

Simon M Potter: The implementation of current asset purchases

Remarks by Mr Simon M Potter, Executive Vice President of the Markets Group of the Federal Reserve Bank of New York, at the Forecasters Club of New York, New York City, 27 March 2013.

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Thank you very much. It's a pleasure to be here today to talk with you all about the Federal Reserve's ongoing policy actions and the role of the Trading Desk (the Desk) at the Federal Reserve Bank of New York in implementing those policies on behalf of the Federal Open Market Committee (FOMC). As always, the views expressed here are my own and do not necessarily reflect those of the Federal Reserve Bank of New York or the Federal Reserve System.

Outcome-based purchases

At the September 2012 FOMC meeting, the Committee decided to increase policy accommodation by purchasing an additional \$40 billion per month of agency mortgage-backed securities (MBS) and to continue the Maturity Extension Program (MEP). Then at its December meeting, the Committee decided to continue buying \$45 billion per month in longer-term Treasury securities following the completion of the MEP. As a result of these decisions, the Federal Reserve is currently adding \$85 billion in longer-term securities each month to its holdings, in addition to reinvesting principal payments from its holdings of agency MBS and agency debt securities into agency MBS.¹ We have bought about \$130 billion in Treasury securities since January and about \$260 billion in agency MBS, excluding reinvestments, since mid-September, bringing the total par value of the Federal Reserve's SOMA (System Open Market Account) portfolio to over \$2.9 trillion.²

The FOMC's current asset purchase program has some key differences from earlier policy initiatives. In the past, when announcing previous programs to change the size or composition of its balance sheet, the FOMC communicated an expected total size of each program and an anticipated date by when it would be completed. Under the current asset purchase program, the FOMC has announced only the monthly pace and composition of purchases and noted that purchases will continue until there is a substantial improvement in the outlook for the labor market in a context of price stability. The Committee has also indicated that, in determining the size, pace, and composition of its asset purchases, it will take appropriate account of the likely efficacy and costs of its purchases as well as the extent of progress toward its economic objectives.

The structure of the current purchase program reflects the Committee's expressed intention to provide policy accommodation as necessary to improve the outlook for the labor market and allows the FOMC's policy response to adjust over time in response to incoming information. The flexibility to adjust purchases is useful given our relatively limited experience

¹ The FOMC also directed the Desk to reinstate its previous policy of rolling over maturing Treasury holdings into new issues. See the Desk's [Frequently Asked Questions](#) for more information. In practice, the amount of maturing proceeds will be quite small over the next several years, since nearly all securities maturing within the next three years were sold or redeemed as part of the MEP.

² The current par value of the portfolio excludes about \$75 billion of agency MBS trades scheduled to settle in the future.

with the balance sheet as a monetary policy tool and the uncertainty about the policy's effects.

Of course, previous asset programs have also been conditioned on the FOMC's assessment of the economy and its evolving views on the efficacy and costs of purchases. For example, the September 2011 FOMC announcement, in which the Committee introduced the MEP, noted that "the Committee will regularly review the size and composition of its securities holdings and is prepared to adjust those holdings as appropriate". Indeed, the FOMC chose to adjust the policy by extending the MEP to the end of 2012, beyond its planned completion in June 2012, in order to support a stronger economic recovery and help ensure that inflation, over time, reached a rate most consistent with its dual mandate. Market participants recognized the program's conditionality and adjusted their expectations for additional policy accommodation prior to the announcement of the extension of the program.

Indeed, results from the Desk's Survey of Primary Dealers prior to the announcement indicated that respondents placed 60 percent odds on the Committee either increasing the duration of Federal Reserve holdings, for instance by extending the MEP, or expanding the size of the portfolio through asset purchases without short-term Treasury sales at the June 2012 FOMC meeting.³ There are also other examples of the FOMC adjusting its balance sheet based on its ongoing assessment of the economy. The advantage of the current policy is that it relates asset purchases to economic conditions and the efficacy and costs of the policy in a more explicit and transparent manner. This should enable market participants to recalibrate their expectations more continuously in light of incoming information and may provide some additional reassurance against downside risks.

