

SPEECH

## Recent Developments in Monetary Policy Implementation

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### Remarks before the Money Marketeers of New York University, New York City

As prepared for delivery

Thank you, Ray, for the introduction and to the Money Marketeers for hosting me.

My remarks this evening will focus on the role played by the New York Fed's Trading Desk (the Desk) in the implementation of monetary policy and how our operational tools have evolved in recent years. I'll focus in particular on the potential use of overnight, fixed-rate reverse repurchase agreements, also known as reverse repos, which we began testing in September. We've been testing this instrument to support the Federal Open Market Committee's (FOMC) longer-run planning for the implementation of monetary policy, and its development shouldn't be interpreted as a signal of the FOMC's intentions for monetary policy or the path or timing of any future change in the level of policy accommodation. As always, the views expressed here are my own and do not necessarily reflect those of the New York Fed or the Federal Reserve System.<sup>1</sup>

### The Desk's Role in Implementing Monetary Policy

Before discussing overnight, fixed-rate reverse repos, I think it would be helpful to lay out some context for how we think about monetary policy implementation.

As you well know, the Federal Reserve Act charges the FOMC with formulating monetary policy to achieve what we call the "dual mandate"—stable prices and maximum employment. In normal times, the Committee would do this principally by changing the level of its target for the overnight fed funds rate, in order to influence the pricing of money and credit. Movements in this rate are passed on to other short-term interest rates that influence borrowing costs for households and businesses and financial conditions more broadly. Since December 2008, of course, the FOMC has held its target fed funds rate in a narrow range just above zero. Since then, in order to support a stronger economic recovery and help ensure that inflation, over time, is at the rate most consistent with its mandate, the FOMC has provided additional monetary policy accommodation using a number of unconventional tools. These tools include alterations in the size and composition of the Federal Reserve's balance sheet and forward guidance on the target federal funds rate. Any change in the size and composition of the System Open Market Account (SOMA) decided upon by the FOMC is implemented by the Desk. This distinction between monetary policy formulation and monetary policy implementation is important. Open market operations are merely a means to an end—tools for implementing the FOMC's decisions.<sup>2</sup>

In designing these operational tools, the Desk aims to effectively and efficiently implement the FOMC's directives.<sup>3</sup> Of course, Desk operations don't take place in a vacuum. We operate in the open market, conducting transactions with a range of private market participants who are motivated by their own business needs, balance sheet constraints, regulatory incentives or disincentives, and individual perceptions of current and future economic conditions and risks. We rely on both internal and external infrastructure and systems to trade, settle, and clear our transactions. Our understanding of the dynamics of the markets in which we operate—including the motivation and behavior of different market participants, linkages among financial institutions, and the microstructure of financial instruments—is therefore vital to our ability to structure and execute operations to achieve the objectives of policymakers.<sup>4</sup> By monitoring markets and maintaining deep expertise in them, we remain vigilant to changes in the financial market landscape that might alter our assessment of our operational toolkit.

On that note, I'll now turn to significant changes in U.S. money markets in recent years and their implications for the Desk's implementation of monetary policy.

### The Changing Landscape of U.S. Money Markets

Prior to the financial crisis, the Desk met the FOMC's interest rate directives primarily by controlling the supply of reserves in the banking system.<sup>5</sup> The Desk conducted open market operations to manage a supply of reserves at a level that was expected to match the estimated quantity of reserves demanded at the FOMC's overnight fed funds rate target. The rate prevailing in the market each day is the effective fed funds rate. In the aggregate, the system at that time was operated with a "structural deficiency," meaning that permanent additions to the supply of reserve balances fell somewhat short of the total need, so the Desk conducted additional daily operations to add balances temporarily to get to the desired level. Even if we supplied the correct aggregate quantity of reserve balances, individual depository institutions with a deficiency of reserves had to find and trade with depository institutions with reserve surpluses. A purchase of fed funds therefore represented the marginal source of funding for a

