its Longer-Run Goals and Monetary Policy Strategy. It had previously committed to targeting 2% inflation, which it described as a symmetric target. The prior inflation target was widely believed to be a period-by-period target, though Fed officials occasionally referenced the desirability of enabling temporary deviations in the rate of inflation.[11] In its revised statement, the Fed made clear it now "seeks to achieve inflation that averages 2 percent over time" (Board, 2020d). In contrast to a period-by-period inflation target, the Fed explained, an average inflation target means "that, following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time." The stated goal of the revision was to "anchor longer-term inflation expectations." However, it also seems likely that the Fed was engaging in a sort of forward guidance, attempting to assure financial markets that it would not tighten monetary policy prematurely.

Based on the Fed's monetary policy efforts from March to September 2020, it seems clear that Fed officials believed the COVID-19 pandemic and corresponding restrictions on activity

[11]For example, Bernanke (2015) writes: "The appropriate monetary policy response to swings in energy and other commodity prices has long challenged central banks. Over the years, the FOMC has generally chosen to look through them and focus on more stable measures of inflation trends, such as so called core inflation which excludes food and energy prices."

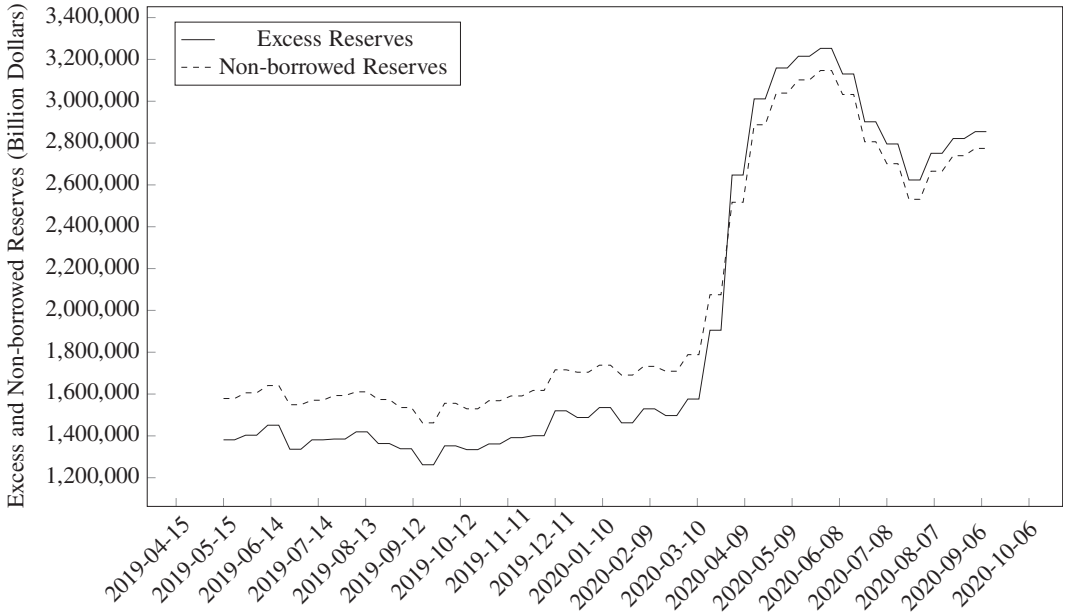

FIGURE 4 Excess and non-borrowed reserves
Source: Board of Governors of the Federal Reserve System

amounted to more than a real shock. They feared the real shock would be coupled with a reduction in nominal spending that, if not dealt with sufficiently, would further reduce economic activity. In an effort to prevent a decline in nominal spending, they took steps to meet the increased demand for general liquidity they anticipated. They lowered interest rates, expanded repurchase operations, engaged in QE, relaxed regulatory constraints, and revised their policy strategy.

2.2 | Emergency lending policy

In order to extend credit to specific banks, businesses, municipalities, states, or other sectors of the economy, the Fed has relied on several lending facilities. Some of these facilities—including the Commercial Paper Funding Facility (CPFF), Primary Dealer Credit Facility (PDCF), Monetary Market Mutual Fund Liquidity Facility (MMLF), and Term Asset-Backed Securities Loan Facility (TALF)—had been established in response to the global financial crisis roughly a decade ago and were revived to aid in the Fed's current efforts. Other lending facilities—including the Primary and Secondary Market Corporate Credit Facilities (PMCCF and SMCCF), Paycheck Protection Program Liquidity Facility (PPPLF), Main Street Lending Program (MSLP), and Municipal Liquidity Facility (MLF)—were specifically created to address the financial market repercussions of COVID-19. A summary of the facilities is included in Table 1.

[12]Commercial paper is used to finance auto loans, mortgages, and the short-term liquidity needs of businesses. Money market mutual funds (MMMFs) were reluctant to make short-term loans to businesses at the time. As the volume of commercial paper needing to be refinanced increased, businesses found it increasingly difficult to obtain credit. The earlier CPFF intended to get the commercial paper market flowing again.