Despite the changes in communication around the current purchases, their intended purpose and the way that I anticipate the purchases will impact the economy are similar to previous policies. The purchases are conducted to help achieve the FOMC's dual mandate of maximum employment and price stability. Asset purchases promote this mandate by putting downward pressure on longer-term interest rates, supporting mortgage markets, and helping to make broader financial conditions more accommodative.

The current purchases reduce interest rates and ease financial conditions through the same transmission channels as previous purchase programs. As has been widely discussed in the academic literature, one of the most important channels is the portfolio balance effect.⁴ This theory relies on the premise that financial assets are imperfect substitutes in investors' portfolios, and, as a result, a rise in the demand for a particular financial asset relative to its supply – reflecting the Federal Reserve's asset purchases, for example – will increase its price and reduce its yield. After selling that asset to the Federal Reserve, investors may rebalance their portfolios by investing in other assets, raising the prices of those assets, lowering their yields, and easing overall financial conditions.

The Federal Reserve's asset purchases are designed to remove risk from the portfolios of private investors. For example, Treasury and agency MBS purchases remove duration risk, thereby lowering longer-term interest rates and reducing private-sector borrowing costs. Furthermore, agency MBS purchases also remove prepayment risk from the market, since homeowners have the option to prepay their mortgages at any time. Investors generally demand an extra return to bear this risk, which is incorporated into agency MBS yields and passed along to borrowers in the form of higher primary mortgage rates. All else equal, the removal of a considerable amount of this risk by the Fed's purchases would be expected to lower agency MBS rates by lowering this extra return, thereby reducing primary mortgage rates, stimulating demand for housing, and prompting increased refinancing activity. Indeed,

³ See responses to [June 2012 Survey of Primary Dealers](#).

⁴ For example, see Brainard and Tobin (1968), Vayanos and Vila (2009), Li and Wei (2012), Gagnon et al (2010), Krishnamurthy and Vissing-Jørgensen (2011), and Hancock and Passmore (2011).

asset purchases do appear to have a meaningful impact on mortgage markets. For example, in the two days following the announcement of additional agency MBS purchases at the September 2012 FOMC meeting, agency MBS yields declined by roughly 30 basis points and option-adjusted spreads to Treasury securities narrowed by about 25 basis points. Over time, the primary mortgage rate also declined to about 3.3 percent, near its lowest levels on record.

Even though the Committee is communicating a monthly pace and composition of purchases, in my opinion, the predominant effect on interest rates from changes in the Federal Reserve's portfolio holdings comes from the expectations of the total stock of different risks that the Federal Reserve will remove from private investors and the length of time that it will hold these risks. The Desk's January Survey of Primary Dealers indicates that the median respondent expects the FOMC to purchase about \$1 trillion in securities over the course of 2013 and early 2014, roughly equally split between Treasuries and agency MBS.

As a group interested in forecasting, you will appreciate that while individual survey respondents may provide a modal expectation for asset purchases – that is, the total amount that they think the FOMC is most likely to purchase – they also place probability on a variety of other outcomes. If a respondent is more uncertain about the economic outlook, the way the FOMC will respond to the outlook, or the Committee's assessment of the efficacy and costs of purchases, he or she will place much higher odds on a wider range of outcomes for the size of the Federal Reserve's portfolio. The Survey of Primary Dealers asks respondents about their individual forecast distribution about the size of the Federal Reserve's portfolio in the future.⁵ These individual probability distributions can then be aggregated by simple averaging to form an estimate of the probability attached to different sizes of the Federal Reserve's portfolio.

The evolution of this probability distribution can be seen in **Figure 1**. As can be seen, the probability attached to a very small amount of purchases or a very large amount of purchases has come down over the last few months. The dispersion seen in this probability distribution can be attributed to two factors: *disagreement* across point forecasts and *uncertainty* around individual point forecasts.⁶

Uncertainty, which is calculated by first taking the standard deviation of each dealer's distribution and then averaging these individual uncertainties, provides a sense of how confident respondents are about their individual point forecasts. Based on this calculation, the uncertainty around dealers' expectations for the size of the SOMA portfolio at the end of 2014 is large. In fact, at around \$500 billion it is almost as large as the entire size of the large-scale asset purchase program announced in November 2010 or the MEP announced in September 2011. Moreover, this uncertainty has not changed significantly since the start of the purchases in September 2012. The dispersion around individual point forecasts likely reflects uncertainty about both how the economy will evolve and how the FOMC will adjust its purchases in response to changes in the economic outlook or changes in its understanding of the efficacy and costs of the policy.