bank, and the fed funds rate paid by the bank was the marginal cost of bank funding. The Desk's daily fine-tuning operations represented a marginal adjustment to the aggregate supply of reserves, mostly in response to the exogenous impact of changes in other balance sheet items, such as Federal Reserve notes and the level of the U.S. Treasury's account balance at the Fed, which altered the level of aggregate reserves in the banking system. In the five years prior to the crisis, this system functioned with an average of \$20 billion in reserve balances and about \$1.5 billion in excess reserves. Although aspects of this approach evolved over time, this general method for implementing monetary policy was employed by the Desk for decades, and the Desk's ability to reliably achieve the FOMC's policy directive was judged quite favorably by market participants. In fact, with increased transparency around the FOMC's fed funds target (which the Committee began to officially announce in the mid-1990s) and with high confidence in the Desk's ability to hit that target, markets often adjusted to announced changes in the FOMC's target policy rate without the need for the Desk to conduct operations to effect the change.

An important point to observe is that the rate for which the FOMC sets a target, the overnight federal funds rate, represents an unsecured lending rate between banks. But the Desk conducted its operations with its primary dealer counterparties—government securities dealers that have an established trading relationship with the New York Fed—in the secured financing market for general collateral repurchase agreements, or GC repos. This market serves as a hub in which broker-dealers and other market participants finance their inventories of securities, frequently borrowing from cash-rich investors, such as money market funds. These financing arrangements are structured as repos, in which the security is technically sold with an agreement to repurchase at an agreed-upon later date. The transaction can be thought of in most respects as economically similar to a collateralized loan. The growth of the GC repo market in recent decades has reflected the greater issuance of marketable securities in the United States, and the repo market and the broker-dealers, through their intermediation, support the healthy functioning of the markets for such securities.

Primary dealers have accounts at the tri-party clearing banks, which are depository institutions. Thus, by crediting funds to the dealers' clearing accounts, the Desk literally created reserve balances in the banking system. These operations didn't attempt to exert any influence directly over the repo markets in which we transacted, and in fact the repo operations were conducted as fixed-quantity auctions in which the Desk took whatever rates the market offered to achieve the targeted amount of repos. The related adjustments in reserve conditions directly influenced the rate in the fed funds market used by banks to borrow reserves to meet reserve requirements and ensure adequate clearing balances for payments activity. The fed funds rate, in turn, had strong linkages to other short-term interest rates, thus allowing the FOMC to affect the broad level of short-term interest rates even through its narrow policy target. Although there might have been relatively small deviations across various short-term money markets, movements were generally aligned, and we retained firm control over short-term interest rates. The Desk's effectiveness in achieving the FOMC's fed funds target through operations with primary dealers in the repo market thus illustrates how its operations are just a technical means to an end.

The crisis brought on several important changes in the conduct of monetary policy with implications for money markets. The first was the easing in the stance of monetary policy, with the FOMC's reduction in its fed funds target from a point target of  $5\frac{1}{4}$  percent in mid-2007 to a target range of zero to  $\frac{1}{4}$  percent by December 2008, where it remains today. The second change was a shift to liquidity and monetary policy operations that resulted in a high level of excess reserves. In the initial year or so of the crisis, the Desk offset the reserve-adding nature of the Federal Reserve's loans to support the liquidity of a range of financial institutions and to foster improved conditions in financial markets by reducing other assets on the Fed's balance sheet, notably holdings of short-term U.S. Treasury securities. By September 2008, however, amid a deepening crisis and widening policy response, the capacity to offset completely the increase in the balance sheet was effectively exhausted.<sup>6</sup> Consequently, additional credit provision and the initiation of large-scale asset purchase programs, the latter of which continue today to support continued progress toward maximum employment and price stability, began and continue to cause reserve balances to grow.