TABLE 1 The Fed's new and revived credit facilities

Facility	Category	Announcement date	Closing date	Capacity (Billions)
Commercial Paper Funding Facility (CPFF)	Revived	March 17, 2020	March 31, 2021[a]	NA
Primary Dealer Credit Facility (PDCF)	Revived	March 17, 2020	March 31, 2021[a]	NA
Money Market Mutual Fund Liquidity Facility (MMLF)	Revived	March 18, 2020	March 31, 2021[a]	NA
Term Asset-backed Securities Loan Facility (TALF)	Revived	March 23, 2020	December 31, 2020	$100
Primary Market Corporate Credit Facility (PMCCF)	New	March 23, 2020	December 31, 2020	$750[b]
Secondary Market Corporate Credit Facility (SMCCF)	New	March 23, 2020	December 31, 2020	$750[b]
Paycheck Protection Program Liquidity Facility (PPPLF)	New	April 9, 2020	March 31, 2021[a]	NA
Main Street Lending Program (MSLP)	New	April 9, 2020	January 8, 2021	$600
Municipal Liquidity Facility (MLF)	New	April 9, 2020	December 31, 2020	$500

[a]Closing dates for CPFF, PDCF, MMLF, and PPPLF are anticipated as of February 1, 2021.
[b]PMCCF and SMCCF have a total combined capacity of $750 billion.
Source: Board of Governors of the Federal Reserve System.

The Fed revived its CPFF and PDCF on March 17. The earlier CPFF, which ran from October 2008 to February 2010 (becoming fully dissolved in August 2010), was designed to provide liquidity to the commercial paper market.[12] It was established when the Federal Reserve Bank of New York (FRBNY) extended a loan to CPFF LLC, a newly created special purpose vehicle (SPV). The CPFF then used these funds to purchase commercial paper directly from eligible issuers unable to secure liquidity in the commercial paper market.[13] Those interested in issuing commercial paper to the CPFF paid an upfront registration fee in addition to the fees required for each issue.

To revive the CPFF, the Treasury provided a $10 billion equity investment from the Exchange Stabilization Fund (Board, 2020l). The new CPFF can purchase paper from issuers of commercial paper, issuers of municipal paper, and U.S. issuers with a foreign parent company but the paper must be in good standing, with a rating of at least A1/P1/F1. As before, issuers must pay registration and issuing fees to participate. Issuers that were inactive prior to the creation of the CPFF are ineligible and the maximum amount of paper the CPFF can hold from a single issuer cannot exceed the amount of outstanding commercial paper the issuer had

[13]To be eligible, commercial paper had to be highly rated, U.S. dollar-denominated, unsecured, and asset-backed with a 3-month maturity.
[14]An inactive issuer is defined as issuer that did not issue a commercial papers to institutions other than the sponsoring institutions for any consecutive term period of three-months or longer between March 2019 and March 2020.

between March 2019 and March 2020.[14] The CPFF is currently set to cease operations in March 2021.

The earlier PDCF was intended to provide liquidity to the repo market in an effort to reduce the strain on primary dealers.[15] However, its overnight loans were not limited to primary dealers; the earlier PDCF provided liquidity to Goldman Sachs, Morgan Stanley, Merrill Lynch, and Citigroup, as well. Eligible collateral was initially limited to investment-grade securities; it was expanded in September 2008 to more closely match the types of instruments usually accepted in the repo market. The earlier PDCF was administered by the FRBNY with assistance from Atlanta and Chicago and ran from March 2008 to February 2010.

The revived PDCF differs from the earlier facility in several respects (Board, 2020k). True to its name, it is only available to primary dealers. It also accepts a broader range of collateral, including investment-grade corporate bonds, international agency securities, commercial papers, municipal papers, MBS, ABS, and equity. In addition to the overnight loans made through the earlier facility, the new PDCF can make term loans up to 90 days. The interest rate on PDCF loans is set equal to the DR. The PDCF, which was initially scheduled to operate until September 2020, is currently set to cease operations in March 2021.

The Fed established the MMLF on March 18, 2020 with a $10 billion backstop from the Treasury (Board, 2020j). Despite its shorter name, the MMLF is just a slightly revised version of the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) that ran from September 2008 to February 2010. The MMLF is designed to help MMMFs meet redemption demands by making loans to U.S. depository institutions and bank holding companies that purchase high-quality assets from MMMFs. As with the earlier AMLF, MMLF is administered by the Federal Reserve Bank of Boston (FRBB).

The primary difference between the MMLF and earlier AMLF is that the MMLF permits borrowers to purchase a broader range of assets. Loans secured by U.S. Treasuries or U.S. government sponsored agencies are made at the primary credit rate. Loans secured by U.S. short-term municipal bonds and variable rate notes are made at the primary credit rate plus a 25 basis points. All other loans through the MMLF are made at the primary credit rate plus 100 basis points. The MMLF was initially scheduled to operate until September 2020, but has since been extended through March 2021.

