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Options for Repo Operations to Support Control of the Federal Funds Rate in an Ample Reserves Regime¹

1. Introduction

Since mid-September, daily open market operations have played a significant role in helping to keep the federal funds rate within the FOMC's target range by directly limiting upward pressures in money markets and increasing the level of reserves. These operations will likely become less important for rate control in 2020, once year-end pressures have passed and as the Committee's program of Treasury bill purchases provides reserve balances at or above the level that prevailed in early September. Nevertheless, even with an ample reserve supply, shocks to money markets have the potential to move the federal funds rate above the top of the target range. For example, on days when reserve supply falls quickly, frictions in financial markets may slow the redistribution of liquidity, resulting in rate pressures. Also, reserve demand may shift over time, because of either transitory factors or more permanent shifts in banks' liquidity management practices.

In light of the continuing potential for money market pressures, this memo reviews possible approaches for conducting ongoing repo operations to support control of the federal funds rate after the currently announced operations expire at the end of January 2020. The first approach would conduct operations on a modest scale to maintain a high degree of readiness, with the option to ramp up the scale on a discretionary basis, as needed, to address money market pressures. The second approach would offer a standing repo facility to provide an automatic backstop to market rates and means of supplying reserves. Both of these approaches would support control of the federal funds rate through three channels: providing a means to rapidly increase the supply of reserves if needed, limiting volatility in other money markets that could pass through to the federal funds market, and reinforcing market participants' confidence that the Desk can act as necessary to keep the federal funds rate within the target range.

The memo begins by reviewing lessons learned from recent repo operations. It then discusses why repo operations may remain an appropriate component of the ample reserves operating regime. It describes the two possible approaches noted above for operations in 2020, including how the Federal Reserve could transition to each option, and the tradeoffs associated with different options.

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This memo focuses on how repo operations can support control of the federal funds rate. In future work, staff will separately examine how repo operations could influence banks' demand for reserves; operations designed for that purpose would likely differ significantly in structure from the operations described here.²

2. Lessons from Recent Repo Operations

Consistent with the Committee's directive to conduct open market operations as necessary to maintain the federal funds rate within the target range, the Desk responded to the significant money market pressures on September 17 by conducting a series of overnight repo operations. These operations calmed markets and restored control over the federal funds rate by relieving upward pressures in repo markets and providing a higher supply of reserves. Ahead of the quarter end, the Desk added term repo operations to address demand for financing and provide assurances that control of the federal funds rate would be maintained during a period when financial firms' balance sheets were expected to be more constrained and reserves were projected to decline. This section summarizes the structure of the operations now in place, describes how they have supported control of the federal funds rate, and reviews some key lessons from the recent experience about the possibilities and challenges in using repo operations for control of the federal funds rate.

A. The current operational approach

Since mid-September, the Desk has offered overnight and term repos to primary dealers in large sizes.³ To date, each overnight operation has offered at least \$75 billion in funding. Take-up has often been less, but operations on Treasury settlement days have been fully subscribed or modestly oversubscribed. The awarded rates in these operations have been determined by auction, subject to a minimum bid rate that for overnight repos has been set equal to the interest rate on excess reserves (IOER), and for term repos has been set based on prevailing market rates that reflect market expectations for the federal funds rate over the upcoming two weeks.

The Desk initially announced operations on a day-by-day basis, then started announcing plans for operations over longer periods. The FOMC's October 11 statement indicated that repo operations will continue at least through January 2020 to maintain ample reserve balances "even during periods of sharp increases in non-reserve liabilities, and to mitigate the risk of money market pressures that could adversely affect policy

² See Nate Wuerffel, Laura Lipscomb, and Steve Spurry, "Standing Fixed-Rate Open Market Repo Facility," June 7, 2019.

³ When the Desk conducts an open market repo operation, it buys eligible securities—including Treasury securities, agency securities, and agency mortgage-backed securities—from primary dealer counterparties, with an agreement to sell the securities back to the counterparties on the repo's maturity date.

implementation.” The Desk has announced sizes and other parameters for operations through mid-November and has indicated that it will announce parameters for repo operations on or around the ninth business day of each month.

