October 16, 2020

Considerations for Asset Purchases[1]

In its September FOMC statement, the Committee indicated that over coming months it will increase Federal Reserve holdings of Treasury securities and agency mortgage-backed securities (MBS) at least at the current pace to sustain smooth market functioning and help foster accommodative financial conditions. With the Committee having updated its forward guidance (FG) for the federal funds rate in September, the Committee may want to next consider whether, and if so how, asset purchases should also evolve to support its maximum employment and price stability goals.

Any changes to asset purchases may depend on the Committee's specific objectives for purchases. In the current environment of very low Treasury yields, there may be limited scope to push yields signficantly lower. In part, these low yields reflect the public's expectations for ongoing Federal Reserve purchases, and thus one objective of purchases may be to sustain accomodative financial conditions. Additionally, an objective could be to help guard against the potential for undesired increases in interest rates. The Committee could also consider whether to continue referencing market functioning as an explicit objective of its asset purchases.

In pursuing its objectives, the Committee could adjust the pace and composition of its asset purchases, and could signal flexibility to make further adjustments in response to economic or financial developments. The Committee could also provide further guidance to the public about the horizon over which it expects to conduct asset purchases and could link that guidance to its objectives or to a specified time horizon. In either case, such guidance would need to be integrated with the FG that the Committee has provided for the federal funds rate to ensure that the two tools are not seen as working at cross purposes.

The remainder of this memo consists of two sections. The first section describes key considerations for adjusting asset purchases in the current environment. The second section lays out possible design features, including those related to the pace and composition of asset purchases. This section also discusses the issue of providing guidance to the public about future asset purchases and its interaction with the Committee's FG for the federal funds rate. Finally, it presents some illustrative examples of the types of guidance that could be provided regarding asset purchases,

[1] Board: Chris Gust and Zeynep Senyuz. FRBNY: Antoine Martin and Patricia Zobel. This memo benefited from inputs provided by Ellen Correia Golay, Brian Greene, Michael Lee, Arsenios Skaperdas, and James Trevino. We thank James Clouse, Michiel DePooter, Rochelle Edge, Lorie Logan, Joshua Louria, Jonathan McCarthy, Andrew Meldrum, Paolo Pesenti, Matt Raskin, and Trevor Reeve for their useful comments and suggestions.

including options for both date-based and outcome-based guidance as well as a fixed or flexible purchase pace.

1. Considerations for conducting asset purchases in the current environment

This section lays out three considerations relevant for conducting asset purchases in the current environment.[2] First, longer-term yields are already low and, relative to past episodes when the Committee conducted asset purchases, it may be more difficult or less effective to reduce longer-term yields significantly further through an expansion in longer-term security holdings. Second, the increase in Treasury debt issuance so far this year has already put upward pressure on term premiums. Given the uncertainty regarding fiscal policy, there is potential for fiscal surprises to put upward pressure on longer-term rates. An asset purchase program with some flexibility could help guard against undesired upward pressures on longer-term rates that could slow the economic recovery. Finally, many financial market participants currently expect the Committee to continue its asset purchases at the current pace at least through next year. With these expectations already influencing term premiums, further purchases may be required to sustain low yields.

A. Long-term yields are already very low

Exhibit 1 displays a history of the 10-year Treasury yield, comparing its current level to levels during asset purchase programs conducted following the Global Financial Crisis (GFC). As shown, prior to the pandemic, the 10-year Treasury yield was already at a historically low level. In March, as much of the economy was shut down to stem the spread of the virus, the 10-year Treasury yield fell sharply and it has been fluctuating around 70 basis points since then. Moreover, since March, Treasury yields across the maturity spectrum have remained very low.

Some research suggests that there may be diminishing returns to an expansion in the Federal Reserve's holdings of longer-term securities when yields move toward the effective lower bound (ELB) and their volatility declines.[3] Such an expansion provides accommodation in part by lowering term premiums through a reduction in interest-rate or duration risk faced by investors. As shown in Exhibit 2, the implied volatility of longer-term yields is considerably below levels when previous asset purchase programs were conducted. This decline in volatility and the potential for reduced interest-rate fluctuations due to an extended ELB spell suggest that the duration risk embedded in Treasury securities is already low and so a given quantity of asset purchases may remove less duration risk from the market than during the previous crisis. However, asset purchases may still be effective

[2] For a broader discussion of the benefits and costs of balance sheet policy as well as a discussion of the empirical evidence regarding its effectiveness, see Carlson *et al*. (2020). For a discussion of the potential effects of increasing reserves in the banking system, see the forthcoming FOMC memo titled "Assessing Risks Related to Adding High Levels of Reserves to the Banking System."

[3] See, for example, King (2019), who finds that duration risk may be less of a concern to investors in a low interest-rate environment, because the expectation for an extended spell at the ELB by itself serves to reduce this risk.

through other channels such as the scarcity/supply (also known as the portfolio balance) channel, and studies that take into account expectations of future purchases generally find that the effectiveness of asset purchases through these channels has not diminished over time. Additionally, asset purchases have signaling effects and could still be effective in reinforcing the credibility of the Committee's FG for the federal funds rate.

The scope to use the balance sheet to further reduce longer-term Treasury yields may be limited if Treasury yields are subject to an ELB. In a recent paper, Gagnon and Jeanne (2020) argue that the scope for nominal bond yields to fall below zero is strictly limited by investors' perceptions of how far below zero the central bank is willing to set its policy rate. That is, arbitrage opportunities available to investors may mean that the lower bound for the policy rate is a lower bound for nominal interest rates at all maturities.[4] In recent outreach, market participants have been mixed on whether there is a firm lower bound on longer-term Treasury yields and most do not perceive a hard floor. Even if a lower bound becomes a binding constraint, asset purchases can still be effective at sustaining the current level of yields and in offsetting upward pressure on longer-term rates. Moreover, the issue of a lower bound for longer-term rates may become less relevant going forward, given that many private-sector forecasters project the 10-year Treasury yield to rise over time.

