



## Monetary Policy with Abundant Liquidity: A New Operating Framework for the Federal Reserve

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The dramatic increase in the Federal Reserve's balance sheet since 2009 has attracted the attention of economists, pundits, and ordinary citizens. The amount of assets held by the Fed recently crossed \$4 trillion and will likely continue to rise to a peak of about \$4.5 trillion. This run-up in asset holdings has resulted from the Fed's large-scale asset purchase programs, which were intended to support economic growth. However, a side-effect of these asset purchases is the creation of unprecedented amounts of liquidity in the financial system.

This liquidity will present a challenge when the time comes to raise short-term interest rates. Indeed, the Federal Reserve has never tightened monetary policy, or even tried to

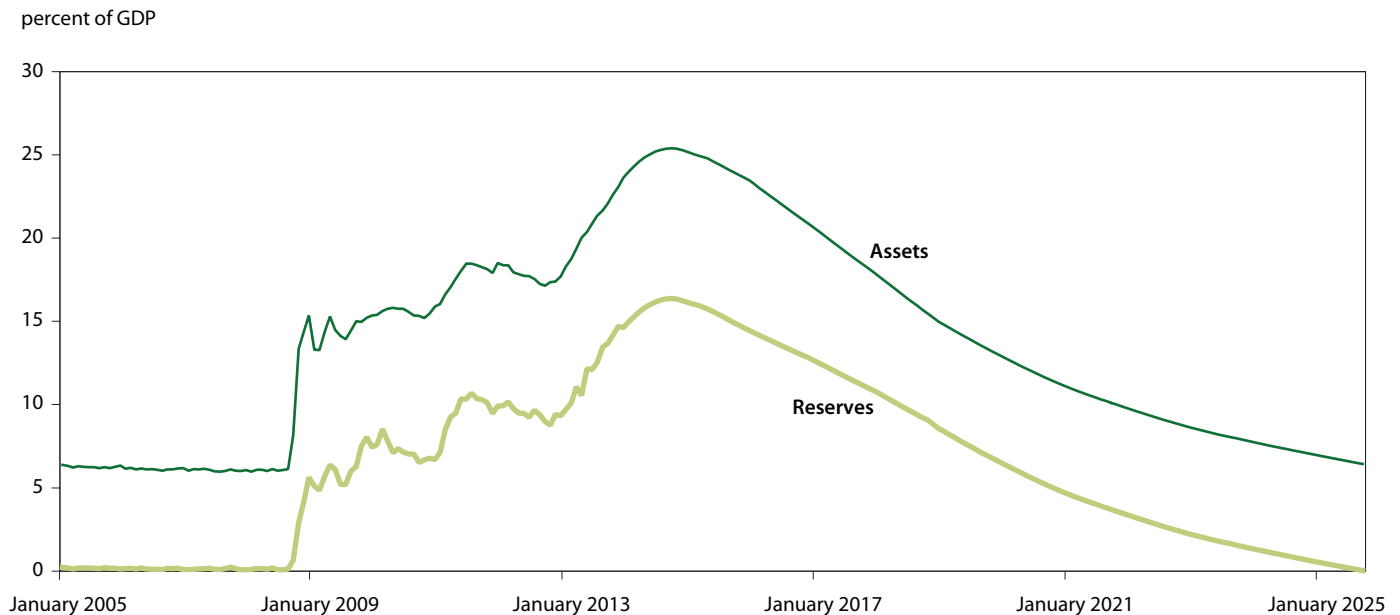
maintain short-term interest rates significantly above zero, with such abundant liquidity in the financial system. Fed officials have emphasized that they have developed the tools needed to drain reserves and manage short-term interest rates in such an environment. However, they have not specified how those tools would be used in practice. Moreover, there are reasons to doubt that conducting policy along the lines of the previous operating framework, which would involve reducing bank reserves as needed to achieve a target level for the federal funds rate, will function smoothly in this environment of high liquidity.

In this Policy Brief, we propose a new operating framework that will allow the Fed to conduct monetary policy while maintaining a substantially elevated balance sheet and abundant liquidity in the financial system. In particular, we believe that

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the Fed should set the interest rate at which it will offer overnight reverse repurchase agreements as its policy instrument and that it should maintain the interest rate paid on bank reserves at the same level. Under our proposal, all banks and many other financial institutions would have an unlimited ability to invest at the Fed at the specified interest rate. All other interest rates, including the federal funds rate, would be determined in the market, presumably with the risk-free interest rate set by the Fed exerting a powerful influence on them.

The environment of high liquidity in financial markets is likely to persist for a number of years, as the Fed has indicated its intention to reduce its asset holdings only gradually once the economic recovery gathers steam. Thus, it is crucial for the Fed to have an operating framework that will be effective in such an environment. In addition, the proposed framework would

**Figure 1 Past and projected Federal Reserve assets and bank reserves, 2005–25**

Note: The increase in reverse repurchase agreements after August 2013 is added to reserves.

Sources: Blue Chip Economic Indicators; Federal Reserve Bank of New York; Federal Reserve Board; and authors' calculations.

provide the Fed with the flexibility to choose the optimal size and structure of its balance sheet after this transition period. We believe that the Fed should not shrink its balance sheet all the way back to a size that would have been considered normal prior to the global financial crisis but should instead leave a larger amount of liquidity in the financial system on a permanent basis.

Overall, we see a number of advantages to our proposed framework. Through the interest rates on reverse repurchase agreements and bank reserves, the Fed would have sufficient control of short-term interest rates, allowing it to influence broader financial conditions in a manner that supports its mandate for full employment and low inflation. And by keeping the balance sheet more elevated than otherwise, the Fed would be providing a greater amount of liquidity to the financial system, allowing it to potentially operate with better efficiency and reduced risks. In our view, this proposal would improve the transmission of monetary policy to the overall economy and would provide the Fed with flexibility to respond to future crises with its balance sheet as it sees appropriate.

## AN ENVIRONMENT OF ABUNDANT LIQUIDITY

The financial system is currently operating with an extreme amount of liquidity as a result of the Federal Reserve's programs to purchase large amounts of Treasury and agency mortgage-

backed securities (MBS).<sup>1</sup> Those asset purchase programs were meant primarily to make financial conditions more supportive of economic growth and not to provide liquidity to the financial system. However, as a result of these purchases, the aggregate amount of reserves in the banking system has reached unprecedented levels, as can be seen in figure 1.<sup>2</sup> Prior to late 2008, bank reserves were only a trivial percentage of GDP.

Given the manner in which the Fed is likely to manage its balance sheet going forward, this environment of abundant liquidity will persist for many years. The Federal Open Market Committee (FOMC) has indicated that it intends to continue to expand the balance sheet until it sees a "substantial improvement" in the outlook for labor market conditions, and subsequently it is likely to hold the balance sheet near its peak level for an extensive period. Once the time comes to begin to normalize policy, the FOMC is likely to shrink the Fed's balance sheet only gradually, by allowing holdings

1. We are using the term "liquidity" to refer to short-term assets with a relatively certain price, implying that they can be easily sold or allowed to mature in order to raise funds for making payments. Bank reserves and currency are the most liquid assets because their value is completely certain and they can be used directly for payment.

2. When the Fed buys a security, it pays for the security by crediting the reserve balance of the bank whose customer sold the security. Thus, asset purchases necessarily create a liability of the Federal Reserve, initially in the form of reserves.

of Treasury securities and agency MBS to run off as they are redeemed.<sup>3</sup> The FOMC has not ruled out selling assets during the normalization of monetary policy, but it appears that most FOMC members do not anticipate doing so.<sup>4</sup>

Figure 1 shows projections of the Fed's total assets and bank reserves through 2025 as a percent of GDP. Based on Chairman Ben Bernanke's remarks after the December 2013 FOMC meeting, we assume that the FOMC continues to reduce the pace of its purchases by \$10 billion per meeting, ending them in the fourth quarter of 2014. Thereafter, principal payments on securities are reinvested to maintain the balance sheet at a constant nominal size until May 2015, when the Fed begins to allow assets to run off gradually as they are redeemed.<sup>5</sup> The difference between assets and reserves, which is mainly composed of currency in circulation, is assumed to gradually return to its pre-2008 level of 6 percent of GDP by late 2018 as interest rates return to more normal levels.<sup>6,7</sup> Finally, we project nominal GDP based on the *Blue Chip Economic Indicators* October 2013 survey.