Disagreement among dealers about the likely amount of purchases is measured as the standard deviation across their average forecasts for the size of the SOMA portfolio at the end of 2014. In the January survey, disagreement was about \$250 billion, significantly lower than its level in October.

Investors' disagreement and uncertainty about the overall stance of monetary policy will reflect their views on the future evolution of both the federal funds rate and the SOMA

⁵ See, for example, Question 8 in the [January 2013 Survey of Primary Dealers](#).

⁶ The measures of forecast uncertainty and disagreement discussed here are based on Rich and Tracy (2006) and Wallis (2004, 2005).

portfolio. One way to get a sense of the overall level of policy uncertainty is to convert the SOMA portfolio into “fed funds equivalents”.⁷ With this translation, it is possible to estimate the hypothetical level of the federal funds rate that would provide a similar amount of monetary policy accommodation as both the actual level of the federal funds rate and the size of the SOMA portfolio. **Figure 2** shows the disagreement and uncertainty around this measure of policy uncertainty 12 months in the future. Disagreement about current policy is quite low relative to the past few years, which likely reflects the effect of forward guidance on expectations about the federal funds rate and the relatively low disagreement about the size of the portfolio that I mentioned earlier. Uncertainty, on the other hand, is relatively high and larger than the amount of disagreement. Since there is very little uncertainty about the level of the federal funds rate one year from now, most of this effect comes from uncertainty about the size of the portfolio.

Implementation of the current asset purchase program

As you may know, one of the roles of the Desk at the New York Fed is to implement monetary policy, including the current purchase program, on behalf of the FOMC. As always, the Desk seeks to implement policy in a manner that obtains competitive prices in its transactions, minimizes market disruptions, and achieves the Committee’s policy objectives. I would like to take some time to explain how the Desk is conducting its operations, with a particular focus on our agency MBS purchases.

Outright purchases of agency MBS are executed in the To-Be-Announced, or TBA market. The TBA market is a forward market that is built around a trading convention that allows market participants to trade thousands of different agency MBS backed by millions of individual mortgages. The market uses only a few standardized contracts, which are grouped based on key characteristics such as the agency, term, coupon, or settlement date of the security that will be delivered. At the settlement date, TBA sellers have the option to deliver any agency MBS that meet the contract requirements. Sellers have an incentive to identify securities that are the most economical to deliver into the contract – these so-called “cheapest-to-deliver” agency MBS are generally the least valuable because their underlying mortgages tend to have higher prepayment risk. Of course, buyers in a TBA transaction understand that sellers will look to exercise their option of delivering these relatively less valuable pools, and the price of the TBA contract will reflect the expected value of these securities. Market participants who wish to trade in MBS with more favorable prepayment characteristics do so in the “specified pool” market, where specific agency MBS are traded at prices quoted as a spread above the corresponding TBA. In other words, TBA prices serve as a benchmark for pricing all agency MBS. The standardized nature of TBA contracts helps make a large segment of the agency MBS market effectively homogeneous and thus highly liquid – an important characteristic for implementing large-scale purchases of agency MBS.⁸

Within the TBA market, the “production coupons” are the contracts in which the bulk of newly issued agency MBS are delivered and most trading occurs. The coupon rates on the production TBA contracts are linked to the primary mortgage rate. As a highly stylized example, say a mortgage originator plans to securitize a group of mortgages with an average primary mortgage rate of 4 percent. The originator pays a fee of about 50 basis points to Fannie Mae, Freddie Mac or Ginnie Mae, in return for a guarantee on the principal and interest payments of the underlying loans. The originator is also required to retain at least 25 basis points to cover costs associated with servicing the loan. Since coupon rates on

⁷ Fed funds equivalents are calculated by comparing the change in the 10-year Treasury yield due to asset purchases to the change that historically occurred following movements in the target federal funds rate. This is a simple framework, so the uncertainty around this measure is likely large.