B. High levels of Treasury issuance present risks of higher yields

Another important consideration is that asset purchases are being conducted against a backdrop of substantial Treasury debt issuance to finance continuing large budget deficits. Historically, the Treasury has gradually increased the weighted average maturity (WAM) of its issuance in order to finance large deficits.[5] While fiscal spending can be effective for stimulating economic activity, the associated higher debt issuance—particularly at longer tenors—can put significant upward pressure on term premiums.

While there is considerable uncertainty about fiscal policy going forward, Treasury debt issuance increased substantially this year with the economic downturn and passage of the CARES Act. Consistent with past Treasury practices to finance large deficits, Treasury first met its financing needs this year by increasing Treasury bill issuance, and then by gradually increasing the amount and the weighted average maturity (WAM) of its coupon issuance. So far this year, Treasury has pushed out the WAM of its coupon issuance to a greater extent than in prior episodes in which it has financed large deficits; the additional notes and bonds issued since April relative to issuance levels earlier in the year have had a WAM of nearly 11 years, compared with 6 years for the additional issuance in the

[4] Gagnon and Jeanne (2020) abstract from frictions in Treasury markets that may limit arbitrage opportunities. To the extent that such frictions are present, longer-term rates could in principle fall below the overnight ELB.

[5] See Skaperdas (2020) for more information on Treasury's debt management practices and potential implications of Treasury's issuance for longer-term yields. As shown there, there is an economically meaningful and statistically significant relationship between the WAM of Treasury issuance and the size of the government budget surplus/deficit over the 1962-2019 period.

period following the Global Financial Crisis.

Prospects for additional fiscal policy stimulus to address the economic effects of the pandemic remain highly uncertain. If fiscal actions provide less support than expected, then a further expansion in the balance sheet may be useful to help support continued economic recovery. In circumstances in which Treasury debt issuance was higher than expected, balance sheet policy could help guard against undesirable upward pressure on longer-term rates.

To highlight this possibility, Exhibit 3 shows estimates of upward pressure on the ten-year Treasury yield from the Li-Wei term premium model due to increases in expected Treasury debt issuance since January.[6] Since January, Congressional Budget Office (CBO) projections of Treasury debt issuance have increased significantly over the next several years. As shown by the solid black line, these increases as well as a projection for the maturity of Treasury debt to gradually lengthen out over time are expected to boost the path of the term premium by nearly 150 basis points over the next few years relative to its pre-pandemic level. This estimate is based on the historical relationship between the ten-year Treasury term premium and the public's debt holdings before 2008 when the level and volatility of yields was higher. If the duration-risk channel has diminished, as discussed above, this estimate may overstate the effects of issuance on term premium, and the dashed red line shows an alternative estimate in which the term premium effects are lower.[7] In this case, the projected increases in Treasury debt issuance since January boost the term premium path about 85 basis points above its pre-pandemic level.

The model estimates of upward pressure on longer-term rates shown in Exhibit 3 stem from actual and projected increases in the current and expected future levels and weighted average maturity of Treasury debt outstanding since January. Current yields may already reflect these projections. As discussed further below, the high uncertainty surrounding fiscal policy and its effects on longer-term rates and the economy suggests that allowing securities holdings to evolve flexibly depending on economic and financial conditions could be beneficial.

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[6] In the Li-Wei model, the 10-year term premium is affected by the current and expected future path of debt held by the public expressed in 10-year duration equivalents. Exhibit 3 shows the partial effects on the term premium from greater Treasury issuance since January and not the net effect inclusive of changes in the Federal Reserve's asset holdings. The model's partial effects on the term premium of increases in projections for the Federal Reserve's Treasury and MBS holdings are discussed later in Exhibit 6, and the model's net effects are discussed there as well.

[7] The effects on term premiums shown by the solid black line are based on estimates of the Li-Wei model using data through 2008. The red dashed line adjusts the estimated responsiveness of the term premium to the amount of duration-equivalent debt held by the public in the model down by 40 percent, which is roughly the decline in the market implied volatility for longer term yields from 2009 to 2020. A 40 percent decline in this responsiveness is somewhat smaller than the estimates in King (2019), who emphasizes that the responsiveness of the term premium to the public's duration-equivalent debt holdings depends on the length of time the policy rate is expected to remain at the ELB with longer spells diminishing the response more than shorter ones. Because the attenuation effect is nonlinear and depends on the expected length of an ELB spell, its magnitude is difficult to determine with much precision.

C. Further asset purchases are expected

Since the GFC, market participants have increasingly come to expect the FOMC to use asset purchases to provide additional accommodation when interest rates are constrained by the ELB. Indeed, the FOMC has continued to conduct significant purchases even as indicators of market functioning have largely normalized following the pandemic-related turmoil in the spring. FOMC communications, including those associated with the strategic review, have reinforced the perception that the Committee views asset purchases as an important tool of policy. Expectations that the Committee will conduct asset purchases along with FG for the federal funds rate during an economic downturn can lower longer-dated yields and support accommodative conditions. Asset purchases can also have a signaling effect and can reinforce the Committee's FG for the federal funds rate.