Under these projections, the amount of assets held by the Fed reaches about \$4.5 trillion, or roughly 25 percent of GDP by late 2014, pushing the amount of excess reserves in the banking system to around \$3 trillion, or 16 percent of GDP. The size of the balance sheet begins to decline in mid-2015,

but the reduction is gradual, leaving the balance sheet well above its "normal" level past 2020.

These projections highlight a critical fact about the policy regime going forward. While the exact timing of monetary policy tightening is unclear, it will almost surely take place in an environment of very large amounts of liquidity. Indeed, according to their own economic projections, most FOMC members see the appropriate policy path as involving increases in short-term interest rates beginning in 2015—at a time when the amount of reserves will still be close to \$3 trillion.

## POLICY TOOLS FOR MANAGING SHORT-TERM INTEREST RATES

The Federal Reserve has never tried to manage short-term interest rates with such abundant liquidity in the financial system. As noted above, bank reserves were a trivial percent of GDP prior to late 2008, with balances typically less than \$30 billion. Over that period, the Fed did not pay interest on reserves, and overnight interest rates were much higher, which meant that holding reserves had a meaningful opportunity cost from the perspective of the banks. In that environment, relatively small changes in the supply of reserves had a meaningful effect on overnight interest rates (Carpenter and Demiralp 2008).

The policy instrument of the FOMC at that time (and still today) was the target for the federal funds rate, which is the interest rate for uncollateralized overnight loans to depository institutions.<sup>8</sup> The FOMC would direct the Open Market Desk of the Federal Reserve Bank of New York to conduct open market operations on each day to set the total amount of reserves at a level judged to be most consistent with achieving the target for the federal funds rate. The banking system generally had a structural deficiency of reserves, which meant that the New York Fed would typically have to inject reserves by conducting repurchase agreements (RPs).<sup>9</sup>

3. Redemptions occur when principal is paid on an asset, either because it matured or because all or part of it was paid off prior to maturity (prepayment applies only to agency MBS and not Treasury securities).

4. In a set of "exit strategy principles" published in the minutes of its June 2011 meeting, the FOMC said the first step in the process of policy normalization would be to "cease reinvesting some or all of the payments of principal" on its securities holdings. Those principles also indicated that the FOMC might sell some of its MBS holdings. Nevertheless, at the press conference following the June 2013 FOMC meeting, Chairman Bernanke said that "a strong majority" of the FOMC does not anticipate selling assets during the process of normalizing monetary policy.

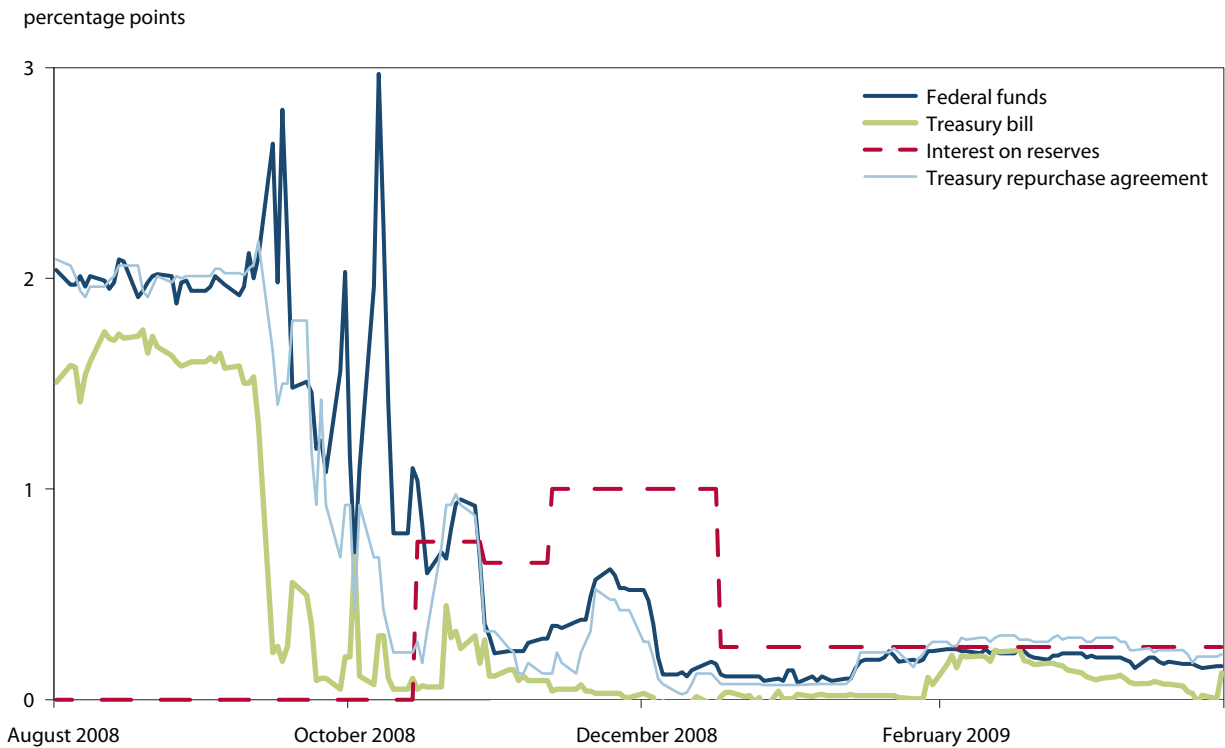
5. Our assumption on the timing of asset redemptions lines up with the median response in the Fed's Survey of Primary Dealers from October 2013. The dealer survey projects redemptions only through 2018, at which point the balance sheet is declining at a rate of 12 percent per year. We assume a rate of decline of 10 percent in 2019–20, 8 percent in 2021–22, and 6 percent thereafter. The declining rate of redemptions reflects a long tail of assets with distant maturities.

6. In January 2013, Fed staff released projections of the Fed balance sheet (Carpenter et al. 2013), which differ from our projections in three respects. First, the Fed study assumed an upper estimate of Fed asset purchases beyond December 2012 of \$1 trillion, but market participants currently expect \$1.5 trillion. Second, the Fed study assumed a rapid initial rate of redemptions of MBS holdings, based on the observed prepayment rates in 2010–11, but these rates fell sharply in late 2013 and market participants now expect a lower rate of redemptions. Third, the Fed study assumes that currency in circulation will remain elevated (as a share of GDP) even after interest rates become significantly positive.

7. Liabilities in the Fed's new overnight reverse repurchase facility, which are assumed to account for all of the growth in reverse repurchase agreements since August 2013, are included with bank reserves. This new facility and its relationship with bank reserves are the central focus of our proposal.

8. Federal funds transactions include the borrowings by a depository institution from a US office of another depository institution, foreign bank, the US government or agency thereof, a Federal Home Loan Bank, or selected other institutions.

9. An RP agreement, also known as a repo agreement, is similar to a collateralized loan. The borrower sells a security to the lender and simultaneously promises to buy back the security at a fixed price. The Fed lends funds to the market through RP agreements in order to increase reserves. To drain reserves, the Fed engages in RP agreements in the opposite direction, known as reverse RPs. The New York Fed can also inject reserves on a permanent basis through outright purchases of Treasury securities. The structural deficiency of reserves in the banking system reflected that these purchases did not keep pace with the average amount of reserves demanded by banking institutions, which was an intentional outcome so that the New York Fed could then manage reserve balances through RP operations.

**Figure 2 Short-term interest rates during the financial crisis, 2008–09**

Sources: Bloomberg and Credit Suisse Locus.