⁸ For more information on the TBA market, see Vickery and Wright (2013).

agency MBS are offered in 50 basis point increments, the originator might choose to sell the remaining cash flows to investors in the TBA market in the form of an agency MBS with a coupon rate of 3 percent and retain the remaining 25 basis points.^{9,10} In this case, the 3 percent TBA contract would be the production coupon.¹¹

The Desk focuses its purchases in production coupons because these securities are the most liquid segment of the TBA market and their yields are closely tied to the primary mortgage rate through the dynamics I just described. Purchases are distributed across different agencies, maturities, and coupons in amounts that are roughly proportional to anticipated gross issuance of those securities. Purchases lower the yield on these securities relative to where they would otherwise be, which should enable originators to offer lower mortgage rates to borrowers.¹² Lower borrowing rates should in turn help stimulate demand in the housing market, support home prices, and increase mortgage borrowers' purchasing power.

As I mentioned before, asset purchases affect interest rates in part by removing risk from investors' portfolios. Although it will not be the case in all interest rate environments, currently, purchasing newly issued production coupons removes from private hands securities that generally have greater exposure to duration risk, since the borrowers whose loans back these lower coupon agency MBS have limited incentive to refinance.¹³ Moreover, by purchasing in the TBA market, investors also ultimately deliver securities that have relatively more prepayment risk than the more valuable securities that trade as specified pools.

One difficulty with purchasing in a manner that is roughly proportional to anticipated gross issuance is that it can be difficult to forecast which securities will be produced in the future. Gross issuance of new securities changes over time, based on the level of refinancing and home purchase activity, and the production coupons will vary along with the overall level of interest rates. This uncertainty is compounded by the fact that TBA market transactions settle up to three months in the future, so in many cases the Desk is purchasing a security that has not yet been issued. For example, mortgage originators will often sell agency MBS backed by loans that they anticipate will close, which allows them to hedge the risk that interest rates will change in the period of time between when a borrower locks in his or her mortgage rate and when the securitized loan is sold. However, a different number of borrowers may actually receive loans than were assumed when the originator sold the forward TBA contracts, a condition that could result in a different amount of gross issuance than initially expected. Given the uncertainty around agency MBS issuance, at times we adjust our purchases when market functioning indicators suggest that particular securities are less readily available for

⁹ This extra 25 basis points is called "excess servicing".

¹⁰ For more information on mortgage origination process and the relationship between primary mortgage rates and yields on agency MBS, see Fuster et al (2012).

¹¹ Originators can also choose to originate in lower coupons by retaining more "servicing", or in a higher coupon – by paying the agency guarantee fee up front, as long as the coupon provides for the originator to still retain 25 basis points required to service the loans.

¹² Purchasing non-production coupons could also have an impact on the primary mortgage rate. Purchases of non-production coupons could increase the value of those securities relative to production coupons. This may prompt investors to rebalance their portfolios by shifting their positions into the relatively undervalued production coupons, lowering yields on the production coupon relative to where it would otherwise be.

¹³ An increase in interest rates may result in origination activity migrating to higher coupon agency MBS. This may result in the duration of lower coupon securities exceeding the duration of the new production coupon securities (because borrowers backing lower coupon MBS would not have an incentive to refinance their loans).

settlement relative to other securities.¹⁴ Another consequence of this uncertainty is that the Desk is not able to provide the same detailed guidance about the composition of its future agency MBS purchases that it does with its purchases of Treasury securities.

These same factors make it more difficult to determine *ex ante* the total amount and pace of securities that the Committee could purchase without causing market disruptions. For production coupon agency MBS with little outstanding stock available for trading – such as the 30-year 2.5 percent contract – there is risk associated with buying more than anticipated gross issuance. In the event of an increase in mortgage rates or a decline in refinancing activity, gross issuance of these securities could decline, leaving the market with less tradable supply. For TBA contracts with sizable outstanding stock, such as the 30-year 3 percent and 3.5 percent coupons, gross issuance may be a smaller concern, since market participants can deliver existing securities into TBA contracts. The total amount and pace at which the Desk could purchase in these TBA contracts would likely depend on the supply of securities that could be readily delivered and the willingness of investors to sell these securities from their portfolios.¹⁵