The Fed revived its TALF on March 23, 2020 (Board, 2020t). The earlier TALF, which ran from November 2008 to June 2010, was funded by the Treasury under the Troubled Asset Relief Program and administered by the FRBNY. The revived TALF will make up to $100 billion in loans with a $10 billion contribution from the Treasury authorized by the Coronavirus Aid Recovery and Economic Security (CARES) Act.

TALF is designed to provide liquidity to the credit market used by consumers and businesses. Under TALF, FRBNY lends to a SPV that then makes loans to U.S. companies. TALF loans mature in 3 years and must be fully secured by eligible asset-backed securities, which includes securities backed by private student loans, auto loans and leases, consumer and corporate credit card receivables, and loans guaranteed by the Small Business Administration.[16] The loans are non-recourse, meaning that a defaulting borrower must hand over the pledged asset-backed securities but is not on the hook for the remaining balance should those securities turn

[15]Since the Fed conducts open market operations through primary dealers, these broker–dealers are thought to be crucial to the conduct of monetary policy.

[16]All of the underlying credit exposures except for commercial mortgage-backed securities must be newly issued.

[17]The haircut schedule is similar to that used in the earlier TALF.

out to be worth less than anticipated.[17] TALF was initially set to expire in September 2020, but was ultimately extended through December 2020.

To provide credit for large businesses, the Fed authorized the PMCCF and SMCCF on March 22, 2020, (Board, 2020q, 2020r). Both are administered by FRBNY. Under PMCCF, FRBNY lends to a SPV that then purchases newly issued investment-grade U.S. corporate bonds and makes loans to U.S. companies.[18] Under SMCCF, the SPV buys investment-grade U.S. corporate bonds and exchange traded funds with broad exposure to investment-grade U.S. corporate bonds on the secondary market.[19] The PMCCF and SMCCF have a combined capacity of $750 billion supported by a $75 billion investment from the Treasury. Both were initially slated to end purchases in September 2020, but were extended through the end of the year.

In an effort designed to support the Small Business Administration's Paycheck Protection Program (PPP), the Fed authorized the PPPLF on April 8, 2020 (Board, 2020s). The PPPLF is designed to provide liquidity to financial institutions making PPP loans. Specifically, regional Reserve Banks make non-recourse loans to eligible financial institutions with the PPP loans, valued at the principal amount, serving as collateral. The PPPLF became active on April 16th. Although it was originally set to terminate in September 2020, it has been extended and is currently set to cease operations in March 2021.

The MSLP, the initial components of which were authorized in April, is intended to help small and medium-sized businesses as well as nonprofit organizations with up to $5 billion in revenues and fewer than 15,000 employees obtain credit.[20] It is administered by FRBB, which established a SPV to purchase participations in loans made to qualified businesses by eligible lenders. Lenders maintain 5% of new loans to businesses and nonprofits; 5% of the upsized tranche of extended loans to businesses and nonprofits; and 15% of priority loans. The MSLP has a potential lending capacity of $600 billion and is backed by $75 billion from the Treasury. It was originally set to terminate in September 2020, but was extended and ceased operations in January 2021.[21]

Finally, the MLF was established to provide credit to state and local governments (Board, 2020p). It is administered by FRBNY, which established an SPV to purchase newly issued tax anticipation notes, tax and revenue anticipation notes, bond anticipation notes, and other similar short-term notes.[22] The quantity of loans allocated to each municipality are determined by its past tax revenues and the interest rate charged to each entity is scaled by its prior credit ratings. The program was twice expanded to include "U.S. counties with a population of at least 500,000 residents, and U.S. cities with a population of at least 250,000 residents." The program has a lending capacity of $500 billion with a $35 billion backstop from the Treasury.

[18]Under both facilities, a company must be headquartered in and have material operations in the United States to be eligible.

[19]Bonds remain eligible if they have fallen below investment grade so long as they were deemed investment grade as of March 22, 2020.

[20]The MSLP is composed of five facilities: Main Street New Loan Facility (MSNLF), Main Street Priority Loan Facility (MSPLF), Main Street Expanded Loan Facility (MSELF), Nonprofit Organization New Loan Facility (NONLF), and Nonprofit Organization Expanded Loan Facility (NOELF) (Board 2020h; 2020i; 2020m; 2020n; 2020o).

[21]The MSLP was not without precedent. During the Great Depression, Congress amended the Federal Reserve Act to authorize the Regional Reserve Banks to lend directly to small businesses in an effort to support the lending already being done by the Reconstruction Finance Corporation. The Depression-era lending program was not heavily utilized by small businesses in large part because the Fed's lending standards and long approval times made the loans unattractive. The Fed took a loss on the loans it made prior to 1940. See: Selgin (2020b).

[22]Notes with maturities in excess of 36 months are ineligible.

And credit extended to state and local governments under MLF is made on a recourse basis. The MLF was extended along with the other facilities before being terminated in December 2020.