The amount of reserves in the banking system surged during the global financial crisis.<sup>10</sup> With the increase in reserves, the Fed would have lost its ability to keep overnight interest rates above zero had it not gained an important new tool at this time—the authority to pay interest on reserve balances held by depository institutions.<sup>11</sup>

#### ■ Interest on reserves

The ability to pay interest on reserves (IOR) significantly affected the Fed's ability to control interest rates in the presence of abundant reserves. In particular, the federal funds rate and other short-term interest rates were expected to remain relatively close to the IOR rate. One reason to expect this

pattern is that banks can perform an arbitrage by borrowing in the federal funds market and holding the resulting funds as reserves at the Fed. This transaction involves no risk for the bank and allows it to earn any spread between the IOR rate and the federal funds rate.<sup>12</sup> Banks can perform a similar transaction using other types of borrowing, for example, when the interest rates on RPs or bank certificates of deposit (CDs) drop sufficiently below the IOR rate.<sup>13</sup>

In practice, though, bank funding rates and other overnight interest rates have traded notably below the IOR rate. This pattern was the most extreme at the height of the financial crisis, when the federal funds rate traded more than 50 basis points below the IOR rate, as shown in figure 2.<sup>14</sup> However, it has also persisted during less stressful market conditions. For

10. The initial surge in the fall of 2008 owed to the increased lending to the financial system that the Fed initiated through various liquidity facilities. Subsequently, the increase in reserves was due to the asset purchases conducted by the Fed. This Policy Brief focuses on the consequences of those policy actions for the Fed's control of overnight interest rates. For a review of the efficacy of the liquidity programs and asset purchases in influencing financial and macroeconomic conditions, see Gagnon and Hinterschweiger (2013).

11. In principle, the Fed may pay interest at a different rate on required reserves than on excess reserves. In practice, these rates have been identical and we do not distinguish between them. It is the rate on excess reserves that is economically more important because only these assets are available for banks to put to alternative uses.

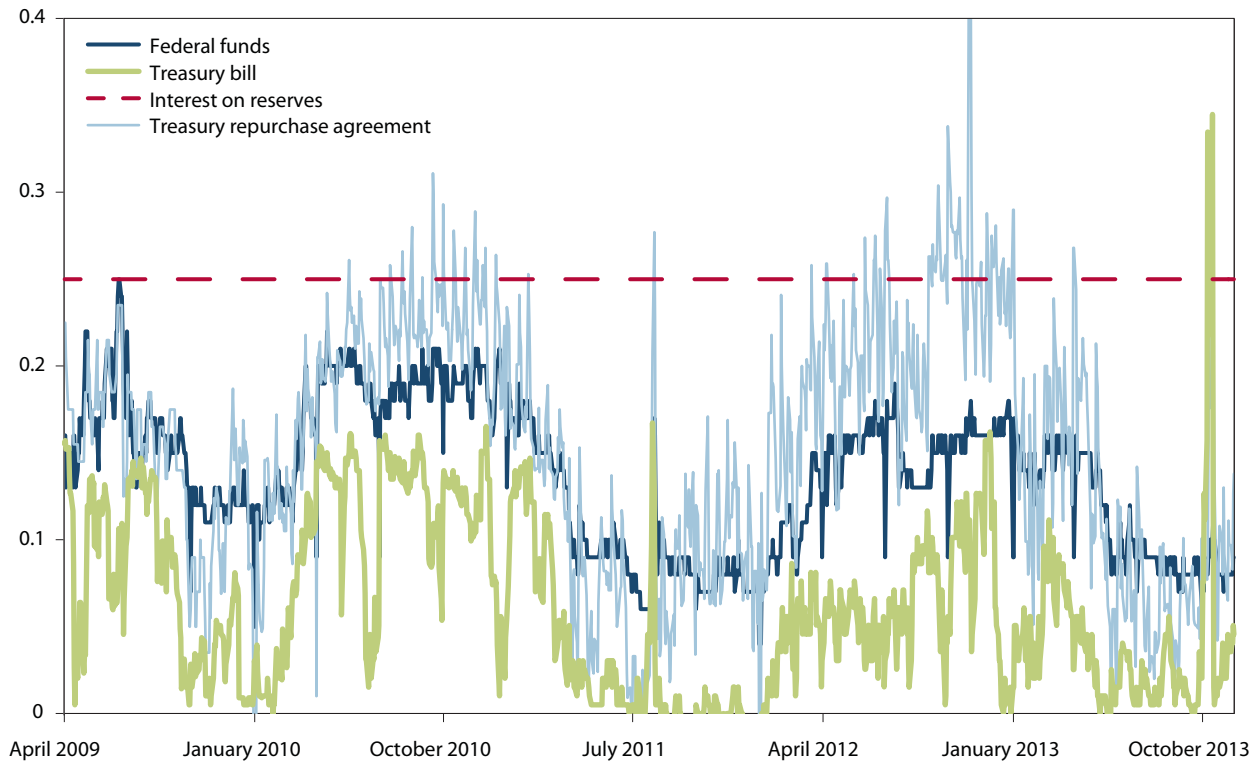
12. Central banks in Australia, Norway, and New Zealand maintained policy rates above 1 percent in 2009. They were able to keep overnight interbank interest rates consistently above the rates of interest paid on bank reserves despite elevated levels of reserves (Bowman, Gagnon, and Leahy 2010).

13. CDs and RPs often have maturities greater than overnight and hence incorporate expected changes in overnight interest rates.

14. To some extent, this large gap may reflect the novelty of IOR, which was rushed into place before its originally scheduled introduction, as well as the unusual stresses on the financial system at that time, which made financial institutions reluctant to lend to one another.

**Figure 3 Short-term interest rates, 2009–13**

percentage points



Sources: Bloomberg and Credit Suisse Locus.

example, over the past several years, the gap between the IOR rate and the federal funds rate has often been 15 basis points or larger, as can be seen in figure 3.

This pattern reflects the fact that some large lenders in the federal funds market are not eligible to receive interest on reserves (mainly government-sponsored enterprises, or GSEs).<sup>15</sup> Banks are willing to borrow from these entities and hold the proceeds as reserves, performing the arbitrage noted above, but they require a yield spread to do so because they view the associated increases in their balance sheets as costly in terms of required regulatory capital and internal oversight.<sup>16</sup> In addition, banks have to pay a fee to the Federal Deposit Insurance Corporation (FDIC) related to the size of their balance sheets, which directly reduces the return on this activity by 10 to 15 basis points on average.<sup>17</sup>

15. For estimates of the extent of activity from these participants, see Afonso, Entz, and LeSueur (2013a).

16. Counterparties of banks may also face constraints, particularly on the amount of unsecured transactions with a single counterparty, which also limits the ability of this arbitrage activity to put a floor on the federal funds rate.

17. The FDIC fee varies across financial institutions, with a rate ranging from 5 to 45 basis points. Foreign banks do not pay the fee because they are not

insured by the FDIC. As a result, they have become the primary borrowers of federal funds (Afonso, Entz, and LeSueur 2013b).

It is possible that this gap would have been larger if the federal funds rate had not been constrained from below by the zero bound on nominal interest rates. Moreover, other types of short-term interest rates, such as the rate on an overnight RP for general Treasury collateral (Treasury RP rate), also traded well below the IOR rate over this period. As with the federal funds rate, this pattern reflects the fact that key participants in this market are not eligible to receive interest on reserves from the Fed and hence have to accept a lower return in the market.

The presence of these gaps suggests that the ability of the Fed to control a broad range of market interest rates by setting the IOR rate alone cannot be taken for granted. Indeed, a primary concern about the conduct of monetary policy going forward is that the gap between overnight market interest rates and the IOR rate could widen and become less predictable as the IOR rate moves away from the zero bound. The Fed presumably wants to have an operational framework that provides it with considerable control over a broad range of short-term interest rates, both in normal times and in periods of financial stress.

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### ■ *Draining tools*

In order to enhance its control over short-term interest rates, the Fed has developed and tested two new tools: a term deposit facility (TDF) and a reverse repurchase (RRP) facility that can be implemented for overnight or term transactions (Martin et al. 2013). Both tools are novel. The Fed had never before offered term deposits, since it did not have the ability to pay interest on reserves. And while the Fed has long had the ability to conduct RP and RRP agreements to add or drain reserves, it had never conducted RRP in large scale.<sup>18</sup> Operations in both the TDF and the RRP facility can be run by either fixing the amount of the operation and allowing an auction to determine the clearing interest rate or fixing the interest rate and allowing the market to determine the quantity (often referred to as “full allotment” operations).