A third and related change in the conduct of monetary policy was the introduction of our ability to pay interest on reserve balances held by depository institutions. Congress granted this authority to the Federal Reserve in the Financial Services Regulatory Relief Act of 2006, with an October 2011 effective date, but accelerated its implementation to October 2008 as part of the legislative response to the financial crisis. In particular, the ability to pay interest on excess reserves, or IOER—that is, reserve balances held by banks above the level of reserves they're required to hold—enhanced the Federal Reserve's ability to control short-term interest rates amid its reserve-expanding credit programs and asset purchases.<sup>7</sup> Without payment of interest on reserves, short-term interest rates could fall to zero or negative levels given the increased level of reserve balances. Interest on reserves represents the rate of return on a riskless overnight deposit at the Fed.<sup>8</sup> Accordingly, the interest rate paid on reserves represents the sure return a bank can earn and therefore the opportunity cost for the bank to make an alternative investment, such as a loan or the purchase of a security. Theoretically, if all money market participants had access to deposits earning the IOER rate, the IOER rate should set a minimum rate—or floor, so to speak—on short-term interest rates, as there would be no incentive for institutions to make loans to any institution at a lower rate. Even in a market without universal access to IOER, depository institutions with access to it could borrow funds or take deposits from institutions that cannot earn it, then leave funds invested at the IOER rate until there's no further economic advantage to borrower or lender. Competition among banks that can earn IOER would thus pull up other money market rates close to the IOER rate.

Money market dynamics in recent years generally reflect these changes. In a world with significantly elevated reserve balances

and a ¼ percent interest rate paid on those balances, IOER has kept the federal funds rate and other money market rates at positive levels within the FOMC's zero to ¼ percent target range. Contrary to the dynamics one would expect of an idealized perfect market, however, short-term rates have consistently traded at levels below the IOER rate, and Treasury bill and repo rates have occasionally gone negative, particularly when financial stresses increase the demand for very safe assets. Since IOER is available only to depository institutions holding balances at the Fed, many other money market participants cannot access it, either because they don't earn interest on Fed account balances (like government-sponsored enterprises, or GSEs) or don't have Fed accounts at all (like money market funds). Without such access, these institutions may have less bargaining power and may have to leave funds unremunerated at the Fed or place funds in the market at sub-IOER rates. This creates a potential arbitrage opportunity for banks, which can earn a spread between their costs of funds and their earnings on reserves, but not for other cash lenders. However, uncertain or rising balance sheet costs—likely related to new regulatory changes, including higher capital requirements, leverage ratio and liquidity requirements, and changes in the FDIC's insurance fee assessment scheme—may have altered banks' cost-benefit evaluations and tempered their willingness to arbitrage the differences in rates. Additionally, banks are reportedly unable to attract substantial funds because of lenders' concerns regarding credit risks associated with uncollateralized lending and because lenders often distribute their investments among several banks, making their supplies of funds relatively insensitive to the interest rates offered by individual banks. Thus, while banks take some advantage of the arbitrage opportunity, competitive conditions in the unsecured money markets haven't proven strong enough to narrow the spread between the fed funds rate and the IOER rate to very small and stable levels, and the floor on rates that IOER is meant to provide appears soft.

Although longer-term correlations remain fairly robust, the federal funds rate and other money market rates are no longer moving as closely together on a day-to-day basis. In recent years, the fed funds rate has been relatively stable on a day-to-day basis, while other short-term rates like GC repo have tended to be more variable and have, more than in the past, fluctuated with sometimes unpredictable spreads to federal funds. These periodic episodes of weaker linkages suggest that although the IOER rate effectively influences the marginal unsecured funding rate for eligible depository institutions, it may not be representative of, and may currently lie above, the marginal cost of funds more broadly across money markets, for example, secured financing costs faced by repo market participants. This weakening of the relationship between short-term interest rates represents a reduction in the precision with which the Desk is able to control them over the very short term. It's difficult to know, though, whether the shift in dynamics across money markets we're seeing is permanent or temporary. While some of the changes could be indicative of an increasing desire by market participants to focus on collateralized rather than uncollateralized markets, it could also reflect more transitory factors related to an elevated level of reserves that leaves banks with no need to borrow funds given the abundance of deposits.