3 | ASSESSMENT OF FED POLICY

The Fed has undertaken a vast number of unique policy actions since the onset of the pandemic and many of its policies were announced or conducted at the same time. Teasing out the precise effect of each of the Fed's various responses on monetary stability is difficult, if not impossible. Given the difficulties of a quantitative assessment, we offer a qualitative assessment of the appropriateness of the Fed's response by considering the nature of the disturbance, the likely consequences of the individual policies adopted, and the available metrics for gauging overall success. Specifically, we ask and answer the following questions:

1. Did the Fed promote monetary stability?
2. Were the Fed's emergency lending facilities necessary?
3. What are the likely consequences of the Fed's emergency lending facilities?

We find that the Fed was largely successful in promoting monetary stability. It should have done more to boost nominal spending. And it probably could have achieved monetary stability without employing its emergency lending facilities. Nonetheless, some of the Fed's emergency lending might be justified—and likely helped promote liquidity. Other facilities primarily allocated credit, expanding the Fed's mandate and undermining its independence in the process.

3.1 | Assessment of monetary policy

To assess the extent to which the Fed promoted monetary stability, we return to the standard textbook macroeconomic model discussed in Section 1. Recall that the COVID-19 pandemic and corresponding restrictions on activity is first and foremost a temporary reduction in total factor productivity. Under such a scenario, the model predicts that inflation will increase, provided that the relationship between the growth rates of the money supply and velocity remain constant. Thus, a straightforward way to determine whether the Fed's monetary response to the pandemic was effective is to examine how people's forecasts of inflation responded to the onset of the pandemic and what effect, if any, the Fed's actions had on these forecasts.

The difference between the yield on U.S. Treasury securities, which are not indexed to inflation, and the yield on Treasury Inflation-Protected Securities (TIPS), which are indexed to inflation, is known as the TIPS spread. It is a standard measure of inflation expectations. Since issuer- and duration-specific risks are the same, the prevailing rate on TIPS serves as a reasonable estimate of the real interest rate on non-indexed Treasuries. Hence, with the Fisher equation, one can estimate inflation expectations over the time horizon given by the duration of the securities as the Treasury rate less the TIPS rate.[23]

[23]TIPS lack the inflation risk inherent in non-indexed Treasuries. As such, the rate on TIPS underestimates the real rate on Treasuries and the TIPS spread overestimates inflation expectations. In the United States, however, the effect is thought to be small. See Christensen (2008); Christensen *et al.* (2010).

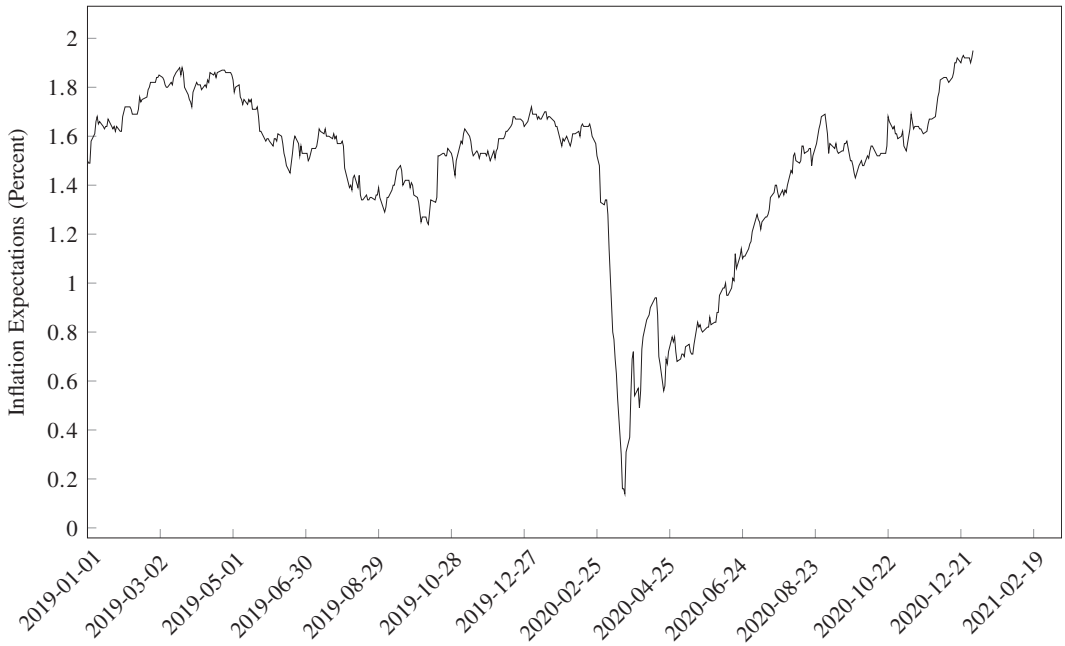

FIGURE 5 Five-year TIPS spread
Source: Board of Governors of the Federal Reserve System

If the pandemic and corresponding restrictions on activity adopted to limit the spread of the virus only affected the supply side of the economy, then we should expect the TIPS spread to increase as the quantity of goods and services produced declined. As it happens, however, the opposite occurred. As Figure 5 makes clear, inflation expectations plummeted from 1.65% in mid-February to 0.14% in mid-March. This suggests that the supply-side effects of the pandemic on inflation expectations were more than offset by a fall in aggregate demand. In other words, the TIPS spread suggests that there was a substantial increase in the demand for money that market participants did not initially believe would be met by an offsetting increase in the money supply.