### **There are risks associated with returning to elements of the previous operational framework for monetary policy....**

The TDF is available to the same depository institutions that receive interest on reserves. In effect, the facility allows those institutions to “lock up” their reserves for a longer period, presumably in return for a slightly higher interest rate than the expected path of the IOR rate over the term of the deposit. In contrast, the RRP facility is available to a broader set of market participants, including primary dealers, money market funds, and GSEs. From the perspective of the financial market participant, an overnight RRP transaction with the Fed is similar to being paid interest on holding reserves at the Fed, in that it is an overnight asset with no credit risk. Thus, the ability to do overnight RRP with nonbanks in effect extends IOR to a broader set of market participants.<sup>19</sup> Similarly, term RRP have many of the same characteristics as TDF transactions.

18. The manner in which the Fed will conduct RRP is also different than in the past. Given their greater potential scale and the practices of many of its counterparties, the Fed decided to conduct these operations in the triparty repo market. That market uses infrastructure provided by two clearing banks, JPMorgan Chase and the Bank of New York Mellon, and the associated services that they provide to intermediate credit in this market.

19. RRP are different in some respects, including that the Fed’s counterparty receives collateral in some cases that can then be used for other purposes. However, this is not uniformly true, as the New York Fed’s legal arrangements with several types of counterparties specify that the collateral is not delivered. That arrangement is applied primarily to counterparties that typically would not rehypothecate the collateral in any case.

The Fed has not specified how it intends to use these two tools in the conduct of monetary policy. One possible approach (that we argue against) is to think of these as draining tools that could be used to remove enough reserves from the banking system to allow the IOR rate to exhibit strong control over other overnight interest rates. However, the amount of reserves that would have to be drained to achieve this outcome is unclear and could be substantial.<sup>20</sup> If it turned out that the vast majority of reserves had to be drained, one might be concerned that the heavy use of the TDF and term RRP to achieve that outcome would itself cause notable distortions in money markets. For example, these operations could cause an unusual steepening of the money market curve, with the Fed having to pay rates for one-month and three-month instruments that are well above overnight interest rates.

In brief, there are risks associated with returning to elements of the previous operational framework for monetary policy—that is, maintaining a federal funds rate target, relying mainly on IOR to control the federal funds rate, and using term draining operations in massive size to encourage a tighter relationship between the funds rate and the IOR rate. This approach could result in sizable and unpredictable deviations between various money market rates—both across instruments and maturities—that would weaken the Fed’s control of financial conditions. With that in mind, we propose using these tools in a different manner, one that is much better suited for the current situation in financial markets.

### **A NEW FRAMEWORK FOR MONETARY POLICY**

We propose a new operational framework for monetary policy in which the FOMC employs the interest rate on its overnight RRP facility as its main policy instrument and maintains an elevated balance sheet and hence abundant reserves. The RRP facility would be implemented as a full allotment facility, providing any amount of overnight RRP transactions to the market at the rate set by the FOMC. The rate at the RRP facility (which we will simply call the RRP rate) would replace the federal funds rate target as the primary policy instrument of the Fed. The FOMC would ask the Federal Reserve Board to set the IOR rate equal to the RRP rate, with the idea that

20. The federal funds rate has been below the IOR rate almost continuously since reserves moved higher in late 2008, suggesting that the Fed might need to bring reserves down to very low levels. Of course, what matters here is the degree to which the federal funds rate and other rates would move with the IOR rate once it is adjusted, which is difficult to predict since the IOR rate has held steady at 25 basis points over most of the period since the Fed began paying interest on reserves.

these two rates together would underpin the Fed's influence on private borrowing rates and broader financial conditions.<sup>21</sup>

The large amount of liquidity created by the Fed's elevated balance sheet has to take the form of either bank reserves or RRP's with the Fed.<sup>22</sup> By providing overnight RRP's in a full allotment facility, the Fed is effectively creating a financial market instrument that is nearly as liquid as reserves and that can be held by a broader set of financial market participants. In our view, it is important for the RRP and IOR rates to be

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set relatively close together to avoid giving an incentive for all of the liquidity in the financial system to remain in the banks (as it would if the IOR rate far exceeded the RRP rate) or to flow out of the banks (as it would if the IOR rate were well below the RRP rate). The Fed should instead try to achieve an "interior solution" that involves substantial volumes of both reserves and overnight RRP's, with the market determining the allocation between reserves and RRP's according to where the liquidity is valued the most. We believe that this interior solution is best achieved with equality between the IOR and RRP rates, as discussed below.

This framework shifts the attention away from using "draining tools" to achieve a target level of reserves and instead focuses directly on controlling the price of overnight liquidity. Indeed, in this framework the concept of achieving a certain amount of reserves becomes obsolete, as the Fed will have created a close substitute for reserves in the form of overnight RRP's. The total amount of what we could call "Fed liquidity"—that is, the sum of reserves and overnight RRP's—

21. Although we see both the RRP rate and the IOR rate as very important, we refer to the RRP rate as the policy instrument of the FOMC. The reason is that the RRP rate can be set by the FOMC, whereas the IOR rate is instead set by the Federal Reserve Board. This setup creates a governance issue when the setting of the IOR rate is an active part of implementing the monetary policy decisions of the FOMC. Our proposal mitigates any governance problems because the Board would be expected to adjust the IOR rate to be consistent with the RRP rate established by the FOMC.

22. This statement assumes that other Fed liabilities, such as currency in circulation, are relatively stable and do not react to the expansion of the Fed's balance sheet.

will be determined by the overall size of the Fed's balance sheet and hence governed by other policy decisions regarding asset purchases or lending programs. Most importantly, the Fed will retain complete control of the cost of this liquidity in the forms of the RRP rate and the IOR rate.

Our proposed policy framework falls into a category that is sometimes referred to as a "floor system." The key attributes of a floor system are a large volume of liquid central bank liabilities, including bank reserves, and control of short-term interest rates through the rates paid by the central bank on its liabilities.<sup>23</sup> Several major central banks are operating floor systems at this time, although those systems rely entirely on interest paid on bank reserves to manage overnight interest rates.<sup>24</sup> Our proposal instead recognizes the importance of the nonbank sector in the creation of credit and the determination of broader financial conditions in US markets, and it therefore extends the floor system to a broader set of firms through the RRP facility.

In that regard, our proposal is a straightforward application of the groundwork that has been laid by the Fed. Indeed, it was the Fed staff that made the key innovation, in that it briefed the FOMC in July 2013 on the possibility of implementing a full allotment overnight RRP facility. Since then, the New York Fed has been running this facility on a limited scale in order to observe how it functions and to ensure its operational readiness.<sup>25</sup> This innovation by the Fed staff is integral to the above proposal, as it allows the FOMC to set the rate on its overnight RRP's without having to worry about the size of those transactions. We would expect the RRP

23. The other framework that is primarily in use, a so-called corridor system, involves setting the rates that the central bank pays on liabilities well below market rates and maintaining only a small amount of excess reserves in the system. Some argue in favor of a corridor system out of concern that a floor system increases the central bank's role in the financial sector and reduces short-term lending between financial institutions. However, we are unconvinced about the importance of maintaining a large interbank lending market. For more on monetary policy in floor and corridor systems, see Goodfriend (2002), Kahn (2010), and Keister (2012).

24. New Zealand has operated a floor system for years as its regular policy framework. Several other major economies are effectively operating floor systems at present because of the expansion of their balance sheets, including the euro area and the United Kingdom. It is not clear whether they will continue to operate floor systems when rates are raised above the effective lower bound. Bill Winters (2012) and Benoit Coeure (2013) explicitly discuss whether the Bank of England and the European Central Bank, respectively, should retain floor systems or return to their previous frameworks.

25. The New York Fed is currently testing the overnight RRP facility by offering daily full allotment operations at fixed rates of between 1 and 5 basis points, for amounts up to a limit of a \$3 billion per counterparty. The counterparty limit is in conflict with the principle of full allotment and is being raised gradually. The development of the RRP facility and the experience to date with these operations were described in detail in a recent speech by Simon Potter (2013), the current head of the New York Fed's Open Market Desk.

facility to operate at very high balances and see no reason to put a limit on its size.

This proposal is appealing from a conceptual perspective. The Fed would be setting overnight risk-free interest rates in the economy—the IOR rate for banks and the RRP rate for a broader set of counterparties. The idea is that these risk-free interest rates would establish a firm floor on many of the overnight interest rates determined in the market, particularly if the Fed obtains a broad enough set of counterparties for its RRP facility. In general, market participants would not be willing to provide funds on an overnight basis to other counterparties for a lower yield than they could obtain at the Fed’s RRP facility, given that the latter is free of counterparty risk.