Of course, it's also difficult to know with certainty how money market rate relationships will respond when the FOMC eventually begins to remove policy accommodation in an environment with a high volume of reserve balances. An elevated level of reserve balances in the system, in and of itself, need not impede our ability to effectively control the level of short-term interest rates.<sup>9</sup> Indeed, there are other central banks, for example Norway, that show that with the right tools and operating framework, it's possible to maintain rate control despite a large amount of central bank reserves in the system. It appears likely that reserves in the U.S. banking system will be at unprecedented levels when interest rates are eventually raised. As of November 27, reserve balances in the system stood at nearly \$2.5 trillion, and the level continues to rise as the Fed's asset purchases continue. In a recent study using median policy expectations from the Desk's June 2013 Survey of Primary Dealers as a baseline scenario, staff economists at the Federal Reserve Board estimated that the Fed's securities portfolio will peak at a level of \$3.9 trillion in mid-2014, with the corresponding level of reserve balances topping out at \$2.7 trillion at that time.<sup>10</sup> The Desk's most recent survey, from October, would put these numbers even higher, owing to dealers' expectations for a larger and longer-lasting purchase program than they previously anticipated.<sup>11</sup>

This changing financial landscape therefore warrants a fresh evaluation of the operating tools we have to achieve the most effective and efficient implementation of monetary policy while operating with or exiting from a very large balance sheet.

### **Enhancing the Range of Tools for Monetary Policy Implementation**

Even in an environment of abundant reserves, the Desk's operating objective remains the same: to maintain control over the policy rate as directed by the FOMC in support of the Committee's monetary policy objectives. That said, the means by which we achieve that end may require alternative approaches. For the purpose of these remarks, I'm assuming that FOMC policy will dictate that the balance sheet remains large, and that open market operations would be designed to achieve the Committee's objectives in such an environment. With this in mind, a well-rounded toolkit for the implementation of monetary policy would provide us with a selection of instruments that allow us to target either reserve levels or interest rates directly, while variables for each type of objective would include the term of the operation, the auction method, and the counterparty type. This would provide a flexible set of instruments to respond to market conditions as they evolve and as directed by the FOMC. Generally speaking, operations that target reserve levels, like those we conducted before the crisis, might be implemented most efficiently through fixed-quantity auctions. A structure of several overlapping term auctions, for example, could achieve significant size objectives while minimizing the rollover risk for maturing operations. In contrast, overnight, fixed-rate tools that are also full allotment, meaning participants could invest as much as they want at the administered rate, might be more effective for directly targeting interest rates. Such tools would allow participants to fine-tune the amount they want every day in response to changes in supply-

and-demand conditions in the market and their cash management needs. In either the fixed-rate or fixed-quantity case, tools offering the ability to transact directly with either bank or non-bank counterparties would enhance the Desk's operational capacity and strengthen the transmission of monetary policy in the face of some of the rates wedges currently seen in markets. I should note that the operations described above are all temporary liability management tools that don't reduce the size of the Fed's balance sheet; they shift one liability item—reserve balances—into another—a reverse repo with the New York Fed, for example.<sup>12</sup> In recent years, the Federal Reserve has developed and tested several tools, including term and overnight reverse repos with an expanded set of counterparties and the Term Deposit Facility, or TDF, available to nearly all depository institutions, that together with IOER represent most of this broad toolkit.<sup>13</sup>

IOER and the TDF represent unsecured overnight and term tools, respectively, in which only depository institutions are eligible. I've already discussed IOER. The TDF is a program through which Federal Reserve Banks offer interest-bearing term deposits to eligible banks through an auction subscription that could be either fixed in quantity or fixed in rate with full allotment. An increase in term deposits outstanding temporarily reduces reserve balances because funds to pay for them are immobilized away from reserve accounts of participating institutions for the life of the term deposit. They don't, however, reduce the size of the participating bank's balance sheet, as they substitute reserve balances with a less liquid instrument.