As discussed in Section 2, the Fed responded aggressively to the pandemic. Figure 5 suggests aggregate demand began recovering quickly, although it would take roughly 5 months for the TIPS spread to return to its pre-pandemic level. The spread reached 1.95% by the end of 2020, indicating that markets expected the Fed would come closer to hitting its 2% inflation target over the coming 5 years. Note, however, that despite the recovery in inflation expectations, nominal spending was expected to remain below trend. The on-going supply-side effects of the pandemic meant that inflation should have been significantly higher than it was prior to the onset of the pandemic. In other words: the Fed failed to stabilize nominal spending—but the shortfall was much less than initially expected.

The sudden collapse and slow recovery of market participants' inflation expectations points to two issues with the Fed's monetary response to the pandemic. The first, noted above, is that market participants did not believe the Fed would act to stabilize aggregate demand. A more credible central bank would have limited the collapse in nominal spending. The second is that, while Fed officials acted swiftly in early March to meet the increased demand for liquidity, the speed and the magnitude of the response were not sufficient to quickly stabilize aggregate

demand. As a result, output and employment were likely below their natural, albeit lower, pandemic-induced potential.

As noted in 2.1, the Fed attempted to address its credibility problem and enable temporarily higher inflation by moving to an average inflation target. The move was the well-anticipated conclusion of the Fed's comprehensive review of its monetary policy framework (Board, 2020u). As such, we cannot rule out that it did not help boost expected inflation prior to adoption. Even still, the move to average inflation targeting appears to have been insufficient. Inflation expectations remained well-below the Fed's stated 2% target in the months following the announcement, and have only more recently begun to climb.

To summarize, the Fed's efforts were largely, but not fully, successful in promoting monetary stability. Its swift response prevented aggregate demand from remaining severely depressed. But, given its mandate, it should have done more to boost nominal spending.

Of course, to argue that the Fed should have done more to boost nominal spending requires that it could have done more. There is, in principle, no limit to the amount of money the Fed can create. In practice, however, the Fed has adopted an operating regime—that is, its floor system—that diminishes the extent to which banks transform an increase in the monetary base into an increase in broader monetary aggregates (e.g., M1 or M2). The Fed certainly could have cut its IOR to zero. It might have even pursued a negative interest rate policy, as the European Central Bank did.[24] These efforts would have further boosted nominal spending. Instead, the Fed left its IOR at 0.10%, while inflation expectations remained below its stated 2% target. Beyond cutting IOR and abandoning its counter-productive floor system, the Fed could have engaged in further open market operations, purchasing even longer duration securities if necessary.

3.2 | Assessment of emergency lending policy

As described in 2.2, the Fed revived and created a host of emergency lending facilities to deal with the COVID-19 contraction. Section 13(3) of the Federal Reserve Act authorizes the Fed to lend to individuals, partnerships, and corporations in "unusual and exigent circumstances" but only in a manner that is "broad-based" and only "for the purpose of providing liquidity to the financial system." In other words, the Fed can lend to individuals, partnerships, and corporations only if it is the circumstances require it to promote monetary stability. Were the Fed's emergency lending facilities necessary?

There is little evidence that the pandemic initiated a severe financial crisis. Four measures of financial market stress are presented in Figure 6: FRB Chicago's National Financial Conditions Index, FRB Kansas City's Financial Stress Index, FRB St. Louis's Financial Stress Index, and the Office of Financial Research's (OFR) Financial Stress Index. While all indicate an increase in financial stress at the onset of the pandemic, the level of stress was comparable to that experienced in 2001. It was substantially less than that which occurred during the Global Financial Crisis and decreased much more rapidly. The circumstances were perhaps unusual,

[24]Ireland (2019) recommends setting IOR to zero on the grounds that it "interferes greatly [...] with the Federal Reserve's ability to use its traditional monetary policy tools to maintain a favorable environment of stable prices and maximum sustainable employment" and "threatens the efficiency of our financial system and even the Fed's own independence, by allowing the central bank to allocate credit on a large scale, possibly under pressure from the political system." Jordan and Luther (2020) argue that the move to a floor system, which is made possible by paying an above-market IOR, reduced the Fed's de facto independence.