**An important advantage of our framework is that it allows the Fed to manage its balance sheet independently of the policy interest rate. We believe the Fed should leave a large amount of liquidity in the financial system on a permanent basis.**

All other overnight interest rates (including the federal funds rate) would then be determined in the market, reaching the appropriate spreads relative to the overnight risk-free rate. It is always challenging to predict the behavior of these spreads, as we saw with the initiation of IOR in late 2008, but we can make a few predictions.<sup>26</sup> We expect the interest rate on Treasury bills maturing within a few days to trade at rates modestly below the RRP rate, given that bills can be held by a broader set of market participants (such as pension funds and individual investors); the Treasury RP rate to trade close to or several basis points above the Fed’s RRP rate;<sup>27</sup> the federal funds rate and the overnight eurodollar rate to trade modestly above the Treasury RP rate for highly rated borrowers in normal times, with the spread reflecting the credit risk associated with unsecured transactions;<sup>28</sup> and three-month London interbank

offered rate (Libor) to price off of the expected path of the overnight federal funds/eurodollar rate at a spread that is similar to that currently observed. Bank deposit rates and money market mutual fund rates could be lower than the RRP rate because of costs of intermediation.

As noted above, this framework shifts the attention away from managing the level of reserves. As such, it is not clear that there is a meaningful role for the TDF and term RRP in this framework. We do not believe that they should be used in massive size to achieve some specified amount of reserves, as that would run counter to the nature of this operational framework. Indeed, there is no obvious way to determine the appropriate size of those operations in this framework. We also see shortcomings to running these as full allotment operations, as this would involve having to set a target for the term risk-free rate in addition to the overnight rate, which is an unnecessary complication.<sup>29</sup>

An important advantage of the proposed framework is that it provides the Fed with the flexibility to manage its balance sheet in a manner that it sees as appropriate, without having to worry about the consequences for liquidity and overnight interest rates. The FOMC would be able to provide a directive to the New York Fed that specified not only the RRP rate but also how the balance sheet should be managed.

Over the course of the next several years, the directive would likely reflect the FOMC’s intention to maintain the balance sheet at very large levels and then to shrink it only slowly. The proposed framework would ensure that the FOMC maintains sufficient control over financial conditions in these circumstances, despite the elevated supply of liquidity to the markets. The FOMC would be affecting financial conditions in the same manner as it has in the past, through the actual and anticipated path of short-term interest rates, with the large balance sheet basically becoming inconsequential for maintaining that control.

Going forward, the framework would allow the FOMC to respond as needed with its balance sheet to unusual circumstances in financial markets or the economy, without compromising its control of overnight interest rates. This response could take the form of liquidity policies during periods of financial stress. Indeed, the Fed would presumably stand ready to lend to banks through its discount window at a fixed spread over the RRP rate, similar to its current practice.<sup>30</sup> The Fed would

26. The Fed initially set the IOR rate below the federal funds rate target, on the assumption that the federal funds rate would generally be above the IOR rate. But, as discussed above, this assumption proved false.

27. In addition, we strongly suspect that the moderate volatility of the Treasury RP rate in recent years (figure 3) would diminish under our proposal given the stability of the RRP rate on a day-to-day basis.

28. A recent study by Fed staff shows that the Treasury RP rate was typically, but not always, several basis points lower than the federal funds rate prior to 2007 (Bech, Klee, and Stebunovs 2012). Stephen Lumpkin (1998) also states that the “federal funds rate generally exceeds the overnight RP rate.”

29. Use of term instruments would reduce the daily turnover associated with overnight RP transactions and hence the operational burden on both the Fed and its counterparties. Accordingly, there could be scope for the Fed to run some term operations in this framework, but it should do so in a manner that is relatively neutral and leaves the focus on the setting of overnight interest rates.

30. The current primary credit rate on discount window transactions is 50 basis points above the upper bound of the target federal funds rate. A straightforward transition to the new operating framework would be to set the rate



also maintain the ability to extend credit to financial firms by resuming the term auction facility (TAF) or the myriad of other liquidity facilities that were implemented during the financial crisis. These policies were generally seen as proving very effective at stemming the liquidity panic at that time and helping to restore better market functioning over time (Gagnon and Hinterschweiger 2013).

This response could also take the form of asset purchases. Even if it is not a part of regular monetary policy, the Fed should retain the option to purchase long-term bonds when bond yields rise to levels that are clearly inconsistent with likely future policies and that threaten the achievement of the Fed's economic objectives. The need for such a policy is most compelling when the traditional approach of lowering the overnight interest rate is constrained, as has been the case in recent years given that the policy rate has reached the effective zero lower bound, but it could prove useful in other circumstances as well.<sup>31</sup>

Lastly, the proposed framework affords the FOMC greater flexibility to determine the optimal size and composition of its balance sheet in steady state. Even in the absence of financial market stress or other special economic circumstances, the FOMC may want to retain a balance sheet that is larger than historical norms. Such an approach would leave more liquidity in the financial system, which could improve its functioning and promote financial stability. A full assessment of the optimal size of the Fed's balance sheet is beyond the scope of this Policy Brief, but one should not presume that the previous system of leaving a trivial amount of Fed liquidity in the market is optimal. Our best guess is that it will prove desirable for the FOMC to leave several hundred billion dollars of liquidity in the financial system in the long run under normal market conditions.

## ADVANTAGES OF THE NEW FRAMEWORK

The most important advantages of this framework were noted above—namely, that it should provide the FOMC with effective control of financial conditions while giving it flexibility to adjust its balance sheet in a manner that is most appropriate for its economic objectives. In this section we review a number of considerations that further support the proposed framework.

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to 50 basis points above the RRP rate. With less worry under this framework about the liquidity that could be injected through the discount window, it may be worth considering whether a narrower spread is more appropriate.

31. Similarly, the Fed could sell long-term bonds when yields fall substantially below levels consistent with expected future short rates in a manner that threatens the achievement of its economic objectives. However, the need for such a policy is presumably more limited than the need for asset purchases, because there is no hard constraint on the ability of the FOMC to tighten policy through the overnight interest rate.

### ■ *It focuses on rates that are of greater importance than the federal funds rate*

The federal funds market has always been a relatively small funding market, but in recent years it has shrunk further and now involves only a limited set of market participants. Indeed, most activity today involves GSEs lending to banks that hold the funds as reserves. Lending between banks, which had been the traditional activity in the market, has become limited, because the high volume of aggregate bank reserves diminishes the need for an active market to allocate those reserves. Data on the aggregate volume of federal funds transactions are not available, but a recent Fed study estimates that the outstanding volume of federal funds transactions is around \$60 billion (Afonso, Entz, and LeSueur 2013a).<sup>32</sup> Moreover, some argue that the interbank funding market will likely shrink further in response to regulatory efforts.

Given the characteristics of this market, the federal funds rate is not an obvious choice to be the policy instrument. Other short-term funding markets have much larger volumes of activity than the federal funds market and hence are presumably more important for determining overall financial conditions in the economy.<sup>33</sup> The RP market is a prime example. A study by staff at the Federal Reserve Bank of New York attempted to estimate the size of the RP market by taking information from various segments of the market and applying judgment in order to scale that information appropriately and avoid double counting. Their estimate put the amount of outstanding RP transactions in mid-2012 at well over \$2 trillion (Copeland et al. 2012).<sup>34</sup> Much of this activity is taking place outside of the banking sector, which reflects the fact that a large portion of credit creation in our economy is not intermediated through banks and that a broader set of market participants is relevant for determining financial conditions.

Moreover, even for banks, it is not clear that the federal funds rate represents the marginal cost of funds when the level of total reserve balances is so high. As noted above, the amount of bank reserves will be well above \$2 trillion for a long period. In such a regime, the opportunity cost of funds to

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32. The market for unsecured bank financing in general is larger. Indeed, while complete data are not available, it appears that the volume of activity in the eurodollar market is larger than that in the federal funds market, and the rates in the two markets are linked to a considerable degree.

33. The choice of the instrument was less consequential in past years because all overnight interest rates moved together. However, in circumstances in which there is greater scope for differences across overnight interest rates, it seems odd to choose the market that has the smallest volume of activity as the target variable.

