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Federal Reserve Commentary

The Fed's balance sheet: To infinity and beyond

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In this report, we consider how large the Fed's balance sheet might grow. However, this is only part of the outlook for monetary policy.

Additionally, we consider how the Fed will strengthen its forward guidance and how it can use yield curve control (YCC) to lock in rate expectations even as the economy starts to recover. We also explore the implications of the Fed's balance sheet on banks. Is there an analogue to the "reversal rate" – that is, a point at which the Fed's balance sheet gets so large that policy becomes contractionary – or at least less expansionary?

- **The Fed's efforts are directly focussed on boosting credit to businesses, households, and municipalities as opposed to supporting financial institutions.**
- **We look for the Fed to transition its asset purchases from support of market functioning to QE-style open-ended Treasury and MBS purchases next month.**
- **We also expect the Fed to shift to stronger forward guidance, linking the time spent at the zero-lower bound to explicit outcomes on unemployment and inflation.**
- **The Fed is also likely considering implementing YCC to pin down the front end of the Treasury curve out to three years.**
- **This would match and anchor its "dot plot" projections and keep rate expectations from rising once the economy starts to recover.**
- **Regulatory capital requirements may limit the ability of banks to expand their balance sheets as part of the Fed's credit extension programs.**

The Fed has moved to lighten some of these requirements and we expect more adjustments to come.

Conservatively, we expect the Fed's balance sheet will grow to $9.5trn by year and to $9.8trn by December 2021. However, stimulating the economy will require the Fed to do more than simply expand its balance sheet.

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The Fed's balance sheet: Up, up, and away

The need to keep the economy in suspended animation during COVID-induced economic lockdowns has necessitated a shift in monetary policy from interest rate policy to balance sheet and targeted lending programs. The Fed's balance sheet has grown $2.3trn since mid-March and, at $6.6trn, is already 31% of GDP (Figure 1). But this is only the beginning. As the Fed's efforts shift from re-liquefying financial markets and supporting the flow of credit to stimulating the economy, we expect its balance sheet will get substantially larger. In this report, we outline our assumptions about the outlook for monetary policy and what they mean for our estimates of the size of the Fed's balance sheet and the level of bank reserves.

In this report, we detail our projections for the Fed's balance sheet

Most analyses of the Fed's balance sheet rely on predictions for the essentially unknowable demand for the various Fed and Treasury lending programs. While we will also attempt to do this, we feel it is also important to highlight the unique circumstances of the Fed's current open-ended balance sheet expansion via large-scale asset purchases and begin our efforts there. We then turn to estimates for the uptake on the Fed's numerous credit and liquidity facilities that have been created. Finally, we consider what the implications of a large Fed balance sheet could mean for banks and lending.

Asset purchases: From supporting market functioning to easing monetary conditions

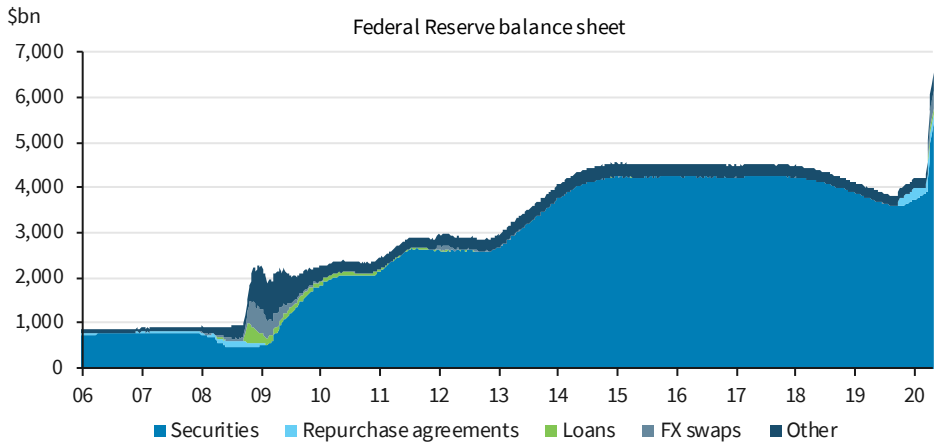
The Fed first shifted to open-ended asset purchases in 2012. Prior to that, its asset purchases were announced as a fixed amount of cumulative purchases over a specific time horizon. During QE2, for example, the Fed stated it would buy $600bn in Treasury securities over about two quarters' time, or a pace of about $100bn per month. By turning to open-ended purchases, the balance sheet program became state-dependent; that is, asset purchases would continue until the unemployment rate fell below 6.5% and inflation was moving back to its 2% target. Monthly purchases of Treasuries and mortgage-backed securities (MBS) during QE3, which began in September 2012 and continued until October 2014, were $45bn and $40bn per month, respectively. By the time QE3 ended, the Fed's balance sheet had grown to $4.5trn from $0.9trn in December 2007 and bank reserves were $2.8trn – much larger than their pre-crisis average of less than $10bn.