For these reasons, it can be useful to gauge our purchases both relative to gross issuance as well as the amount of outstanding stock that can likely be delivered into the Desk's TBA purchases. Since the current purchase program began, the Desk's purchases have accounted for about 50 percent of gross issuance on average, below the average monthly purchase rate of roughly two-thirds during the first round of large-scale MBS purchases in 2009. If refinancing activity declines, leading to a decrease in gross issuance, our purchases could exceed these levels. Such higher levels still seem unlikely to cause significant market functioning issues, given the considerable supply of existing stock that we believe could be delivered into the Desk's TBA purchases over time. Nevertheless, not all new securities are issued in the TBA market, and it is difficult to estimate future gross issuance, so the Desk monitors the purchasable supply of MBS closely.¹⁶

Purchases of Treasury securities are more straightforward, reflecting the relative simplicity of the market and our long history of operating in it. Treasury purchases are distributed across securities with different maturities, with the intent of removing a specified amount of duration risk from the market without causing significant market disruption. For recent programs, this maturity distribution has been announced at the outset, and a schedule of upcoming operations is released at the end of each month.¹⁷ Such transparency is possible because, unlike the agency MBS market, the composition of Treasury coupon securities available for purchase is reasonably predictable.

The current monthly pace of Treasury purchases is within the range seen during the Federal Reserve's previous asset purchase programs, whether measured in par terms or when adjusted for duration risk. Current SOMA holdings are less than 20 percent of coupon Treasuries outstanding, and our purchases make up only about 25 percent of monthly gross

¹⁴ For example, in January, the Desk decreased its purchases of 30-year fixed-rate 3.5 percent coupon agency MBS relative to projected gross issuance as a result of concerns about the near-term availability of this coupon for settlement and increased its purchases of 3 percent coupon agency MBS.

¹⁵ The Desk could also purchase from the stock of securities that trade as specialized pools, although such purchases may involve different efficacy and cost considerations.

¹⁶ For example, the percentage of securities issued outside of the TBA market has recently been higher due to programs like the Home Affordable Refinance Program (HARP). MBS backed by loans refinanced through HARP have lower prepayment risk than other MBS, because borrowers can only use the program once, and consequently are not typically issued in the TBA market.

¹⁷ Of course, this maturity distribution could change as part of the Committee's ongoing assessment of the economic outlook and the efficacy and costs of asset purchases.

issuance of coupon securities.¹⁸ We have a larger presence in the market for longer-term securities, with SOMA holdings making up about 35 percent of securities with four or more years to maturity.

The Committee carefully assesses the total amount, pace and composition of its purchases in part because it is aware of the potential for large-scale asset purchases to contribute to financial market dysfunction. Some on the Committee have listed financial market disruptions among the potential risks that they will consider as they evaluate the current purchase program. There is a finite supply of Treasury securities and agency MBS available to purchase, in terms of both total outstanding amount and how much is available for purchase in the market at any given time. If the Federal Reserve were to become too dominant a buyer or holder, it could reduce the tradable supply of these securities and discourage trading among market participants, leading to diminished liquidity and price discovery. A significant deterioration in liquidity could lead investors to demand a premium for transacting in these markets, ultimately raising borrowing costs and undermining the program's policy goal.¹⁹

With this concern in mind, the Desk closely monitors how our implementation of asset purchases impacts financial market functioning. In particular, we follow measures of market activity, such as trading volumes, bid-ask spreads, trade sizes, quote sizes, financing costs, and settlement fails, as well as other indicators. We also monitor indicators related to our operations, which can provide some direct insight into potential market functioning issues. These include the prices at which we can execute in comparison with prevailing market quotes, the extent and concentration of dealer participation in operations, and the ease of settlement of our MBS purchases. As an example, **Figure 3** and **Figure 4** show daily trading volumes and failures to deliver in the Treasury and agency MBS market. Based on these types of measures, our operations are going smoothly and market liquidity is holding up well.