34. Although some of those transactions involve interdealer activity that nets down into more limited exposure, the study suggests that more than half of the activity took place in the triparty repo market, suggesting that it comprises nondealer firms providing funding to the dealer community.

a bank may be better measured by the IOR rate than the rate at which it could borrow, as a bank would presumably fund a marginal loan by reducing its reserves position rather than increasing its borrowing in the market.

Given the size of the RP market and the overall amount of bank reserves, the rates that are set on these instruments are likely to be far more important for influencing economic activity than the rate that occurs on federal funds transactions. It therefore makes sense to establish a framework that is focused on these rates. Of course, our proposal does not target the Treasury RP rate directly.<sup>35</sup> However, we anticipate that an overnight RRP with the Fed will be viewed as a very close substitute to investing in the Treasury RP market, because the latter transaction is secured with high-quality collateral and is thus close to being risk-free and because it uses much of the same infrastructure and involves many of the same participants as the former market.

#### ■ *It enhances the integration of financial markets*

As discussed above, various short-term interest rates have been below the IOR rate in recent years. That has been the case even for rates that involve little or no credit risk and hence are most comparable to an overnight transaction with the Federal Reserve. Indeed, for much of 2011 and again in 2013, the Treasury RP rate fluctuated below 10 basis points—well below the IOR rate of 25 basis points (figure 3).

In an integrated and efficient financial market, rates of return on financial instruments with the same characteristics will generally be equal. Having the risk-free overnight interest rates available to different types of market participants (nonbanks versus banks) differ by such a large amount violates this condition. By setting the IOR and RRP rates close together, the Fed would help to better align short-term risk-free interest rates, making the opportunity cost of lending and investment essentially identical for a wide range of financial institutions that affect the credit conditions available to households and businesses. In addition, this outcome is arguably more fair, as the current differences in rates could be seen as being advantageous to banks over nonbanks.

35. Elizabeth Klee and Viktors Stebunovs (2013) recommend that the Fed adopt the overnight Treasury RP rate as its main policy target. That proposal addresses some of the concerns about maintaining a federal funds rate target that we raise here. However, we believe that our proposal, in which the Fed is simply setting the interest rates on its own RRP facility and on bank reserves, is a clean and effective framework that avoids some of the operational complications and other concerns that might emerge from adopting a Treasury RP rate target.

#### ■ *It could save taxpayer money*

Maintaining an IOR rate that is well above the returns on other short-term risk-free assets might also cost the taxpayer more money than would be the case under our proposal. Because the current system forces banks to hold all of the liquidity created by the Fed, and because they face a host of regulatory costs, the Fed ends up paying the banks a higher return than would be necessary if the liquidity were spread more efficiently throughout the financial system.

The current circumstances in funding markets can be used as an example to demonstrate this point. The FOMC has achieved a certain level of broad financial accommodation for the economy, which presumably incorporates the entire set of short-term risk-free interest rates across a variety of instruments. If the Fed were to move to our proposed framework, it could presumably achieve the same degree of overall accommodation at a lower IOR rate if other risk-free rates in the economy (the Treasury RP rate and Treasury bill rates) were near the IOR rate rather than well below it. The average short-term risk-free interest rate in the economy could be the same, but the range would be smaller across instruments, and the Fed would no longer be paying only the rate at the upper end of that range.

Moreover, our proposed framework should have positive implications for the taxpayer over the longer run by allowing the Fed to maintain a larger balance sheet. Even though the larger balance sheet would result in larger interest payments on reserves and RRP, those liabilities would be matched by assets that generate positive income. On average, we expect that the Fed would earn more on its assets than it pays on its liabilities, because of a positive risk premium on the assets held.<sup>36</sup>

#### ■ *It maximizes the benefits of quantitative easing (QE)*

Numerous studies show that central bank purchases of long-term bonds tend to reduce long-term interest rates through a portfolio balance channel.<sup>37</sup> The longer the bonds are expected to be held, the higher the potency of a given volume of purchases. If securities purchased through QE were instead expected to be sold in the near future, those purchases would have little effect on long-term rates. By allowing the Fed to maintain an elevated balance sheet indefinitely, our framework would maximize the potency of QE purchases, especially if the

36. The income to the taxpayer would be more volatile than would be the case with a smaller balance sheet. However, much of the variation will be driven by the business cycle, because short-term interest rates tend to decline when the economy weakens. This presents potential advantages, such as increasing scope to engage in countercyclical fiscal policies.

37. We are among the coauthors of the first widely cited study (Gagnon, Raskin, Remache, and Sack 2011). Gagnon and Hinterschweiger (2013) provide a recent survey of subsequent studies of the effects of QE.

Fed were to establish a precedent of not selling assets before redemption. Moreover, as noted above, the framework would allow the Fed to stand ready for future asset purchases should they prove necessary.

■ *It could mitigate shortages of Treasury collateral*

The Fed's large-scale asset purchases have reduced the amount of liquid debt securities available as collateral for a variety of financial market activities. Some argue that the resulting scarcity of Treasury securities has hindered the efficient functioning of financial markets and the ability of the markets to effectively create credit outside of the banking system. Although we find these concerns to be overstated in light of the large net issuance of Treasury securities in recent years, we are open to the idea that making the Fed's holdings of Treasury securities available to the market could benefit the functioning of financial markets.

By having a standing RRP facility, the Fed would be making its holdings of Treasury securities available to alleviate any shortages. Indeed, if the market were finding Treasury securities to be in short supply, the Treasury RP rate would be expected to decline, all else equal. This would make the Fed's RRP facility more attractive, allowing the market in aggregate to shift liquidity from bank reserves into Fed RRP. These transactions would, in effect, make the Fed's Treasury holdings available to the market, providing some relief for the collateral shortage.<sup>38</sup>

■ *It provides a useful reference rate for financial markets*

Our financial system depends on a small set of benchmark interest rates for determining the payments on derivatives contracts and as a reference in a broader set of financial contracts. Although these benchmarks have historically been based on market-determined rates (such as Libor or the effective federal funds rate), an administered rate such as the RRP rate could also serve as a reference rate in these contracts. Such an approach might be appealing if the RRP rate exerts a powerful influence on a wide set of market rates, as the reference rate would then not be affected by the idiosyncratic properties of any particular market. Moreover, the RRP rate has an advantage over a private rate as a benchmark because there would be no issue of errors in measurement or misreporting

38. As noted earlier, for many types of counterparties, the Fed does not allow the counterparty to rehypothecate the collateral. Nevertheless, the transaction would still be expected to relieve the collateral shortage by providing an alternative for those counterparties that would have otherwise removed Treasury collateral from the system (such as doing RPs with other counterparties or buying a Treasury bill).

of the rate. Of course, switching between benchmarks could present a difficult transition, as discussed in the appendix.

■ *It improves the efficiency of liquidity management in the financial system*

The proposal makes liquid financial instruments available to a range of financial market participants, which could help them efficiently manage the liquidity of their portfolios. In addition, it may benefit the functioning of the payments system. A recent study by Fed staff argues that the high volume of bank reserves in recent years has reduced measures of risk in the payments system (Bech, Martin, and McAndrews 2012).<sup>39</sup> In particular, banks have less incentive to delay payments until late in the day in order to economize on reserves. Bank reserves provide a unique transaction service and yet are costless to create, so that society benefits by their abundant supply. Our proposal could save on resources spent by the banking system in economizing reserve balances relative to what would take place if the Fed returned to a framework with minimal amounts of excess reserves.

■ *It appropriately ignores the quantity of money*

Our proposed operating framework relies on the fact that the traditional analysis of the money multiplier based on so-called high-powered money (central bank liabilities) is defunct when central bank liabilities pay interest. In our view, central banks always achieved macroeconomic stabilization and low inflation by managing interest rates. Formerly, the path to controlling interest rates was the supply of non-interest-bearing currency and bank reserves. Now central banks can control interest rates directly through the rates they pay on their liabilities. This new framework severs the link between the size of a central bank's balance sheet and inflation.<sup>40</sup>

■ *It accords well with regulatory changes*

A full review of the effects of realized and prospective changes in the regulatory framework, and how those changes interact with this proposal, is beyond the scope of this Policy Brief. However, in general the proposed framework should fit well with some of the regulatory changes that have been implemented or are under consideration. Various regulatory changes emphasize the importance of financial market participants retaining a liquid portfolio. This is the case for banks, for example, through the

39. The Fed's decision in 2008 to increase the availability of collateralized daylight overdrafts in the payments system arguably provides similar benefits.