B. How repo operations have supported control of the federal funds rate

Repo operations influence the federal funds rate through three main channels: by increasing reserve supply, by easing pressures in secured markets that can spill over to the federal funds market, and, when announced in advance, by reinforcing confidence in rate control.

When a dealer obtains funding at a repo operation, it sends securities to the Federal Reserve, while the Federal Reserve adds reserves to the banking system, initially at the dealer’s settlement bank (which credits the dealer with a deposit) and eventually at other banks as the dealer makes payments. An increase in reserve supply can reduce some banks’ need to borrow overnight to maintain reserve levels, reducing pressure on the federal funds rate. Also, higher reserve levels can ease banks’ demand for advances from Federal Home Loan Banks (FHLBs), which may then increase their federal funds lending.

Moreover, because a repo operation influences dealers’ access to and cost of funding, it changes conditions in secured markets, which in turn affect supply and demand in the federal funds market through arbitrage. FHLBs, the main lenders in the federal funds market, view repo as an alternative short-term investment. Lower repo rates reduce the incentive for FHLBs to shift their liquid investments to repo and weaken FHLBs’ bargaining position in the federal funds market, easing pressure on rates there.⁴ In addition, lower repo rates reduce the incentive for some banks to borrow in unsecured markets to finance lending in repo markets, further reducing pressure on the federal funds rate.

Importantly, although repo market conditions can influence the federal funds rate, the pass-through of repo rates to the federal funds rate is typically significantly less than one-for-one.⁵ Therefore, controlling the federal funds rate does not always require tightly controlling repo rates or responding to all pressures in the repo market. But on some

⁴ See Sam Schulhofer-Wohl and James Clouse, “A Sequential Bargaining Model of the Fed Funds Market with Excess Reserves,” Federal Reserve Bank of Chicago Working Paper 2018-08, July 2018, and Gara Afonso, Roc Armenter, and Benjamin Lester, “An analysis of the recent dynamics in the federal funds market,” September 7, 2018.

⁵ Schulhofer-Wohl and Clouse (2018) and Afonso, Armenter, and Lester (2018) both find approximately 30% pass-through from repo rates to federal funds in calibrated models. Alyssa Anderson, Chris Gust, Zeynep Senyuz, Gara Afonso, Domenico Giannone, Gabriele La Spada, and Tony Baer, “Summary of Analytical Results for the September Report on Reserve Conditions,” September 13, 2019, describe relationships between secured and unsecured money market rates in a range of models.

occasions, as in mid-September, the degree of pressure in secured markets can be exceptional and can strongly influence unsecured markets.

C. Lessons learned

The recent experience has demonstrated that large repo operations can help to alleviate pressures on the federal funds rate. Offering repos in large size to the Desk's primary dealer counterparties in September calmed both secured and unsecured markets, and brought the federal funds rate back into the target range.

There appear to be frictions, however, that limit the effectiveness of these operations in some circumstances. For example, despite the availability of large repo operations, the federal funds rate and repo rates rose over the September quarter end and again around the mid-October Treasury settlement. Dealers and other firms have said that on certain financial reporting dates, such as quarter ends, they more tightly limit their balance sheets. These constraints reduce the willingness of some counterparties to participate in repo operations and redistribute funding to other parts of the financial system.

Conducting operations only after pressure is evident in funding markets also has drawbacks, as recent experience has highlighted. Once rates became highly volatile, large overnight and term operations were needed to re-instill confidence and calm markets; that is, once market participants lose confidence, the Desk must commit to conducting operations in larger size and over a longer time horizon to return the federal funds rate to, and keep it in, the target range.

Moreover, recent experience highlights the difficulty of deciding whether and how to initiate repo operations. Money market pressure can be hard to predict. Even a few days before the events of mid-September, forward-settling transactions did not suggest abnormally elevated rates. The information needed to make a clear determination surfaced only after rates were already elevated. And, once the decision is made to conduct operations, it can be challenging to choose the size and minimum bid rate appropriate for effectively addressing the funding need. An operation that is too small and is well oversubscribed, or has too high a minimum bid rate, will fail to adequately stem money market pressures. Conversely, an operation that is overly large or has too low a minimum bid rate will be effective at stemming market pressures, but at the potential cost of appearing to provide a funding advantage to Desk counterparties. The pass-through from repo operations to the federal funds rate is also uncertain, making the

choice of parameters yet more difficult. Signaling effects and communications about over- or undersubscribed operations can also be challenging.⁶