Reverse repos are a type of open market operation in which eligible counterparties place cash at the Federal Reserve in return for securities from the Fed's portfolio. Technically structured as a sale and repurchase agreement, a reverse repo is economically equivalent to a collateralized investment with the Fed (with the opposite flow of cash from a repo, the traditional liquidity-adding open market operation described earlier). These transactions are arranged as auctions between the New York Fed and the Desk's traditional primary dealer counterparties, as well as with an expanded set of counterparty types, including money market funds and GSEs, that typically provide large amounts of short-term funding to the financial markets.<sup>14</sup> Reverse repos were initially envisioned to be used as a term, fixed-quantity tool. However, with the necessary operational infrastructure to support reverse repo operations through tri-party arrangements and an expanded set of counterparties now in place, we're focusing on additional ways to tap the capabilities. Specifically, reverse repos with expanded counterparties could also be used in an overnight, fixed-rate, full-allotment facility with same-day settlement that directly targets overnight interest rates. Such a facility—which is essentially an extension of IOER to a broader set of counterparties—might help strengthen the floor and tighten control over short-term interest rates by increasing competition in the market and diverting deposits from banks, potentially improving the integration among the various market segments. Reverse repos with non-banks would remove reserves from the banking system.

The TDF and term reverse repos are somewhat parallel tools, in that they were initially envisioned to auction a fixed quantity of term investments (deposits or reverse repos) to bank and non-bank counterparties, respectively, in order to drain reserves. Their capabilities have been tested periodically over the past several years through small-value exercises in order to ensure that they'll be ready to deploy in size if and when needed. Nevertheless, for reasons discussed earlier, achieving an interest rate target through the management of the supply of reserves alone may not offer the best framework for implementing monetary policy in a system with an elevated level of reserve balances. Instead, overnight, fixed-rate, full-allotment reverse repo operations with expanded counterparties, coupled with IOER available to banks, might enhance the Fed's achievement of its policy objectives in this environment.

Similar to IOER for banks, an overnight, fixed-rate, full-allotment reverse repo facility with same-day settlement would provide an essentially risk-free investment directly at a fixed rate, in this case to a broad range of non-bank counterparties. By reaching financial institutions that are ineligible to earn IOER, including, for example, money market funds, the facility widens the universe of counterparties that should generally be unwilling to lend at rates below those rates available through the central bank.<sup>15</sup> The facility should also enhance competition in the markets by strengthening the bargaining position of non-bank lenders, which would now be able to place essentially unlimited funds overnight in the Fed's facility.<sup>16</sup> In this way, the facility is expected to complement IOER, strengthening the floor on the level of overnight rates and tightening the relationship among various money market rates.

Such a facility might also be expected to help reduce the volatility of short-term interest rates. By conducting a daily operation with a known, fixed rate in unlimited amounts, the Fed can reduce uncertainty and absorb day-to-day variations in the supply of and demand for funds and collateral. An eligible lender that cannot earn the IOER rate and that has an unexpectedly large amount of funds to invest would be able to place the funds in the reverse repo facility rather than sell them in the market at an unusually low rate. This should reduce downward pressure on money market rates. Meanwhile, the availability of risk-free assets to a broader pool of counterparties could help to satisfy demand when the appetite for safe assets by those counterparties increases, but only indirectly. The Fed's counterparty may hold a risk-free asset on its balance sheet—a reverse repo with the Fed collateralized by risk-free securities. However, the securities sold to the counterparty are in the tri-party system, making them unavailable for the counterparty to satisfy margin requirements. That said, to the extent that the counterparty switches its investments from other high-quality assets to reverse repos with the Federal Reserve, the distribution of safe assets within the system could become more efficient.