40. Marvin Goodfriend (2002) and Todd Keister, Antoine Martin, and James McAndrews (2008) also discuss this separation in the conduct of monetary policy.

liquidity coverage ratio (LCR) that is part of Basel standards, and it is also the case for nonbanks, for example, through tougher Securities and Exchange Commission (SEC) liquidity standards for money market funds. The creation of bank reserves and RRP from an expanded Fed balance sheet provides liquid financial instruments that can be useful for meeting these standards.<sup>41</sup> In this regard, the role of RRP is important, as it allows this liquidity to be held outside the banking sector.

## ADDITIONAL CONSIDERATIONS FOR THE PROPOSAL

The effectiveness of our proposal will depend critically on how the RRP rate is set and on how it interacts with other market interest rates. Here we discuss several considerations along those dimensions.

### ■ *RRP rate relative to the IOR rate*

Above we argued that it is best to achieve an “interior solution” in which the market would maintain large amounts of both bank reserves and RRP, without the Fed’s framework skewing that liquidity strongly towards one instrument or the other. This outcome requires that the IOR and RRP rates be relatively close to each other. We believe that the most appropriate choice may be to set the IOR and RRP rates equal.<sup>42</sup>

Some considerations would seem to argue for setting the RRP rate below the IOR rate. Specifically, the FDIC fee acts as a tax on banks’ holdings of reserves—one that other financial institutions do not have to pay on their holdings of Fed liquidity. However, the FDIC fee is just one of a variety of regulatory costs for banks that could be taken into account, and banks also receive key benefits (including deposit insurance and discount window access) that are not provided to other financial institutions. Thus, it does not seem appropriate to simply adjust for this one fee.

Moreover, other types of financial institutions face their own sets of regulatory costs and benefits. If one accepts the argument that the RRP rate should differ from the IOR rate due to

regulatory costs, then one might argue that the RRP rate should differ across different types of counterparties. Our view is that it is too difficult to measure regulatory costs and benefits to accurately adjust for these differences. In addition, from a conceptual perspective, it is not clear that the Fed should be attempting to offset regulatory costs by adjusting the return offered to market participants. Ideally, differences in regulatory treatment across institutions should reflect social costs and benefits of their activities.

Lastly, it should be noted that bank reserves and Fed RRP are not perfect substitutes, in that reserves provide transactions services that other short-term financial instruments do not. This consideration provides another reason not to set the IOR rate above the RRP rate.

Based on these arguments, we believe that the best approach is to set the two rates equal. However, this approach could be adjusted as we learn about how markets behave in the presence of large-scale RRP. The Fed could stand ready to insert a small and steady wedge between the two rates if the balance between the levels of bank reserves and RRP’s outstanding swings too strongly in one direction or the other.

### ■ *Need to monitor short-term interest rates*

We believe that the combination of IOR and the RRP facility will exert a strong influence on other overnight interest rates. Nevertheless, it will be important for the Fed to monitor the behavior of key short-term interest rates as the framework is implemented, and to make adjustments if necessary.

If other short-term rates trade significantly below the RRP rate, the Fed could respond by expanding the list of RRP counterparties to include important investors in the assets whose rates are lower, thereby giving them the option of earning a higher return. By including most money market mutual funds as counterparties, the Fed has already captured the most important class of nonbank investors, and hence we believe that such expansion will not prove necessary. However, there is little reason not to be as expansive as possible, as broader participation should only strengthen the floor and make the proposed framework more effective.<sup>43</sup>

The Fed might also be concerned if short-term market rates instead traded significantly above the RRP rate. In this case, the appropriate response will depend on the circumstances driving that outcome. If this pattern were to result from unusual demand for liquidity or meaningful financial stress, the Fed might choose to respond by reducing the RRP and IOR rates or by using its liquidity facilities more aggressively (such as lowering

41. The details of the regulatory changes matter for this point. For banks, holding reserves is just as beneficial for the LCR as holding Treasury securities, and so Fed purchases of treasuries do not affect the ability to meet the LCR in aggregate. However, purchases of MBS and other liquidity facilities can meaningfully increase liquidity. For money funds, the SEC rules involve the maturity of the instruments held. Thus, the availability of RRP, even if generated by the Fed’s purchases of longer-term treasuries, can have a beneficial effect in aggregate.

42. To further make RRP comparable to IOR, it would be useful for the Fed to push the RRP operations as late as possible within the day, subject to the constraints arising from the settlement of the triparty RP market. The New York Fed announced a step in this direction on January 13, 2014, by pushing the time of operations from late morning to early afternoon.

43. We recognize that the process of adding RRP counterparties is not straightforward, as it requires considerable due diligence and involves a number of operational and legal issues.

the primary credit rate at its discount window or restarting the TAF). If the firmness of market interest rates were to occur in more normal market circumstances, the Fed could see this as a signal that the financial system does not have an appropriate level of liquidity and could respond by increasing the amount of assets held on its balance sheet. Alternatively, the Fed might consider modifying our proposed framework to automatically inject reserves at a particular rate, as discussed next.

■ *A potential modification to stand ready to inject reserves*

An important assumption for our proposed framework is that the large amounts of liquidity created by the Fed's balance sheet will keep other overnight interest rates relatively close to the RRP rate (and IOR rate) established by the Fed. However, one cannot rule out the possibility that market interest rates

**We believe that the best time for the FOMC to begin transitioning to a new framework is now—well in advance of policy tightening.**

could be persistently above the RRP rate, particularly once the Fed's balance sheet shrinks towards its new steady state level.

Based on this consideration, the Fed could consider modifying our proposed framework to incorporate an automatic mechanism for providing reserves if market interest rates are judged to be too far above the RRP rate or too volatile even in normal times. In particular, within our proposed framework, the Fed could also offer a standing RP facility with full allotment at a rate moderately higher than the RRP rate (say 10 basis points above the RRP rate).<sup>44</sup> This facility would automatically inject reserves by lending to financial institutions when market rates became firm relative to the RRP rate. The modified framework would therefore have a symmetric approach, with standing facilities to react to soft market rates (through RRP) and to firm market rates (through RPs). This two-sided ap-

44. The discount window available to banks has some similarities to this proposed RP facility, in that it stands ready to inject funds against collateral if funding rates for banks get too high. However, at most times it is used as a source of backup liquidity for individual firms rather than a broad facility for influencing market prices. It could be modified to more effectively support the RP facility, for example, by offering discount window credit against Treasury collateral at the same rate as the RP facility (10 basis points above the RRP rate), while maintaining a higher rate for other types of collateral.

proach could provide the Fed with even more effective control of short-term interest rates.

## CONCLUSION

The notion of the Federal Reserve adopting a new operating regime may sound daunting, and some observers will want to stay as close as possible to the old regime because it feels more comfortable. But trying to maintain the existing operating framework would be inappropriate, because the policy environment has changed dramatically. The Fed's balance sheet is likely to be very large for an extended period of time, and financial markets will be awash in substantial amounts of liquidity as a result. It is important for the Fed's operating regime to adapt to those circumstances to ensure that the FOMC retains control of overnight interest rates in a manner that is efficient for the financial system and sufficient for the Fed to meet its economic mandate.

In this Policy Brief, we propose an operating framework for monetary policy that would meet these standards in a world of high liquidity and a large Fed balance sheet. This framework shifts the FOMC's operating instrument to the rate at its overnight RRP facility, with the IOR rate set in lockstep with the RRP rate. The federal funds rate would become just one of the various overnight interest rates determined by the market in the normal transmission of monetary policy. Moreover, the framework would allow the Federal Reserve to manage its balance sheet in a manner that it saw as appropriate. We anticipate that the FOMC will shrink the balance sheet only gradually in coming years, and we suggest that, over the long run, it retain a larger balance sheet as a share of GDP than has been the case historically.

In our view, this approach would improve the transmission of monetary policy, as the Fed would be setting two overnight interest rates that directly affect a far larger pool of institutions and investors than does the federal funds rate. At the same time, this framework would make the financial system more efficient, more equitable, and more robust. We believe that the best time for the FOMC to begin transitioning to a new framework is now—well in advance of policy tightening. If it were to instead wait until the shortcomings of its current operating regime become apparent, the FOMC would be seen as reacting to difficult circumstances rather than taking proactive steps to achieve the best operating framework possible.