The current low levels of yields reflect the effects of the significant increases in securities holdings to date, the Committee's guidance for the federal funds rate, and market expectations for further expansion of the Committee's securities holdings. Precisely gauging asset purchase expectations embedded in yields is challenging, as yields reflect a range of projections for the economic outlook, investor preferences, and a broad spectrum of expectations regarding the pace and composition of increases in the Federal Reserve's securities holdings. Staff use surveys, market commentary and outreach to try to understand the range of views held by financial market participants.

In the September Desk surveys, median expectations for the most likely level of net Treasury and agency MBS purchases through 2023 totaled more than $2 trillion, although, as shown in Exhibits 4 and 5, the interquartile ranges of these expectations were quite wide.[8] Recent market commentary suggested that net purchases are expected to continue at the current pace of $80 billion per month for Treasury securities and $40 billion per month for agency MBS over the near future. Some market participants indicate that they expect the composition of Treasury purchases to shift towards longer-dated securities. The October/November Desk surveys will provide an update of market participants' asset purchase expectations.

Exhibit 6 shows estimates of downward pressure on the ten-year Treasury yield from the Li-Wei term premium model due to increases in SOMA securities holdings. The solid green line shows the estimated reduction in the term premium stemming from the increase in securities holdings since January as well as assumptions in the September Tealbook regarding asset holdings going forward. Since January, the path of the effect of the Federal Reserve's asset holdings on the term premium has been revised down by nearly 100 basis points. Participants in the Desk Surveys generally expect greater asset purchases than projected in the September Tealbook. Accordingly, if purchases instead

[8] The survey does not provide information on the expected maturity composition of purchases.

are projected to follow the median path from the September Desk Surveys, the estimated reduction in the term premium is about 150 basis points, as shown by the dashed blue line.[9]

2. Key structural elements of asset purchases

This section describes the key elements of asset purchases that the FOMC could adjust to achieve its objectives. It first describes how the Committee could change the overall pace of purchases, the maturity of Treasury purchases, and the split between Treasury and agency MBS purchases to modify the amount of accommodation provided. By changing the maturity composition of purchases, the FOMC could increase accommodation without changing the pace of purchases, or reduce the pace while maintaining the current level of accommodation. The Committee could signal some flexibility to change these parameters over time.

Second, the section reviews considerations around the additional guidance that could be provided regarding the horizon of asset purchases. While specifying a date-based horizon could provide clear communications on the Committee's intentions, specifying a state-based horizon would be more responsive to changes in economic conditions. Finally, interactions between the guidance about asset purchases and the policy rate FG are considered.

Examples of how these parameters could be combined are included in a summary table at the end of this section.

A. Purchase structure

Pace of purchases: Currently, the Committee is increasing its securities holdings by $120 billion per month, and market participants generally expect this pace to continue through 2021. The Committee could sustain this existing pace of purchases or adjust the pace if it wished to provide more or less accommodation. The amount of accommodation provided by purchases is typically believed to depend primarily on the total stock of purchases rather than the monthly flow. Hence, a higher monthly pace of purchases over a shorter period of time could be equivalent in terms of overall accommodation to a lower monthly pace over a longer period.

[9] Because the model is linear, the net effect on the term premium from the greater Treasury issuance, inclusive of the change in Federal Reserve's asset holdings, can be obtained as the sum of the effects of the black line in Exhibit 3 and one of the lines in Exhibit 6. Although there is considerable uncertainty around these estimates, the model suggests that if future Fed purchases follow a path roughly consistent with the median expectations from the September Desk Survey, the effects of these purchases would roughly offset the upward pressure coming from the projected increase in Treasury issuance over the next few years.

For historical comparison, while the current dollar amount of Treasury purchases is higher than that of asset purchase programs conducted after the GFC, the pace relative to the size of the Treasury market or as a share of GDP are within the ranges of previous programs, as shown in the appendix table. For agency MBS, the monthly increase in holdings since June 2020 is the same as it was during LSAP 3, which is $40 billion per month. In addition, principal payments are reinvested. The current pace of gross agency MBS purchases as a share of issuance is lower than during LSAP 3 and the share of SOMA holdings as a percent of agency MBS outstanding remains below its 2014 peak.[10]

Maturity of Treasury purchases: Current purchases include a substantial amount of shorter-dated securities, which provide very little accommodation through the duration-risk channel. As such, there may be some potential to add accommodation without changing current total purchase amounts, or to leave accommodation unchanged and reduce the purchase amounts. For example, if purchases in the 0-3 year sector had been reallocated across other nominal coupon sectors in recent months, the estimated 10-year equivalent amount of monthly purchases would have increased about $30 billion, from approximately $50 billion per month to almost $80 billion (See Exhibit 7).[11] Even if the maturities of purchases are lengthened, some shorter-dated securities may be helpful to maintain a presence for market functioning purposes.

Treasury and agency MBS composition of purchases: Currently, Treasury securities comprise two-thirds and agency MBS one-third of the increase in SOMA holdings each month. Purchases of agency MBS provide accommodation through similar channels as purchases of Treasury securities and, in addition, lower MBS yields by an additional increment by removing prepayment risk from the market. This additional channel may make the effectiveness of MBS purchases somewhat less sensitive to the diminished role of the duration-risk channel when longer-term rates are low.

In June, SOMA holdings of agency MBS as a percentage of the universe outstanding stood at 26.5 percent. At the current net purchase pace of $40 billion per month, and assuming zero net issuance, SOMA holdings as a percent of outstanding would hit 32 percent, the peak share from LSAP 3, in April 2021.[12]

While these statistics suggest some space to add to the pace of net MBS purchases, the scope for an increase may be limited for market functioning reasons. In the aftermath of the GFC, Fannie and Freddie were unwinding their portfolios, and the Federal Reserve was absorbing that selling in

[10] See appendix for more detail.