This type of facility represents an efficient tool from an operational and market-functioning standpoint as well. Unlike Desk operations conducted with fixed quantities, the Desk wouldn't need to estimate the appropriate amount of reverse repos to offer

each day in order to absorb the quantity of reserve balances at the target rate.<sup>17</sup> With IOER and an overnight, fixed-rate, full-allotment reverse repo facility, counterparties would determine the level of participation based on daily demand for overnight investments at a fixed rate that's judged consistent with the FOMC's overall policy stance. Market forces will therefore determine how to allocate the Federal Reserve's liabilities between depository institutions holding them as reserves and money market funds, GSEs, and other non-bank financial institutions holding them as reverse repos.

The effectiveness of an overnight, fixed-rate, full-allotment facility in helping to control overnight money market rates will depend on a range of factors, including whether a sufficiently wide set of non-bank counterparties has access to the facility. Following seven waves of counterparty expansions since 2009, the Desk currently has 139 reverse repo counterparties, covering 94 of the largest 2a-7 money market funds, 6 GSEs, 18 banks, and the 21 primary dealers. Taken together, these institutions represent an estimated 25 percent of all overnight Treasury tri-party repo volume. More counterparties could certainly be added, and we're in the process of considering how best to proceed. The efficacy of the facility will also depend on factors such as the regulatory and balance sheet constraints of counterparties and the level of competition in the markets. However, the facility's value in terms of monetary policy implementation wouldn't necessarily be determined by the amount of usage. If the facility increases bargaining power for market participants, it could conceivably provide an effective floor for short-term rates, giving the Desk tighter control of money market conditions even with usage of the facility that's low on average.

At its September 2013 meeting, the FOMC unanimously approved a resolution that allowed the Desk to start an operational test of fixed-rate, overnight reverse repos.<sup>18</sup> The exercise, which began on September 23 and is authorized to run until January 29, 2014, entails the conduct of a daily overnight, fixed-rate reverse repo auction in order to assess operational readiness to carry out such transactions. It therefore allows the Desk, its wide range of counterparties, and the tri-party clearing banks to utilize and fine-tune their procedures for end-to-end processing of trades, from posting of the rate to running operations, moving cash and collateral, unwinding the trade, and integrating information with accounting systems. Like other technical exercises, this one isn't intended to materially affect the current level of short-term interest rates. Accordingly, for the purposes of the exercise, each counterparty's participation is capped. The maximum bid amount and rate have varied over the life of the exercise in order to ensure usage sufficient to generate useful observations about counterparty demand under various market conditions during the testing period; however, as authorized by the Committee, they cannot exceed \$1 billion per counterparty and 5 basis points, respectively.<sup>19</sup> It bears emphasizing once again that, like the Federal Reserve's other operational readiness exercises, this one is a matter of prudent advance planning. The testing operations don't represent a change in the stance of monetary policy, and no inference should be drawn about the timing of any change in the stance of future policy.

Not surprisingly, the exercise to date has confirmed that the level of facility use is sensitive to the rate offered ([Exhibit 1](#)). For much of the testing period thus far, the spread between market rates and the fixed rate offered on reverse repos has been relatively wide. However, we've seen take-up increase in instances where the spread narrowed. Also not surprisingly, participation increased on quarter- and month-end dates, particularly by GSEs and money funds, which noted that uncertain access to overnight secured investments on these dates, combined with lower unsecured overnight rates, increased the attractiveness of our operations. We've also seen that different counterparty types have used the facility differently, reflecting their business models and investment alternatives. Through November, total usage of the facility has ranged from \$345 million to \$58 billion and the number of bidders has ranged from 4 to 87 per operation ([Exhibit 2](#)). Excluding the quarter- and month-ends, daily bids have averaged \$4.5 billion from 17 bidders.