In addition to this monitoring, we have developed active policies to help prevent market dysfunction as a result of our operations. In the Treasury market, the Desk ceases purchases of a specific security once SOMA holdings of that security reach 70 percent of the outstanding stock. In addition, when SOMA holdings of a specific issue exceed 30 percent of outstanding securities, the Desk limits the rate at which it acquires new holdings of that issue based on a predetermined, graduated schedule. The Desk also refrains from purchasing certain Treasury securities in its operations if investors' demand for those specific securities as collateral in the repurchase market or as deliverables into Treasury futures contracts is relatively high. In the event of significant market demand for specific Treasury collateral held by the SOMA, investors can borrow these holdings through competitive securities lending operations.

In the agency MBS market, the Desk is supportive of market functioning in two main ways. First, as I mentioned earlier, we adjust our purchase allocation as necessary to respond to concerns about relative scarcity in particular securities. Second, we use dollar roll transactions to facilitate the orderly settlement of our unsettled purchases.²⁰ Selling dollar roll

¹⁸ Some analysts calculate the Desk's Treasury purchases as a percentage of the Federal budget deficit. This approach overstates the Federal Reserve's role in the market since the Treasury is obligated to issue additional securities to finance direct loan accounts, most notably the Department of Education's Federal Direct Student Loan Program. In fiscal year 2013, the OMB estimates that the net effect of direct loan accounts on Treasury's borrowing needs will be about \$175 billion. (See the Fiscal Year 2013 Mid-Session Review).

¹⁹ For more information about liquidity premiums in the Treasury market, see Fleming (2002) and Fleming (2000).

²⁰ The Desk also has the ability to use coupon swap transactions to facilitate the settlement of its purchases, if needed. A coupon swap involves the sale of one agency MBS and the simultaneous purchase of another agency MBS with a different coupon. For example, in 2010 the Desk swapped unsettled Fannie Mae 5.5 percent coupon securities for other agency MBS that were more readily available for settlement.

contracts essentially postpones the settlement of an outstanding purchase, while buying dollar roll contracts brings it forward. The Desk actively monitors implied financing rates on dollar roll contracts for the securities that the Desk expects to be delivered. When implied financing rates reach levels notably below the general level of short-term interest rates, thereby signaling supply concerns, the Desk sells dollar roll contracts to postpone settlement of that outstanding purchase.²¹ Our dollar roll activity is consistent with the guidelines laid out by the Treasury Market Practices Group (TMPG), an industry group sponsored by the Federal Reserve Bank of New York. TMPG Best Practices encourage market participants who have amassed a particularly large position in the agency MBS market to manage that position mindful of the need to support market liquidity and to take care that sudden changes in trading strategies do not adversely impact liquidity or settlement.²² The Desk has often transacted in the dollar roll market when purchasing agency MBS to facilitate the orderly settlement of its purchases and will continue to do so as necessary to avoid deterioration in the liquidity of these contracts.²³

Developing and implementing policies that are supportive of market functioning and monitoring market liquidity on an ongoing basis are important elements of the Desk's work. However, actual or potential deterioration in financial market functioning is only one of many considerations in the FOMC's monetary policy decisions. Moreover, signs of stress, if they emerge, may be unrelated to Federal Reserve policy actions. Stresses in liquidity and market functioning could also be temporary, as the market learns to adapt to the Desk's presence in the markets. So far, though, there seems to be little evidence that the current pace of purchases is prompting deterioration in market liquidity or straining the market's ability to deliver securities.

Conclusion

Overall, I believe the Desk has effectively and efficiently carried out the FOMC's directive to purchase additional Treasury securities and agency MBS in a transparent fashion that achieves the FOMC's policy objectives, supports orderly market functioning, and obtains competitive market prices. I also believe that the Federal Reserve's balance sheet policies have been effective in easing financial conditions, particularly with respect to helping make historically low borrowing costs available to existing and prospective American homeowners, as well as lowering interest rates to spur business investment and household spending.

Thank you for listening to me today. I would be happy to take a few questions.