3. Options for Repo Operations to Support Rate Control in 2020

Staff expect that repo operations will remain important for control of the federal funds rate at least through January 2020. Although the program of Treasury bill purchases will provide reserves, it will take time for those purchases to cumulate to the amount needed to sustain reserves at or above the level that prevailed in early September. In addition, balance sheet constraints at financial firms have historically created pressures in money markets around year end. Once these pressures pass, however, staff expect that the need for frequent repo operations will likely diminish and that adjustments of the Federal Reserve’s administered rates will likely be sufficient for control of the federal funds rate most of the time.⁷

Money market dynamics can surprise, however, as September’s events show. Treasury issuance and other shocks unrelated to reserves can create volatility in the repo market that spills over to the federal funds market. In addition, banks’ reserve demand and the distributional frictions that affect the aggregate quantity of reserves needed to meet demand at market rates near IOER can both vary over time, and staff’s ability to predict these changes in time to proactively adjust reserve supply is limited. Further, as revealed in mid-September, some banks facing large reserve drains can be willing to pay high rates in overnight markets. As a result, even with asset purchases maintaining what is thought to be an ample level of reserves, a risk of undesired volatility in the federal funds rate will remain.

This section describes two distinct approaches the Committee might take to using repo operations to support rate control on an ongoing basis in light of this risk. The first approach would use modestly sized operations to maintain a high degree of operational readiness, with the option to increase the size of operations on a discretionary basis if necessary; a few variations on this basic approach are possible. The second approach would offer a standing repo facility as an automatic backstop. In both approaches, the operations would provide a means to rapidly add reserves and to limit pressures in the

⁶ Market participants can interpret the announcement of a large operation as signaling that the Federal Reserve’s concerns about funding pressures are greater than their own. In addition, increasing the size of an operation, only for that operation to be undersubscribed, runs the risk of being misinterpreted as an operation that “failed.”

⁷ Ongoing purchases of Treasuries will be needed to sustain reserve levels. Depending on the reserve outlook and the pace of purchases, some repos may be needed around the April tax payment date to sustain reserve levels.

repo market that could pull up unsecured interest rates. The transition from current operations to a longer-run plan would depend on the Committee’s desired approach.

A. Modestly sized operations to maintain a high degree of readiness

Before mid-September, the Desk had maintained readiness to conduct repo operations by carrying out small-value operations a few times a year in amounts of \$75 million. Despite these tests, the rapid start-up of large-scale operations created some challenges.⁸ The size of these operations—much larger than any test operations or even any operations previously conducted for rate control—means that disruptions could be consequential. In the future, a more extensive operational readiness program could increase the ability of the Desk and its counterparties to respond rapidly to funding market pressures, both by enhancing the Desk’s knowledge of changes in market conditions and structure, and by reducing the risk that technical problems would interfere with an operation that is needed for rate control. A couple of strategies are possible for such a program.

One strategy would be for the Desk to conduct overnight small-value operations much more frequently than in the past, perhaps as often as weekly. Additionally, the Desk could practice its ability to carry out discretionary operations on short notice, for example by giving dealers and trading staff minimal advance notice of some small-value tests. These forms of small-value operations would minimize the risk of technical problems.

Another strategy would use daily or weekly offerings of larger overnight operations than in past small-value exercises, possibly in the \$10 billion to \$20 billion range.⁹ Operations on this scale would not be so large as to meaningfully influence the level of reserves or affect short-term interest rates, consistent with the Committee’s statement in January 2019 that the operating regime will be one “in which active management of the supply of reserves is not required.” However, relative to a program of small-value operations, offerings of \$10 billion to \$20 billion would further enhance readiness because dealers may have a stronger incentive to maintain focus on the operations and participate on a regular basis. Frequent repo operations of this size would give the Desk more visibility into changing market conditions and could help identify

⁸ For example, the Desk had to restart its initial repo operation on September 17 when it encountered a technical issue, related to a new parameter for the operation. The issue has now been remedied, but as systems and operational parameters change, other issues could arise. Similarly, some of the Desk’s counterparties had to refresh their operational and technical processes so they could participate smoothly in the operations. The Desk also had to scale up its trading and technology support teams to operate frequently.