Operationally, market participants generally characterize the exercise as smooth, with minimal disruptions. From a policy perspective, participants have indicated that they expect that a facility, if executed in full scale in the future, should be an effective tool for increasing the Federal Reserve's control of short-term money market rates through a stronger floor. In addition, money market experts have noted the exercise's importance in the current environment of promoting market functioning; for example, it reduces the likelihood of pervasive, negative short-term rates trading.

## Conclusion

In the five years since the FOMC has set the target for the federal funds rate at its zero lower bound, the landscape for the implementation of monetary policy has changed. The tools to implement monetary policy have also changed, and I focused here primarily on a possible new overnight, fixed-rate, full-allotment reverse repo facility. Although the current overnight, reverse repo exercise provides us with useful observations that allow us to improve the technical execution of policy, our knowledge is naturally limited by the exercise's capped nature. Important questions will remain about the broader money market effects of a fully operational facility. Larger policy and implementation questions will also entail whether—and if so how—other tools would be used in conjunction with this facility and IOER, and how the facility might or might not fit into the Federal Reserve's longer-run policy framework.

But while there's still a lot to learn, the potential addition of an overnight, fixed-rate, full-allotment reverse repo facility offers a promising new technical advance in the Desk's implementation of monetary policy. Used together with IOER, it may strengthen the floor for short-term interest rates and, with it, the Federal Reserve's control of money market rates, by surmounting the competitive and balance sheet frictions seen in money markets and by extending the central bank's payment of interest to a wider

universe of relevant counterparties. Improved control over the level of money market rates and reduced volatility of short-term interest rates could enhance the flexibility of the Desk's operational tools, ultimately allowing for a more robust and effective implementation of the FOMC's policy directives both during the rate normalization period and when there is a very large balance sheet.

Thank you.

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<sup>1</sup> I would like to thank Deborah Leonard for her excellent assistance in the preparation of these remarks and colleagues in the Federal Reserve System for numerous insightful comments and suggestions.

<sup>2</sup> Additional policy tools related to depository institutions, such as the discount window, interest on reserves, and the Term Deposit Facility, are overseen by the Board of Governors of the Federal Reserve System and implemented by the Federal Reserve Banks.

<sup>3</sup> The FOMC issues a "directive" to the New York Fed after each of its [meetings](#). The directive outlines the approach to monetary policy that the FOMC considers appropriate for the time period between its policy meetings (for example, its target fed funds rate or range, or an amount of long-term securities to purchase) and authorizes the Desk to conduct transactions in the SOMA in furtherance of it.

<sup>4</sup> See my November 27, 2012, [Remarks on the Role of Central Bank Interactions with Financial Markets](#).

<sup>5</sup> The Federal Reserve also established a baseline demand for reserves through reserve requirements. Since the expansion of the Federal Reserve's balance sheet and resultant increase in reserve levels, however, these requirements have been so far below the level of actual reserves that they can be met without any additional Desk actions.

<sup>6</sup> After selling a significant portion of its holdings, the SOMA eventually lacked a sufficient volume of unencumbered Treasury securities to sell. However, some additional capacity came from the Supplementary Financing Program (SFP), initiated in September 2008 by the Federal Reserve and the U.S. Treasury Department. The SFP consisted of a series of Treasury bill auctions, separate from Treasury's regular borrowing program, with the proceeds maintained in an account at the Federal Reserve Bank of New York. Funds in this account served to drain reserves from the banking system, offsetting the reserve impact of some of the Federal Reserve's lending and liquidity initiatives. The SFP has not been used since July 2011.

<sup>7</sup> The Federal Reserve also pays interest on required reserve balances, which reduces the opportunity cost that depository institutions incur by holding required reserves at a Federal Reserve Bank. The Federal Reserve Board is responsible for setting the rate of interest on reserves. Since December 16, 2008, the interest rates on required reserve balances and excess reserve balances have been  $\frac{1}{4}$  percent, although the rates need not be the same.