[11] An increase in 10-year equivalent amount of purchases by $10 billion per month over the next two years is estimated to make the TTPE 5 basis points more negative at the end of 2023.

[12] While unlikely, zero net issuance is possible and is chosen as a very conservative assumption. In the last ten years, the agency MBS market has increased by about 2.5 percent per year though this number has varied. Net issuance is difficult to predict because it is highly dependent on the path and level of mortgage rates, the demand for housing and securitization rates.

addition to MBS originations. There is no such natural seller in the current environment. And, although MBS issuance is currently at record levels, if rates increase, it could drop off sharply and the current purchase amounts would increase as a share of issuance.

B. Flexibility in purchase structure

An important consideration for the Committee is how significant a change in the outlook would have to be to warrant a change in the structure of its asset purchases. That threshold could be high, similar in spirit to previous LSAPs, at least ex post. However, given the uncertainty associated with the outlook and the low level of current yields, the Committee may want to consider alternatives that emphasize its flexibility to adjust the pace, maturity, or composition of purchases as economic or financial conditions evolve.

Fixed program: A fixed program would specify the initial parameters of asset purchases and would not alter the pace or composition in response to changes in economic or financial conditions, unless there were significant changes in the economic outlook. This type of program would provide clarity on the purchases and would be familiar to market participants, as it has been the standard approach to asset purchases in the past. The first two examples in the summary table below provide illustrations for a fixed program.

Flexible program: A flexible program would specify the initial parameters of monthly purchases and emphasize that these parameters could be adjusted over time as necessary. This could signal a willingness to provide more accommodation if economic conditions deteriorate, or less if purchases appeared to be causing problems with market functioning or posing other risks. The Committee could specify which parameters of the program would be expected to remain fixed and which would likely be modified. Examples 3, and 4 in the summary table, provide illustrations for a flexible program.

While retaining flexibility to adjust purchases may be beneficial for responding to evolving conditions, it may be difficult for market participants to understand the Committee's policy intentions or reaction function. Accordingly, there could be increased uncertainty about the ultimate stock of securities that the Committee will purchase, with implications for the yield effects as well as increased volatility in market participants' expectations regarding future asset purchases. There is also a risk that market participants' expectations for purchases could differ from those of the Committee. Given

these uncertainties, it may be challenging for the Committee to determine whether certain adjustments to purchases will achieve the intended goal.[13]

Flexibility for market functioning: The current FOMC statement refers to sustaining "smooth market functioning" as an objective of the asset purchases. The Committee may want to retain the flexibility for the Desk to respond to any deterioration in market functioning by changing the pace or composition of purchases.[14]

C. Guidance on purchase horizon

Currently, the FOMC is providing guidance that asset purchases will continue "over coming months." In evolving the guidance on the expected horizon for asset purchases, the Committee could choose to specify a date at which the asset purchases would cease or taper, or a set of circumstances that need to be satisfied. We consider each case in turn.

Date-based guidance: Specifying a date at which asset purchases would cease or taper could provide clear communication on the FOMC's intentions. A key consideration is choosing a date. For a given monthly pace of purchases, providing a longer horizon can signal stronger support for the economy. However, date-based guidance is inflexible to new information, which may be problematic over longer time horizons, especially in situations with a highly uncertain economic outlook. A long horizon could result in asset purchases continuing longer than needed to support the recovery, potentially increasing risks to financial stability or an overshoot of inflation that is larger or longer than desired. Example 5 in the summary table provides an illustration for date-based guidance.

Specifying a near-term date could reduce the risks that may come with a long-lasting program amid a highly uncertain outlook. However, a near-term date could be viewed by market participants as providing insufficient commitment to providing accommodation. A near-term date could be accompanied by additional wording, such as "at least until," suggesting that purchases could continue past the specified date. Even so, market participants could interpret such language as signaling that the Committee intends to provide less accommodation than is currently expected.

State-based guidance: State-based guidance would tie the purchase horizon to the degree of progress toward the FOMC's goals. Purchases with state-based criteria would be more responsive to changes in economic conditions and could be perceived as a stronger signal of the FOMC's

[13] As an example, if market participants expect more accommodation than the Committee expects to provide, then even an accommodative change in purchases could lead to an unexpected tightening in financial conditions as market participants revise their expectations.

[14] If the Committee decides to omit this language for Treasury securities and agency MBS, it would need to decide whether to continue purchases of CMBS for market functioning purposes.

commitment to its macroeconomic objectives. The responsiveness provided by state-based guidance may be particularly valuable in the case of fixed-pace purchases, which would have less flexibility to adjust the pace of purchases based on changes in the outlook. Examples 6, 7, and 8, provide illustrations for state-based guidance. Example 6 uses language similar to the Bank of Canada while example 8 uses language similar to the European Central Bank.[15]

State-based guidance could result in an extended period of purchases if progress toward the Committee's goals is slow. This type of guidance may be particularly binding if the stated thresholds are very specific. More general guidance, using wording such as "until substantial progress is made," could reduce these risks. Another possibility is that the Committee could initially provide more general guidance and update the guidance over time, becoming more specific as the end of purchases gets closer.

State-based guidance that refers to more general conditions could raise communication challenges similar to those described above for flexible purchases. It may be difficult for market participants to understand the Committee's reaction function and could result in challenges around communications about the end of purchases. In addition, any threshold for the tapering and then ending of asset purchases, such as that which might be used with more specific guidance, would need to align with interest-rate guidance.