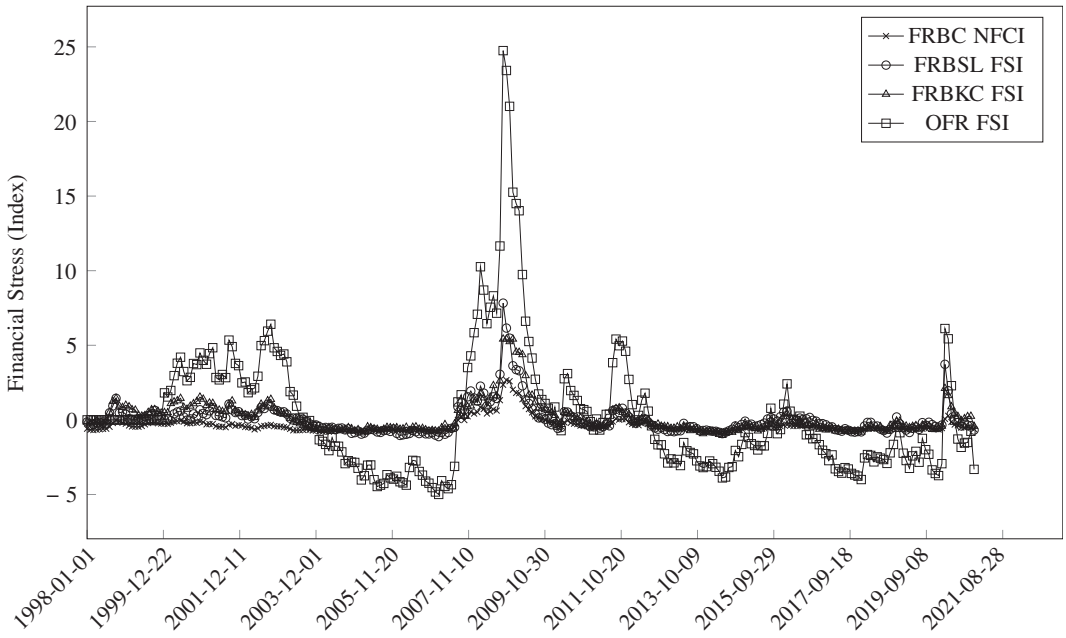

FIGURE 6 Measurements of financial stress

Source: Federal Reserve Bank of Chicago; Federal Reserve Bank of Kansas City; Federal Reserve Bank of St. Louis; Office of Financial Research

but they do not appear to have been exigent—at least no more so than in a normal recession. The available evidence suggests that the financial system was fully capable of meeting the increased demand for liquidity provided that Fed officials sufficiently eased monetary conditions.

The limited usage of the Fed's emergency lending facilities also suggests they were not needed to maintain financial market stability. The MLF attracted only two borrowers, the State of Illinois and New York's Metropolitan Transportation Authority (MTA), for a total of $6.6 billion in loans, roughly 1.3% of its total lending capacity (Board, 2021). With 1,810 borrowers, the MSLP lent $17.4 billion—less than 2.9% of its capacity (Federal Reserve Bank of Boston, 2021). The SMCCF purchased about $215 billion in corporate bonds, around 28.7% of its capacity, while the PMCCF made no purchases at all (Board, 2021).

Why did these facilities operate well-below capacity? For the MLF and PMCCF, preliminary evidence points to the high borrowing rates charged by the Fed relative to financial markets. For the MSLP, its cumbersome administrative process coupled with restrictive eligibility requirements appear to have deterred potential borrowers.

The MLF was administered as a traditional last-resort lending facility with lending rates priced at a premium above market rates based on the riskiness of the borrower. The Fed established the rates for each municipality as "a fixed interest rate based on a comparable maturity overnight index swap ("OIS") rate plus the applicable spread based on the long-term rating of the security" (Board, 2020f). The spreads above the market rate range from 100 basis points for AAA/Aaa securities up to 333 basis points BBB-/Baa3 and 540 basis point for those below investment grade.

This pricing method made the MLF unattractive to all but a few potential borrowers. The state of New York, for example, has a bond rating of AA/Aa2, indicating a premium of 175 basis points above the OIS rate, which averaged around 0.25% on 3-year contracts from the program's announcement in June through the end of the year (ICE, 2020).

This puts New York State's borrowing rate from the MLF at around 2.0%. As of January 2021, however, the market interest rates on New York state's bonds were less than 0.8% for those with maturities 36 months or less, the maximum maturity range allowed by the MLF (Municipal Bonds, 2020). If market credit spreads had spiked in 2020 as much as they did in 2008, many municipalities would have found MLF borrowing attractive despite the penalty rates. In 2020, however, financial markets were able to function with limited disruption, so state and local governments were able to borrow at market rates lower than those available from the Fed.