<sup>8</sup> Although interest on reserves represents an overnight rate, it is calculated and paid out on a lagged basis according to two-week reserves management maintenance periods. The payment is based on daily account balances and a weighted average of applicable overnight rates over the maintenance period. More information can be found in [Regulation D](#).

<sup>9</sup> Antoine Martin, James McAndrews, and David Skeie, "[Bank Lending in Times of Large Bank Reserves](#)," Federal Reserve Bank of New York *Staff Reports*, no. 497, May 2011, revised June 2013.

<sup>10</sup> Seth B. Carpenter, Jane E. Ihrig, Elizabeth C. Klee, Daniel W. Quinn, and Alexander H. Boote, "[The Federal Reserve's Balance Sheet and Earnings: A Primer and Projections](#)," Board of Governors of the Federal Reserve System *Finance and Economics Discussion Series*, no. 2013-01, January 2013, revised September 2013.

<sup>11</sup> The [October 2013 Survey of Primary Dealers](#) indicates median expectations for a domestic securities portfolio that peaks at \$4.3 trillion after an end to asset purchases at the conclusion of 2014. The survey did not ask respondents to provide expectations for the peak level of reserve balances, but reserve balances would inevitably rise along with the larger expansion of securities holdings. The exact path of reserves in the banking system would depend on the interplay of numerous autonomous factors outside the Fed's influence, such as currency growth and balances at the Federal Reserve held by the Treasury Department, as well as the usage of reverse repo and term deposit facilities.

<sup>12</sup> Permanent operations such as asset sales would also remain in the Desk's toolkit and would result in a reduction in the size of the Fed's securities portfolio and balance sheet.

<sup>13</sup> Operational exercises for both mortgage-backed security purchase and sale operations using the Desk's proprietary trading system, FedTrade, were started on November 21, 2013.

<sup>14</sup> The [expanded set of counterparties](#) is intended to enhance the capacity of the Desk's reverse repo operations beyond that provided solely by the primary dealers. Given the nature of their business, primary dealers are more likely to seek financing for their inventories of securities rather than look to invest cash in reverse repos with the Federal Reserve.

<sup>15</sup> A separate, overnight reverse repo facility has long existed as an investment vehicle for foreign central banks and international accounts that hold dollars in their accounts at the New York Fed. Investments in this program are pooled and are arranged in mutually agreed-upon amounts. Reverse repos with foreign official and international accounts are reported as a separate line item in the Board of Governors' weekly [H.4.1 statistical release](#) on factors affecting reserve balances.

<sup>16</sup> In practice, the size of the operation would be limited by the lesser of the level of excess reserves or the amount of securities held in the SOMA portfolio.

<sup>17</sup> The facility does, however, raise new collateral management issues for the Desk, which would have to ensure that SOMA securities are appropriately allocated to meet policy and operational needs across multiple operations.

<sup>18</sup> The Desk has been conducting periodic, small-value term reverse repo exercises with its expanded counterparties through tri-party arrangements since October 2009. These exercises have been limited to \$5 billion in total amounts outstanding and have been conducted according to the traditional, fixed-quantity model of Desk operations. In August 2013, the exercises were arranged for same-day settlement and overnight maturity in anticipation of initiating overnight fixed-rate reverse repos.

<sup>19</sup> All 139 counterparties are eligible to participate, but they are able to choose whether they do so. Each counterparty was initially limited to a maximum bid of \$500 million. This amount was raised to \$1 billion on September 26, after we ensured that the initial launch of the exercise did not operationally overwhelm the Desk or its clearing banks. The initial fixed rate for the operation was set at 1 basis point, which was below current market rates; it was subsequently raised periodically in 1-basis point increments to a level of 5 basis points, which has been in effect since November 19.

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