D. Interaction of asset purchases with FG

Regardless of the structure of the program, FOMC communications on asset purchases should be well integrated with FG for the federal funds rate, so that the Committee's different tools do not work at cross purposes or communications are not overly complex.

In the case of a date-based program, an important consideration is the sequencing of the end of asset purchases and the first increase in the target range for the federal funds rate. The Committee may want the date specified for the end of asset purchases to occur before the conditions for an increase in the target range are met. This sequence would imply that purchases would stop adding accommodation before the removal of accommodation through a rate hike occurs.

In the case of a state-based program, the Committee may want to consider how the criteria that would define the end of the purchases align with the existing FG for the policy rate. One option could be to keep the communication about the asset purchase program at a high level. Alternatively, the FOMC may prefer to provide guidance based on specific thresholds for economic variables such as unemployment or inflation. Examples 6 and 7 provide illustrative language for each case.

[15] See the accompanying memo titled "Ongoing Asset Purchases at Foreign Central Banks" for a discussion of asset purchase programs undertaken by foreign central banks in response to the economic effects of the pandemic.

Summary table

Pace and maturity of asset purchases

Example 1 (fixed current pace): *…the Federal Reserve will continue to increase its holdings of Treasury securities and agency mortgage-backed securities at the current pace…*

Example 2 (fixed specific pace**)**: *…the Federal Reserve will increase its holdings of Treasury securities by $X billion per month and of agency mortgage-backed securities by $Y billion per month until….*

Example 3 (partially flexible pace of purchases with change in maturity structure**)**: *…the Federal Reserve will increase its holdings of longer-dated Treasury securities by* ***at least*** *$X billion per month and of agency mortgage-backed securities by* ***at least*** *$Y billion per month until… The composition of purchases of Treasury securities will be weighted toward those with longer maturities*.

Example 4 (flexible pace of purchases): *The increase in holdings will initially occur at a pace of $X billion and $Y billion per month for Treasury securities and agency MBS, respectively. The Committee will adjust the pace and composition of these purchases in coming months if appropriate to [maintain accommodative financial conditions | support the attainment of its employment and inflation objectives]*.

Date-based program

Example 5: *…the Federal Reserve will increase its holdings of Treasury securities and agency mortgage-backed securities … [at least] through [December 2021] [to help foster accommodative financial conditions / to support the attainment of the Committee's employment and inflation goals.]*

State-based time horizon

Example 6 (general objective, similar to the approach taken by the Bank of Canada): *…the Federal Reserve will increase its holdings of Treasury securities and agency mortgage-backed securities… until [the economy is substantially closer to the Committee's employment and inflation goals | substantial progress has been made toward the Committee's employment and inflation goals.]*

Example 7 (more specific objective): *...the Federal Reserve will increase its holdings of Treasury securities and agency mortgage-backed securities ... at least until labor market conditions [have reached | are close to] the Committee's assessments of maximum employment and inflation is near 2 percent*.

Example 8 (refer to the timing of the first rate increase, similar to an approach taken by the European Central Bank): *...the Federal Reserve will increase its holdings of Treasury securities and agency mortgage-backed securities ... at least until [some time | shortly] before the Committee expects to start raising the target range for the federal funds rate.*

References

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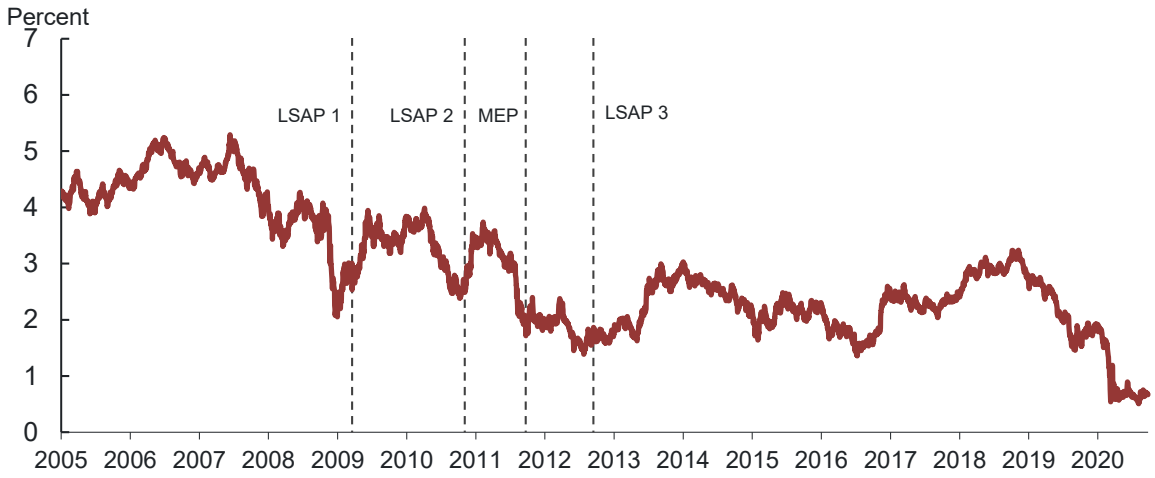
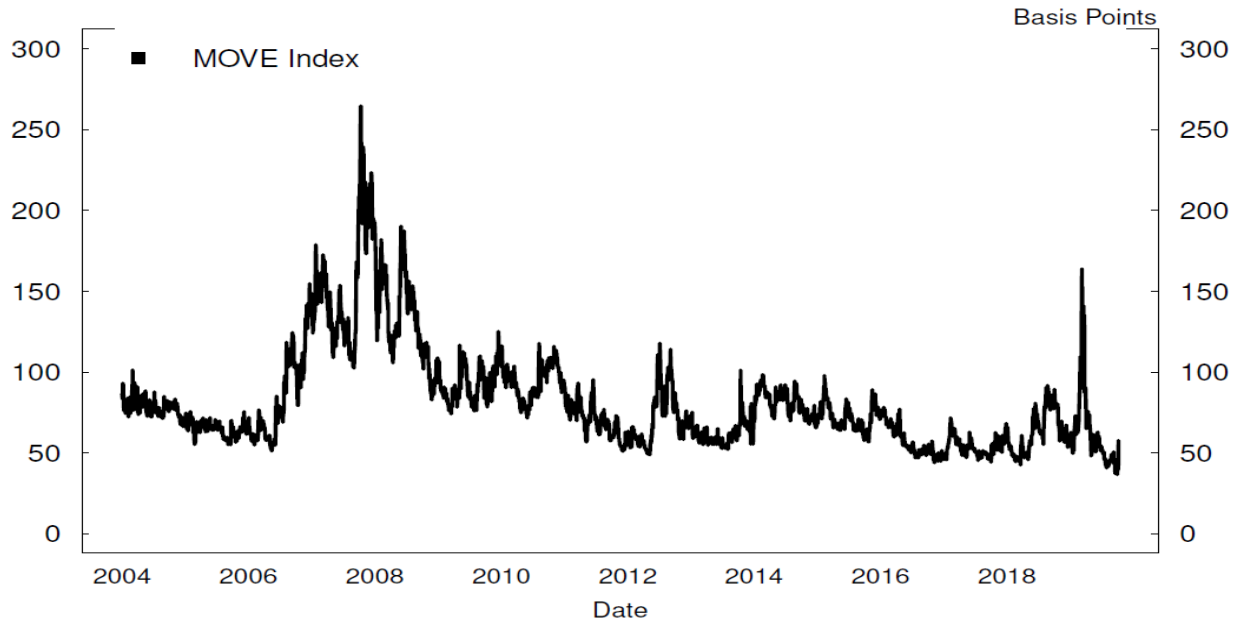
Exhibits