⁹ An ongoing program of modestly sized term repo operations could use a similar design, if desired.

emerging pressures in money markets.¹⁰ These operations would also establish a rhythm of operational announcements and activity that could help in credibly communicating larger interventions if necessary.

Under a program focused on operational readiness, whether using small-value operations or daily operations of as much as \$20 billion, the Desk would likely need to substantially increase the size of operations in circumstances of significant money market pressures. Upward pressure on forward money market rates and market commentary about potential pressures could provide advance signals that an adjustment might be needed, as could aggressive bidding in \$10 billion to \$20 billion operations. But such signals may not always be reliable. The Desk would have to make decisions with imperfect information and would risk identifying the need to respond only after significant pressure on the federal funds rate emerged. The Desk would also need to determine how large an increase in the operation's size was needed.

To transition to a program focused on operational readiness, the Committee could announce that it expected repo operations would no longer need to be conducted daily in large size, but that the Desk would scale up operations as necessary to control the federal funds rate. The Desk could then gradually reduce the offering size of overnight repos, while maintaining the minimum bid rate at IOER.

B. Standing repo facility as a backstop

The Committee could instead direct the Desk to offer a standing overnight repo facility that is available to dealers in large size, but with a minimum bid rate above the top of the target range, as a backstop for control of the federal funds rate. The large size—well above the \$75 billion offering size of current overnight repo operations—would avoid the challenges of calibrating the size of operations and serve to assure market participants that funding would automatically be available on a large scale in response to shocks.^{11,12}

¹⁰ Compared with small-value operations, repos of \$10 billion to \$20 billion would give dealers a stronger incentive to adjust their bids in response to changes in the costs of alternative funding. The minimum bid rate on these operations could be set equal to IOER, as in current operations. If market rates were significantly above IOER, average awarded rates would likely be higher and close to market rates given the limited size. Bid-to-cover ratios would also likely increase if market rates were significantly above IOER.

¹¹ To enhance this assurance, the per-participant bid limits could also be larger than at present.

¹² Most central banks offer ceiling facilities of some kind to support rate control. See “The Foreign Experience with Monetary Policy Implementation,” Foreign Experience Group of the Long-Run Framework for Monetary Policy Implementation Project, co-chaired by Brian Doyle and Patricia Zobel, with Paul Wood, Francois Velde, Renate van Ginderen, Carolyn Shen, Jonathan Rose, William Roberds, Liza Reiderman, Fabiola Ravazzolo, Kleopatra Nikolaou, Robert Lerman, Katherine Femia, Federico Diez, Michael Carson, and David Bowman, July 7, 2016.

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The choice of a minimum bid rate for this facility would entail important tradeoffs related to the distribution of rates on market transactions. The figures below illustrate the distribution of rates across federal funds trading; tri-party general collateral repo (TGCR), which is indicative of typical primary dealers’ borrowing costs; and Fixed Income Clearing Corporation delivery-versus-payment (FICC DVP) repo trading, which includes primary dealers’ lending to less creditworthy borrowers. As illustrated in Figure 1, the Desk’s primary dealer counterparties generally borrow at the lower end of the rate distribution, near both IOER and the federal funds rate. On month ends, shown in figure 2, repo rates, including those paid by primary dealers, can move significantly above IOER and the federal funds rate.

Figure 1: Average Distribution of Overnight Secured and Unsecured Money Market Volumes on Non-Month-Ends