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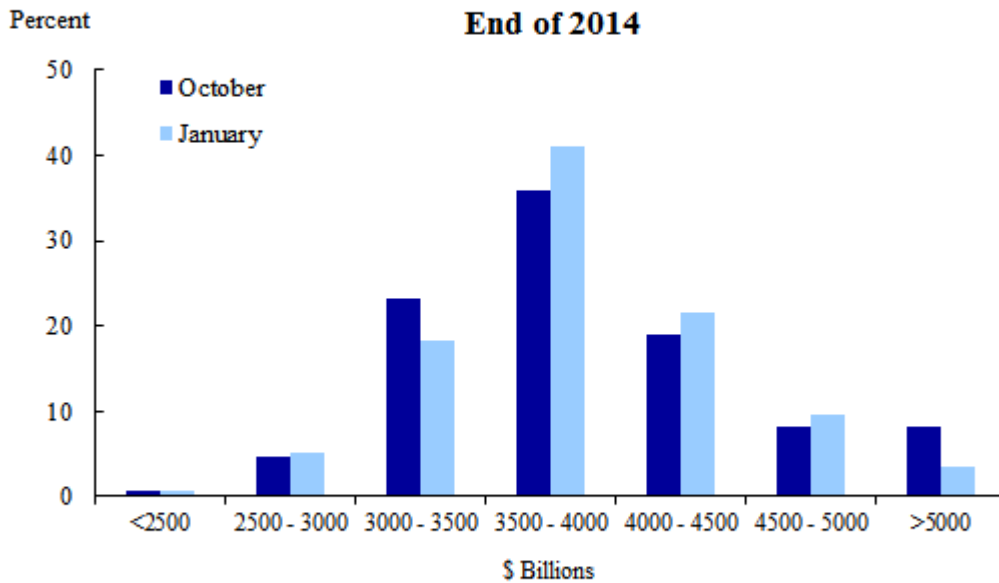
²¹ The Desk also purchases dollar roll contracts when implied financing rates are sufficiently positive. Such operations occurred in December 2011.

²² See [TMPG Best Practices for Treasury, Agency Debt, and Agency Mortgage-Backed Securities Markets.](#)

²³ Selling dollar rolls when concerns arise about the availability of certain TBA contracts is conceptually similar to making SOMA Treasury holdings available to the market through our securities lending program. One key difference is that the Desk offers settled Treasury holdings to the market through its securities lending program, whereas the Desk only rolls unsettled MBS holdings.

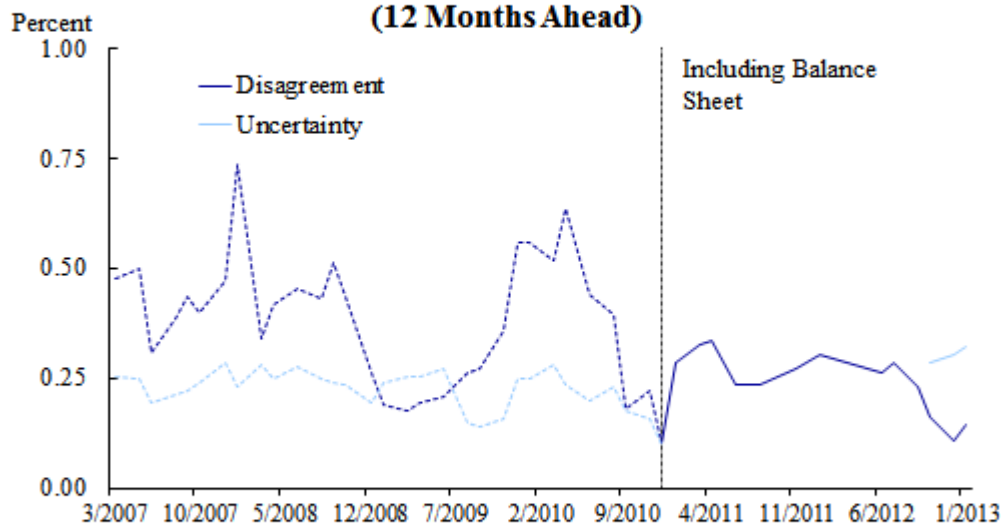
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Figure 1: Primary Dealers' Average Forecast Distribution about the Size of the SOMA Portfolio at the End of 2014