Exhibit 1: 10-Year Treasury Yield



Note: Tripwires represent announcement dates for each program.

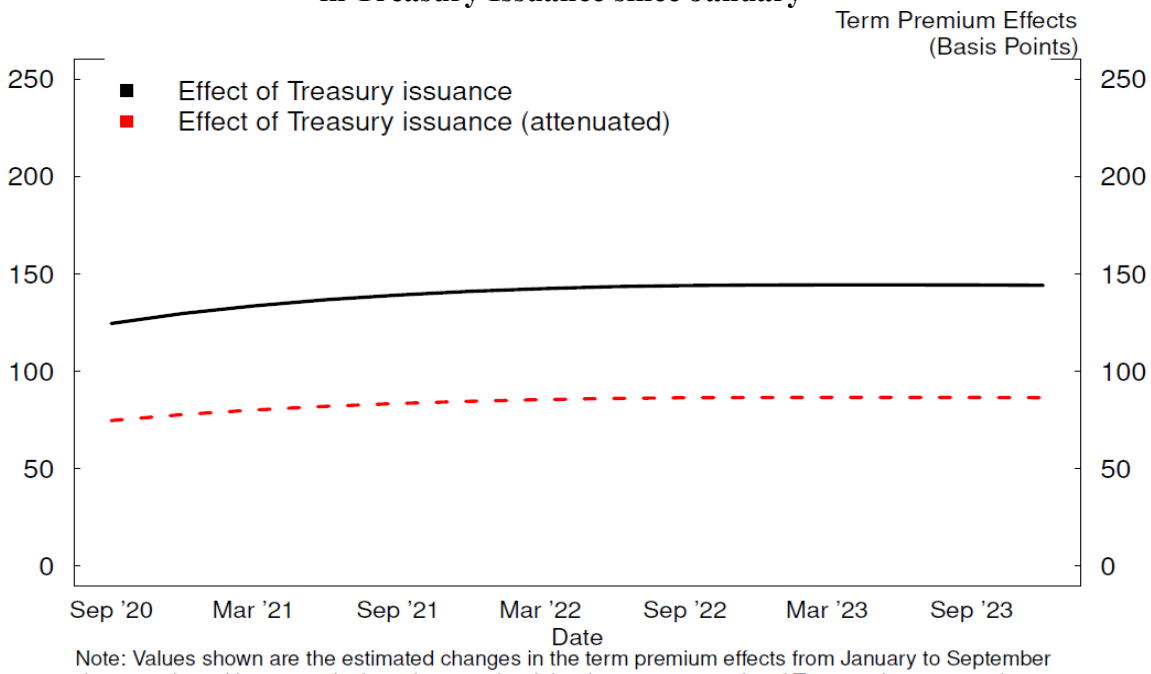
Exhibit 2: Implied Volatility for U.S. Treasury Options