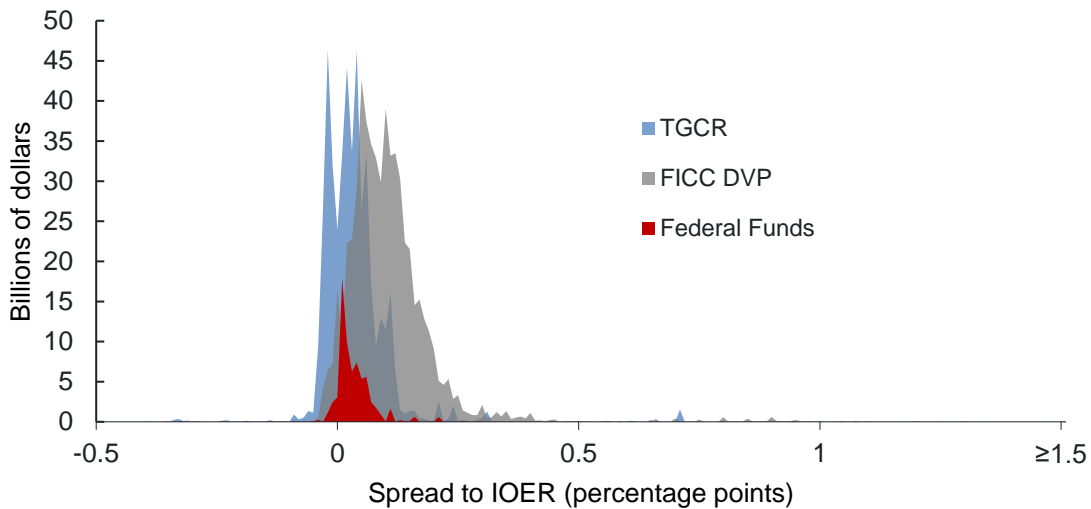
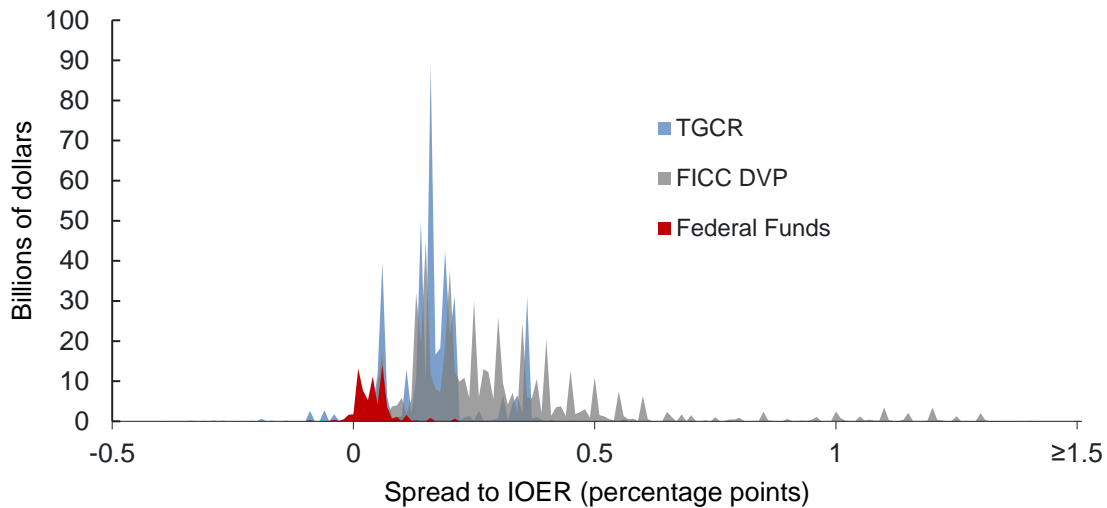


Figure 2: Average Distribution of Overnight Secured and Unsecured Money Market Volumes on Month-Ends



Source: Federal Reserve Bank of New York, FR2420. Includes data from Jan. 2, 2019, to Sept. 13, 2019.

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Setting the minimum bid rate around the high end of the distribution of rates would limit usage to more extreme events. However, such a rate setting would diminish the extent to which the facility could automatically address financing pressures by adding reserves to the system when pressures emerge. With a lower setting of the minimum bid rate, more modestly above the top of the target range, the facility would be more likely to be used. A minimum bid rate modestly above the top of the target range could also support use frequent enough to reduce stigma, but not so frequent as to displace private sector trading under typical trading conditions.

Because moderate repo rate fluctuations normally do not affect the fed funds market, a minimum bid rate well above the top of the target range might be sufficient for control of the federal funds rate. This rate setting could enable the facility to serve as a backstop in instances where large repo market dislocations would very likely push the fed funds rate out of the target range. Nevertheless, a facility at a backstop rate well above the range might not always be sufficient to keep the federal funds rate in the target range, especially around reporting dates. The Committee's directive could provide the Desk with flexibility to lower the minimum bid rate if conditions indicated that such a step was necessary to keep the federal funds rate in the target range.