The PMCCF and SMCCP were intended to help stabilize corporate debt markets, but only the latter was utilized. Like the MLF, the PMCCF set the loan rates according to a borrower-specific characteristics. As the term sheet describes, the rates were "issuer-specific, informed by market conditions" plus a penalty spread of 100 basis points. Because corporate credit spreads were not elevated in 2020, no borrowers found this penalty rate attractive (Board, 2020g). By contrast, the SMCCF, according to its term sheet, purchased corporate bonds at "fair market value in the secondary market" (Board, 2020v). This made the SMCCF different from the MLF and PMCCF in two important ways. First, fair market prices were much more attractive to market participants than the penalties charged by other facilities. Second, unlike the MLF and PMCCF, which required borrowers seek out funding from the Fed, the Fed's active participation in the secondary market allowed it to determine the total value of bonds to be purchased. These features allowed the SMCCF to grow much larger, in both dollar and percentage utilization terms.

It remains somewhat unclear as to why more companies did not take advantage of the MSLP, especially given the severity of the economic downturn in particular industries.[25] A senior loan officer survey conducted by the Fed in September 2020 suggests that several factors may have contributed to banks unwillingness to make loans through the program. In particular, the survey results suggest that both banks and borrowers found the terms of the MSLP loans relatively unattractive given their alternatives (Board, 2020w).

3.3 | Political economy of emergency lending

The available evidence discussed in 3.2 casts doubt on the claim that the pandemic initiated a severe financial crisis. Even if one were to except that the circumstance was unusual and exigent, however, such a circumstance would merely support lending aimed at providing liquidity to the financial system, and thereby promoting monetary stability, in a manner that is broad-based. It would not support loans primarily intended to keep specific individuals, partnerships, or corporations afloat. While some of the Fed's lending facilities might be justified on broad-based liquidity provision grounds (i.e., CPFF, MMLF, PDCF, TALF), others (i.e., MLF, MSLP,

[25]The Congressional debate on extending MSLP in December, as described by Timiraos and Davidson (2020), is even more puzzling when one considers how little it had been used up until then. The Fed purchased more than $10 billion worth of loans through the MSLP in December 2020, which was more than it had purchased in the preceding 4 months combined (Board 2020x).

PMCCF, PPPLF, SMCCF) are more appropriately described as credit allocation. These credit allocation facilities were unwarranted: they were not necessary to promote monetary stability. They were also unwise: they expanded the Fed's mandate and undermined its independence.

The MLF, MSLP, PMCCF, PPPLF, and SMCCF are primarily intended to allocate credit to municipalities (MLF), small (MSLP) and medium-sized (PPPLF) businesses, and large corporations (PMCCF, SMCCF). In doing so, they amount to an expansion of the Fed's mandate beyond providing liquidity to the financial system. Interestingly, Congress did not amend the Federal Reserve Act to authorize these programs. Rather, it circumvented the 13(3) restriction by designating these facilities "for the purpose of providing liquidity to the financial system that supports lending to eligible businesses, States, or municipalities" in the CARES Act. In other words, Congress simply instructed the Fed to treat these programs as if they were primarily intended to provide liquidity to the financial system, even though they were not. This approach completely undermines the 13(3) restriction that such lending be "broad-based" and only "for the purpose of providing liquidity to the financial system." As Menand (2020, p. 31) notes, "if lending directly to business is a way to provide liquidity to the financial system, then any lending meets the requirement."

Despite Congressional authorization, the Fed's new credit allocation facilities appear to violate the plain meaning of the Federal Reserve Act's 13(3) provision. They also break with the traditional view of prudent Fed lending. Consider, for example, the MLF. Prior Fed officials pushed back against Congressional pleas to provide loans to state and local governments. In 2011 Congressional testimony, then-Chair Bernanke (2011) was asked if the Fed would provide aid to municipal governments that might be nearing default. He said the Fed had "no expectation or intention to get involved in state and local finance." Such matters, he believed, were best suited for Congress, not the Fed. "This is really a political, fiscal issue," he said.

Similarly, in 2015 Congressional testimony, then-Chair Yellen was asked if the Fed should intervene in negotiations between Puerto Rico and its creditors or provide financial assistance. "This is not a matter in which I have an opinion," Yellen (2015) replied. "It is something the Federal Reserve can't and shouldn't be involved in." Then, when Congressman Royce reminded then-Chair Yellen of her previous testimony that "it is best not to have the Federal Reserve step in as a creditor of a State or municipality," she responded succinctly: "I continue to believe that very strongly."

Previous Fed Chairs have also balked at extending credit to non-bank businesses. In 2008, for example, Congress asked the Fed to lend to failing automakers, especially General Motors (GM). Then-Chair Bernanke (2015) recalls the event in his memoir:

> Members of Congress called on the Fed to lend to the auto companies. We were extremely reluctant. We believed that, consistent with the Fed's original purpose, we should focus our efforts on the financial panic. We were hardly the right agency to oversee the restructuring of a sprawling manufacturing industry, an area in which we had little or no expertise.

Lending to specific non-bank businesses, in other words, was thought to be inconsistent with the Fed's mission to provide general liquidity.