Source: MOVE Index, Bloomberg, Bank of America

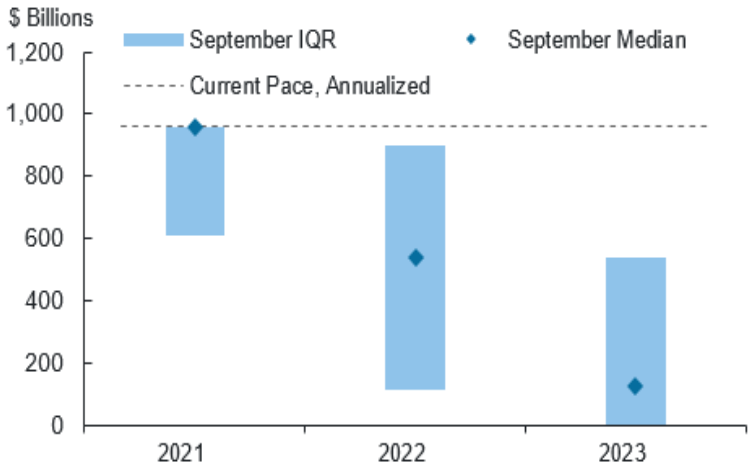
Note: The MOVE Index is a yield curve weighted index of the normalized implied volatility on 1-month Treasury options. It is the weighted average of 1m2y, 1m5y, 1m10y and 1m30y Treasury implied volatilities with weights 0.2/0.2/0.4/0.2, respectively.

Exhibit 3: Estimated Effects on the 10-Year Treasury Term Premium from Projected Increases in Treasury Issuance since January



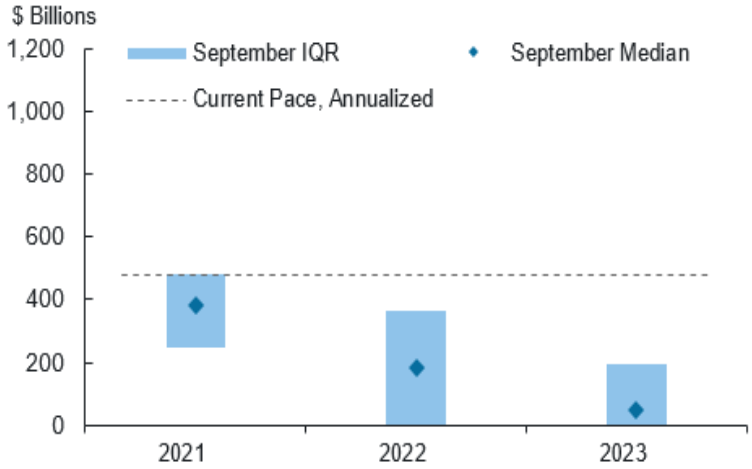
Note: Values shown are the estimated changes in the term premium effects from January to September due to projected increases in the volume and weighted–average maturity of Treasury issuance, using the Li–Wei model.The black line shows the standard estimate and the dashed red line shows an alternative estimate in which the term premium effects are lower.
Source: January and September Tealbooks, CBO projections, and staff calculations.

Exhibit 4: Expected Net Treasury Purchases



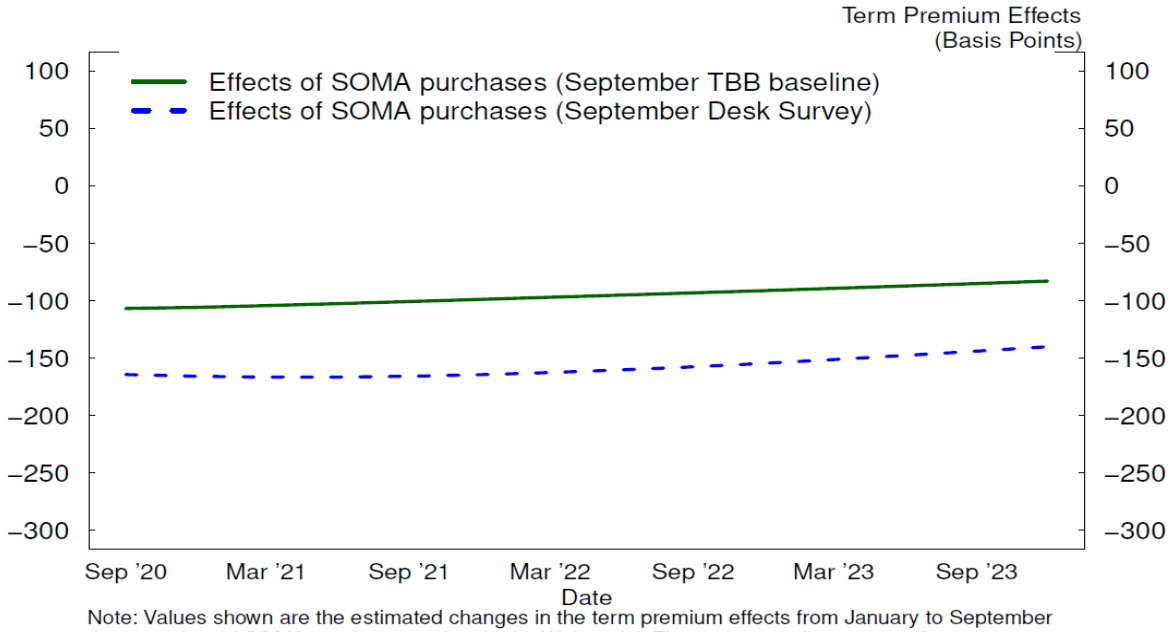
Note: 2023 was not asked in the July survey. Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

Exhibit 5: Expected Net MBS Purchases



Note: 2023 was not asked in the July survey. Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

Exhibit 6: Estimated Effects on the 10-Year Treasury Term Premium from SOMA Purchases since January



Note: Values shown are the estimated changes in the term premium effects from January to September due to projected SOMA purchases, using the Li–Wei model. The dark green line uses projected purchases in the September Tealbook (through 2020), while the dashed blue line uses projected purchases in the September Desk Survey of Market Participants (through mid–2023).
Source: January and September Tealbooks, September Desk Survey of Market Participants, and staff calculations.