Source: Survey of Primary Dealers, Federal Reserve Bank of New York

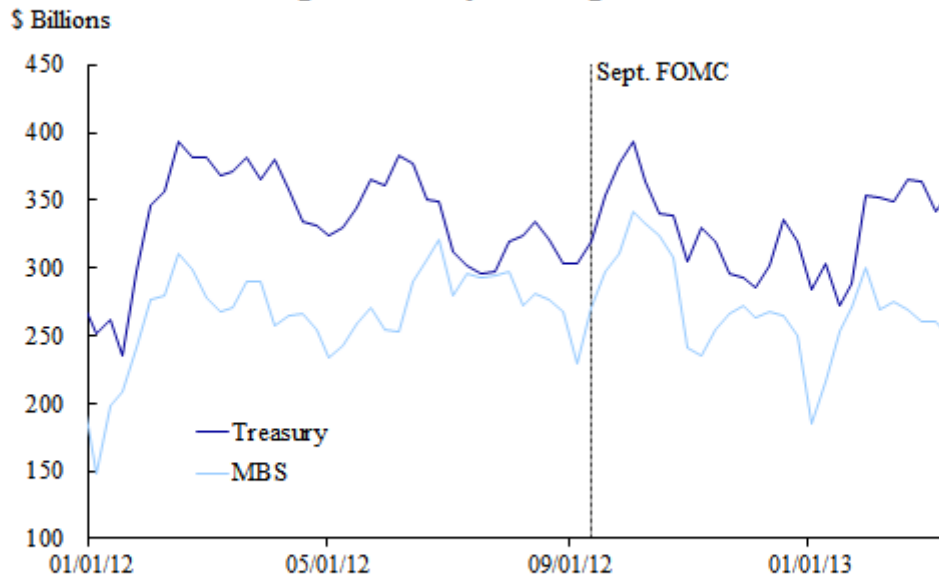
Figure 2: Primary Dealers' Overall Policy Forecast Dispersion in Fed Funds Equivalents* (12 Months Ahead)



*Dashed lines are measures for fed funds only; solid lines are overall policy uncertainty and disagreement.

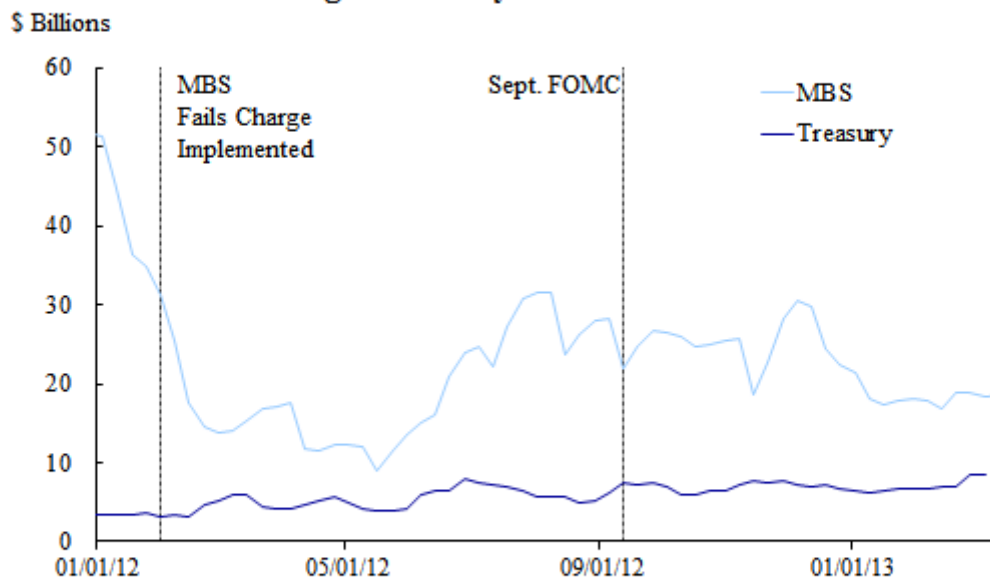
Source: Survey of Primary Dealer, Federal Reserve Bank of New York

Figure 3: Daily Trading Volumes*



*4-week moving averages of primary dealer volumes.
Source: FR.2004

Figure 4: Daily Fails to Deliver*



*4-week moving averages of primary dealer fails to deliver.
Source: FR.2004