## APPENDIX

### FURTHER CONSIDERATIONS RELATED TO THE FEDERAL FUNDS RATE

This Policy Brief has argued that conducting overnight RRP in unlimited size and paying interest on reserves are sufficient instruments for affecting financial conditions. In that context, we feel that it is appropriate for the FOMC to set the RRP rate as its policy instrument (with the IOR rate set in lockstep). However, the FOMC has relied on the federal funds rate as its main policy target for many years, and hence one might question whether dropping the focus on the federal funds rate is the right approach. Here we consider the challenges that would arise from retaining a target for the federal funds rate as well as the challenges associated with transitioning away from it.

#### ■ *Operational difficulties of maintaining a target federal funds rate*

The FOMC could decide to retain the federal funds rate as the main policy target and use the RRP facility and the IOR rate to achieve that target. Here we raise several broad concerns about this approach.

First, it is unclear what configuration of rates would deliver the federal funds rate target. Under the expected patterns discussed above, the New York Fed would set the RRP rate and the IOR rate below the federal funds rate target by whatever gap was seen as likely to prevail at the general level of liquidity at the time. However, if the federal funds rate remained unexpectedly soft relative to other overnight interest rates, it is possible that the Open Market Desk would have to set the RRP rate above the IOR rate, thereby using the full allotment facility to remove substantial reserves and pulling the effective federal funds rate above the IOR rate. The New York Fed would have to adjust its approach as it learned about these patterns.

Second, and more problematic, the gap between the federal funds rate and the RRP rate could prove to be volatile over time, especially if the availability of the RRP facility causes the federal funds market to continue to shrink. In that case, the Fed might have to frequently adjust the RRP and IOR rates to hit the federal funds rate target. This approach would be counterproductive, as it would introduce unpre-

dictable volatility in the overnight interest rate of significant importance (applying to nearly \$3 trillion of financial instruments) in order to maintain a steadier level of an interest rate that is of more limited relevance (applying to less than \$100 billion of transactions).

A third potential problem with this approach is that the presence of a federal funds rate target, by itself, does not fully determine how the New York Fed should operate, especially if term draining tools were in use. In particular, the New York Fed could presumably achieve a given target with different combinations of the total amount of reserves and the RRP rate. Thus, the FOMC would have to specify either how it wanted reserves managed or the desired spread between the federal funds rate and the RRP rate. The first option would seem odd, considering that the FOMC has downplayed the importance of the quantity of reserves. And under the second option, the FOMC would be specifying an operating objective for the RRP rate, as is the case in our proposal.

#### ■ *Transition to the new framework*

One important challenge involved with changing an operational framework is the transition. In this case, the primary issue is not the activity in the federal funds market itself but the fact that the effective federal funds rate is the reference rate for an important set of interest rate swaps (overnight index swaps, or OIS) and that OIS rates serve as a reference for a much broader set of derivatives and other financial contracts. Thus, any volatility that is introduced into the effective federal funds rate through the changes described here could have unintended and undesirable consequences for the financial system.

In our view, it would be inappropriate for the Fed to consider itself “stuck” with a federal funds rate target for this reason. However, this consideration certainly speaks to the need for a careful transition. Ideally, the financial system would migrate to a set of contracts indexed to the Fed’s RRP rate (or equivalently the IOR rate), given that it becomes the key reference point for other short-term interest rates. There may be an advantage to indicating the change in framework well in advance, and to managing the federal funds rate smoothly through the transition, to limit any unexpected consequences for existing contracts.

## REFERENCES

- Afonso, Gara, Alex Entz, and Eric LeSueur. 2013a. Who's Lending in the Fed Funds Market? Blog post at Liberty Street Economics, Federal Reserve Bank of New York, December 2. Available at <http://libertystreeteconomics.newyorkfed.org>.
- Afonso, Gara, Alex Entz, and Eric LeSueur. 2013b. Who's Borrowing in the Fed Funds Market? Blog post at Liberty Street Economics, Federal Reserve Bank of New York, December 9. Available at <http://libertystreeteconomics.newyorkfed.org>.
- Bech, Morten, Elizabeth Klee, and Victor Stebunovs. 2012. *Arbitrage, Liquidity, and Exit: The Repo and Federal Funds Markets Before, During, and Emerging from the Financial Crisis*. Finance and Economics Discussion Series 2012-21. Washington: Board of Governors of the Federal Reserve System.
- Bech, Morten, Antoine Martin, and James McAndrews. 2012. Settlement Liquidity and Monetary Policy Implementation—Lessons from the Financial Crisis. *FRBNY Economic Policy Review* (March). Federal Reserve Bank of New York.
- Bowman, David, Etienne Gagnon, and Michael Leahy. 2010. *Interest on Excess Reserves as a Monetary Policy Instrument*. International Finance Discussion Papers 996. Washington: Board of Governors of the Federal Reserve System.
- Carpenter, Seth, and Selva Demiralp. 2008. The Liquidity Effect in the Federal Funds Market: Evidence at the Monthly Frequency. *Journal of Money, Credit and Banking* 40, no. 1: 1–24.
- Carpenter, Seth, Jane Ihrig, Elizabeth Klee, Daniel Quinn, and Alexander Boote. 2013. *The Federal Reserve's Balance Sheet and Earnings: A Primer and Projections*. Finance and Economics Discussion Series 2013-01. Washington: Board of Governors of the Federal Reserve System.
- Coeure, Benoit. 2013. Where to Exit to? Monetary Policy Implementation after the Crisis. Speech at the 15th Geneva Conference on the World Economy, May 3.
- Copeland, Adam, Isaac Davis, Eric LeSueur, and Antoine Martin. 2012. Mapping and Sizing the US Repo Market. Blog post at Liberty Street Economics, Federal Reserve Bank of New York, June 25. Available at <http://libertystreeteconomics.newyorkfed.org>.
- Gagnon, Joseph, and Marc Hinterschweiger. 2013. Responses of Central Banks in Advanced Economies to the Global Financial Crisis. In *Responding to Financial Crisis*, ed. Changyong Rhee and Adam Posen. Washington: Peterson Institute for International Economics.
- Gagnon, Joseph, Matthew Raskin, Julie Remache, and Brian Sack. 2011. The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases. *International Journal of Central Banking* 7, no. 1: 3–44.
- Goodfriend, Marvin. 2002. Interest on Reserves and Monetary Policy. *FRBNY Economic Policy Review* (May).
- Kahn, George. 2010. Monetary Policy under a Corridor Operating Framework. *Economic Review* (Fourth Quarter). Federal Reserve Bank of Kansas City.
- Keister, Todd. 2012. Corridors and Floors in Monetary Policy. Blog post at Liberty Street Economics, Federal Reserve Bank of New York, April 4. Available at <http://libertystreeteconomics.newyorkfed.org>.
- Keister, Todd, Antoine Martin, and James McAndrews. 2008. Divorcing Money from Monetary Policy. *FRBNY Economic Policy Review* (September): 41–56. Federal Reserve Bank of New York.
- Klee, Elizabeth, and Viktors Stebunovs. 2013. Target Practice: Monetary Policy Implementation in a Post-Crisis Environment. Manuscript posted on April 13 at [www.gc.cuny.edu](http://www.gc.cuny.edu).
- Lumpkin, Stephen. 1998. Repurchase and Reverse Repurchase Agreements. In *Instruments of the Money Market*, ed. Timothy Cook and Robert Laroche. Federal Reserve Bank of Richmond.
- Martin, Antoine, James McAndrews, Ali Palida, and David Skeie. 2013. *Federal Reserve Tools for Managing Rates and Reserves*. Staff Report 642. Federal Reserve Bank of New York.
- Potter, Simon. 2013. Recent Developments in Monetary Policy Implementation. Remarks before the Money Marketeters of New York University, December 2.
- Winters, Bill. 2012. *Review of the Bank of England's Framework for Providing Liquidity to the Banking System*. London: Bank of England. Available at [www.bankofengland.co.uk](http://www.bankofengland.co.uk) (accessed on January 2, 2014).

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