To transition to a standing facility at a backstop rate either modestly above or well above the target range, the FOMC could communicate that the minimum bid rate and size of repo operations would gradually increase. For maximum effect on market confidence, the FOMC would need to communicate its intention to maintain the facility on an ongoing basis.

4. Tradeoffs and Policy Considerations

The approaches described above vary in the tradeoffs they create. These tradeoffs include the degree of assurance of control over the federal funds rate, the effect on market incentives, and the potential for the operations to become stigmatized.

Assurance of rate control. A standing repo facility with a large offering size at a backstop rate modestly above the top of the federal funds target range would provide strong assurance that interest rate volatility would be contained. Primary dealers would likely turn to the facility rather than pay much higher market repo rates. In effect, the facility would serve as an automatic stabilizer, providing funding and reserve balances when repo rates rise. This characteristic could enhance market confidence in rate control, which in turn may help stabilize rates even without Desk action.¹³ Daily or weekly operations in modest size or small-value tests would have less ability to automatically stabilize rates, though they may enhance credibility that the Desk would quickly increase

¹³ A standing facility with a rate well above the top of the target range might not prevent the federal funds rate from moving outside the range under all circumstances, unless the Desk adjusted the minimum bid rate downward as needed in response to actual or anticipated pressures on the federal funds rate.

operations to control the federal funds rate when needed. Nonetheless, an approach focused on operational readiness would require the Desk to anticipate market pressures and calibrate the specific terms of operations to the funding needs, which has proven challenging; it might be necessary to accept more variability in the federal funds rate under this approach.

Federal Reserve effect on market incentives. Whether the Federal Reserve has a small, ongoing presence in the market or a large, contingent presence could affect market incentives and business models over the long term. A standing facility represents a commitment to expand the Federal Reserve's balance sheet and provide liquidity against eligible securities if primary dealers choose to use the facility. Currently, only banks have routine access to Federal Reserve liquidity, through the discount window. Although the Federal Reserve has a long history of conducting discretionary repo operations with primary dealers, a standing repo facility would effectively extend to primary dealers a discount-window-like option to access liquidity against certain securities at their discretion. Providing a standing facility to primary dealers may create a moral hazard that would give them an incentive to take on more liquidity risk. Still, the liquidity upgrade available through the facility would be limited because funding would be available only against Treasury, agency and agency mortgage-backed securities, which are usually highly liquid.¹⁴ While dealers might use the facility infrequently, they could obtain significant funding from the facility on some days. The facility could be particularly attractive at times to primary dealers that are in relatively weaker condition and, as a result, would have to pay above-average rates in private transactions. Design parameters, such as the maximum operation size and the per-counterparty maximum allocation, could partly mitigate these concerns.

Daily \$10 billion to \$20 billion operations would mainly preserve the Federal Reserve's discretion to adjust the size of operations as deemed appropriate. An approach based purely on small-value tests would maintain maximum discretion over the size of operations. None of the options seems likely to permanently take the place of a significant amount of private sector transactions, limiting the risk that repo operations would cause private-sector money market activity to wither.

Stigma. Central bank facilities that are rarely used, charge penalty rates, and are available to market participants at their own discretion can become stigmatized. A firm's decision to obtain funds from the central bank on these terms, rather than from the market, can be seen as a signal of weakness. A standing facility at a backstop rate well above the federal funds target range is most at risk of stigma: Such a facility would likely see little use on most days, and a high rate would be most attractive to the weakest dealers. If the facility became stigmatized, it would not be as effective in supporting rate control. A lower minimum bid rate would incent more frequent and larger usage,

¹⁴ The Committee could choose to further restrict collateral eligibility.

reducing stigma, but would also give the Federal Reserve a greater ongoing presence in the market. By contrast, daily or weekly modestly sized repo operations could offer a rate closer to market rates, which would encourage more frequent use and reduce the risk of stigma relative to a standing facility with a higher rate. In addition, a Desk decision to ramp up the scale of operations would signal that markets were under broader pressure, likely reducing the signal that participation in repo operations would send about any one firm.