Exhibit 7: Asset Purchase Allocations

Table 1. August 2020 purchase month allocation

	Total Par Purchased ($MM)	Ten-Year Equiv. ($MM)	Wtd. Avg. Duration
0-3 years	$35.1	$5.9	1.6
3-7 years	$20.1	$9.8	4.7
7-20 years	$7.2	$6.7	8.9
20-30 years	$10.4	$21.3	19.5
TIPS	$7.2	$6.0	8.0
Total	$80.0	$49.7	5.9

Table 2. August 2020 purchase month allocation - 0-3 reallocated across curve

	Total Par Purchased ($MM)	Ten-Year Equiv. ($MM)	Wtd. Avg. Duration
0-3 years			
3-7 years	$38.8	$18.9	4.7
7-20 years	$13.9	$13.0	8.9
20-30 years	$20.1	$41.1	19.5
TIPS	$7.2	$6.0	8.0
Total	$80.0	$78.9	9.4

Appendix: Comparisons with previous purchase programs

Comparison of previous Treasury purchase programs

- During LSAP 3 the Desk purchased Treasuries at a pace of $45 billion per month from 2012 through 2013, tapering purchases thereafter. Over this time, purchases as a percent of Treasury issuance outstanding averaged approximately 0.4 percent per month, while purchases as a percent of GDP averaged approximately 0.25 percent per month and as a percent of monthly FR2004 Treasury trading volume averaged approximately 0.5 percent per month. Currently, the Desk is purchasing Treasuries at a pace of $80 billion per month, which measured as a share of Treasury issuance averages approximately 0.4 percent per month, and as a share of GDP approximately 0.4 percent per month and as a share of FR2004 Treasury trading volume averages approximately 0.7 percent per month.
- The average duration of purchases in LSAP 3 was 9.5 years, vs. 5.7 years for the current program.
- At the high point following LSAP 3, the SOMA Treasury portfolio comprised roughly 19 percent of Treasuries outstanding and was 13 percent of GDP. Currently, the SOMA Treasury portfolio is roughly 22 percent of Treasuries outstanding and 23 percent of GDP.

Comparison of previous MBS purchase programs – gross purchases vs. gross issuance:

- During LSAP 3 the Desk purchased MBS at a pace of $40 billion per month, plus reinvestments, starting in September 2012 and lasting through December 2013. Over this time gross purchases ($40/month + reinvestments) as a percent of gross issuance (new issuance + issuance from refinancing activity) averaged approximately 58 percent per month (range: 43 percent to 79 percent). The Desk began to taper purchases in January of 2014, but purchases as a percentage of gross issuance actually increased during the first half of 2014 (73 percent on average) as issuance declined substantially as result of higher mortgage rates.
- Starting in June 2020 the Desk once again began purchasing at a pace of $40 billion per month plus reinvestments (gross monthly purchases of $100 to $110 billion). Over this three-month period gross purchases as percent of gross issuance averaged about 36 percent as issuance has hit three consecutive monthly records (August was $323 billion). Issuance is expected to continue to be sizable in the near term as mortgage rates hover near record lows, however, should rates increase, issuance would likely decline substantially

Comparison of previous MBS purchase programs – SOMA holdings vs. mortgage outstanding:

- The high watermark for SOMA holdings as a percent of agency MBS outstanding came in 2014 at 32.1 percent, at the end of LSAP 3. At this level of holdings, the Desk did not observe any deterioration in MBS market functioning. It is also useful to look at SOMA holdings as a percent of total family residential mortgages outstanding since commercial banks will often hold agency-eligible whole loans on their balance sheet in lieu of securitizing them. In 2014, this amounted to 17.5 percent.
- At the end of Q2 2020, SOMA held nearly $1.9 trillion in agency MBS or about 26.5 percent of agency MBS outstanding at that time. The equivalent amount as a percent of 1-4 family residential mortgages outstanding is 16.7 percent. These differences in holding percentages are consistent with higher securitization rates in recent years.

Comparison Table of Treasury Purchase Programs

	LSAP 1	LSAP 2 + Reinvestments	MEP	LSAP 3	Market Functioning*
Announcement Date:	03/18/2009	11/03/2010	09/21/2011	2/2012 (started) 12/18/2013 (taper)	15/2020 - Ongoing
Program Type:	**Fixed Quantity**	**Fixed Quantity**	**Fixed Quantity**	**State-Based**	**Open Ended**
Announcement:	Purchase $300 billion by end of 2009	$600 billion at about $75 billion per month	$400 billion to June 2012 + $45 billion per month to 12/2012	Until improvement in labor market (later changed to economic objectives and inflation)	Initially $500 billion, then "in the amounts needed", and then "at the current pace"
Total Par:	$300 billion	$600 billion LSAP 2, $211 billion MBS reinvestments	$667 billion	$790 billion	$1.9 trillion
10-year Equivalents:	$180 billion	$514 billion	$664 billion	$817 billion	$1.2 trillion
Average Duration:	5.3 years	5.7 years	9.0 years (net) 10.75 (purch) - 1.70 (sales)	9.5 years	5.7 years
Pace Per Month:	$37 billion	$74 billion	$44 billion	$45 billion ($35 billion incl. taper)	$709 billion (avg. Mar to Apr) $86 billion (avg. May to Aug) $80 billion pace starting June
Ops Per Month:	9 (on avg)	20 for LSAP 2 + reinvestments, 7 for reinvestments only	19 (on avg) for purchases, 5-6 for sales	18 (frequency of ops reduced during Taper)	80 (March to April) 22 (May to Sept.)

*Statistics through end of September