In contrast to previous Fed Chairs, current Chair Powell has been an enthusiastic proponent of the Fed's new programs for lending to municipalities and non-bank businesses. In May 2020, Powell (2020b) testified that the Fed's programs would "facilitate more directly the flow of credit to households, businesses, and state and local governments." When asked by Senator

Menendez whether the Fed would consider a larger and longer-term facility for municipal lending, Powell left the option open. "Those are really longer-term funding needs," he said, "but notwithstanding that, we are taking a look." In an interview soon thereafter, Powell stated that the Fed "is strongly committed to using our tools to do whatever we can for as long as it takes" (Shevin, 2020).

We do not take a position on the desirability of lending to municipalities and non-bank businesses in the midst of a pandemic. We merely argue that such efforts should not be delegated to the Fed. Despite wording to the contrary in the CARES Act, the MLF, MSLP, PMCCF, PPPLF, and SMCCF are not primarily intended to provide general liquidity to financial markets. They are intended to make specific loans to specific municipalities and non-bank businesses. They are fiscal policies. If they are desirable fiscal policies, they should be authorized by Congress and executed by the Department of the Treasury, Department of Commerce, Department of Labor, Small Business Administration, or some other executive agency. Delegating these lending efforts to the Fed blurs the line between monetary and fiscal policy.

What are the likely consequences of the Fed's emergency lending facilities? To the extent that these facilities are intended to allocate credit, it shifts the Fed's focus away from its primary objective of promoting monetary stability. And, if the Fed fails to promote monetary stability, the recession will be worse than it otherwise would be.

Perhaps more important for the long run, however, is that these lending facilities risk undermining the Fed's independence.[26] If the Fed can extend trillions of dollars in loans at the behest of Congress to mitigate the damage of a pandemic, it could be used by Congress to accomplish any number of fiscal policy objectives in the future. Moreover, since the Fed can create money, it would enable Congress to pursue fiscal policy initiatives largely off-budget—perhaps under the mistaken view that such initiatives are costless when funded by the Fed.[27] Apart from trying to explain to Congress and the public that allocating credit will likely reduce economic growth, the Fed is largely defenseless against this politicization. As Plosser (2020) explains, the Fed's traditional defense—that such efforts would reduce its ability to achieve price stability—does not apply in the Fed's current operating regime.

There is already some evidence that the Fed has become more politicized as a result of its credit allocation policies. In April 2020, Galvin and Healy (2020) revived calls for the Fed to fund a Green New Deal. In August 2020, Waters *et al.* (2020) introduced legislation to amend the Federal Reserve Act. Specifically, The Federal Reserve Racial and Economic Equity Act (FRREEA) would require the Fed pursue policy "to minimize and eliminate racial disparities in employment, wages, wealth, and access to affordable credit." It seems unlikely that the Fed could comply with FRREEA by conducting monetary policy. Monetary policy is not well suited to advancing such narrow political objectives (Wagner, 1977). Instead, it would have to allocate credit, as it has done in response to pandemic.

4 | CONCLUSION

The economic downturn during the first half of 2020, caused by the COVID-19 outbreak and corresponding restrictions on activity, was among the largest in U.S. history. While the COVID-19

[26]We are certainly not suggesting that the Fed has been devoid of political pressure in the past. During the Global Financial Crisis, for example, political considerations appear to have influenced the Fed's emergency lending (Blau, 2017; Blau *et al.*, 2013). We merely claim that its new credit allocation policies risk making matters worse.

[27]If the Fed allocates credit, such that some entities end up with more real resources, other entities end up with fewer real resources. The cost to society is the foregone uses of those reallocated resources.

shock was first and foremost a temporary reduction in total factor productivity, falling inflation expectations suggest aggregate demand declined as well. The Fed responded quickly, both through monetary policy and by opening a variety of emergency lending facilities.

We have discussed the implementation and evaluated the effectiveness of the Fed's monetary and emergency lending policies. Its interest rate policies and asset purchases pushed inflation expectations back to their prior levels, although they remain below the Fed's 2% target rate. While the Fed's monetary policies have helped facilitate the economic recovery, as GDP growth and unemployment move back toward their long-run rates, we maintain that they could have (and should have) done more to promote monetary stability.

The Fed opened several credit programs under its emergency lending authority. Some of these facilities were intended to promote monetary stability by supporting the flow of credit through existing channels. Its lending to municipalities and non-bank businesses, however, was both unwarranted and unwise: unwarranted because they were not needed to promote monetary stability and unwise because they allocate credit preferentially and undermine the Fed's independence. Whether by the judgment of Fed officials or by mandate from Congress, the Fed's future emergency lending should be limited to providing general liquidity to the financial system, as authorized under the 13(3) of the Federal Reserve Act. The Fed should avoid providing credit to municipalities and non-bank businesses.

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How to cite this article: Cachanosky N, Cutsinger BP, Hogan TL, Luther WJ, Salter AW. The Federal Reserve's response to the COVID-19 contraction: An initial appraisal. *South Econ J*. 2021;87:1152–1174. https://doi.org/10.1002/soej.12498