The Fed will shift from market liquidity purchases…

Although the Fed has been buying Treasuries and MBS since last autumn[1], the motivation for these purchases is different from the various rounds of QE following the financial crisis.

FIGURE 1

The size of the Fed's balance sheet has increased rapidly since late 2019



Source: Federal Reserve, Haver Analytics, Barclays Research

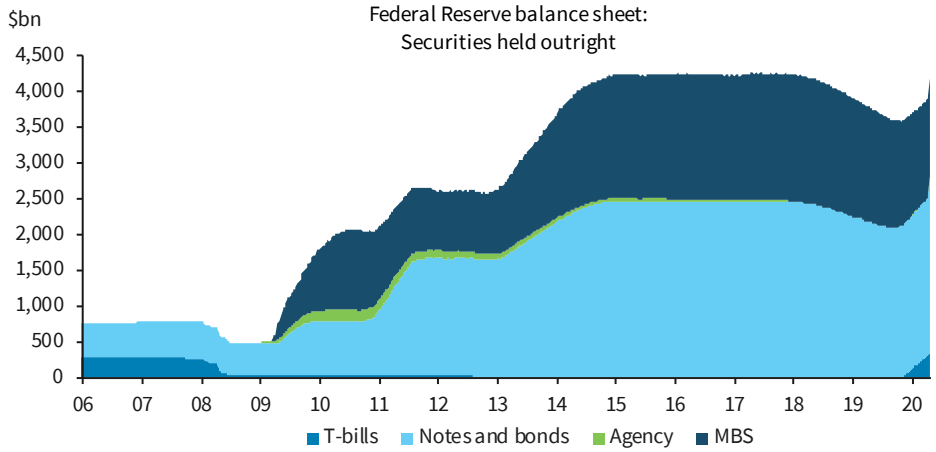
[1] And CMBs, which was not the case in earlier QE rounds.

…to QE stimulus

Rather than stimulating the economy (Figure 2), purchases since last September have been intended to re-liquefy financial markets in order to satisfy increasing demand for liquid reserves. In September 2019, the repo market froze up largely because the level of bank reserves had fallen below banks' lowest comfortable level of reserves (LCLoR), which made banks reluctant to lend even on a securitized basis. The Fed initially addressed this by stepping in to conduct repos, and by purchasing bills at a $60bn/month pace in order to gradually lift reserves to more comfortable levels. Although this alleviated the shortage for a time, demand for cash surged when the COVID-19 pandemic spread. Banks and non-financial companies moved aggressively to build buffers of cash and highly liquid assets ahead of economic lockdowns. This had a number of unforeseen side effects, including a seizing up of Treasury and MBS markets as investors shunned all but the most liquid securities, causing less-liquid securities to pile up on dealer balance sheets. This strong preference for liquidity came to a head in March, when the spread between off- and the on-the-run Treasuries widened to record levels, overnight borrowing rates against Treasury collateral spiked, and private financing dried up. At that time, the Fed stepped in once again, with aggressive Treasury purchases – initially at a $75bn/day pace – that sharply reduced the supply of paper circulating in the market and drained the less-liquid paper that had accumulated on dealer balance sheets (Figure 3). This freed up dealers to better perform their role of intermediating across asset classes and between cash and repo markets, improving market functioning. Since then, as repo rates have come down and cash market spreads have narrowed, the Fed has been able to taper its daily purchases. We expect market functioning to remain stable in the near future, allowing the Fed to end its purchases in early May. All told, liquidity-related purchases since mid-September 2019 have totalled $2trn (of which $1.7trn has occurred since mid-March).

FIGURE 2

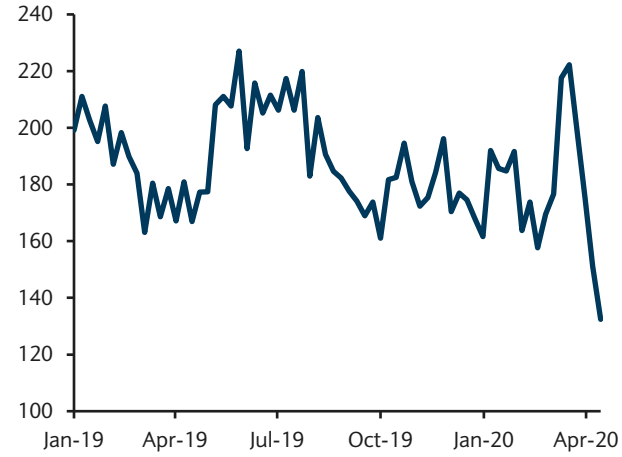
After purchasing bills to boost reserves in 2019, Fed holdings of longer-term Treasury and Agency mortgage-backed securities are now on the rise



Source: Federal Reserve, Haver Analytics, Barclays Research

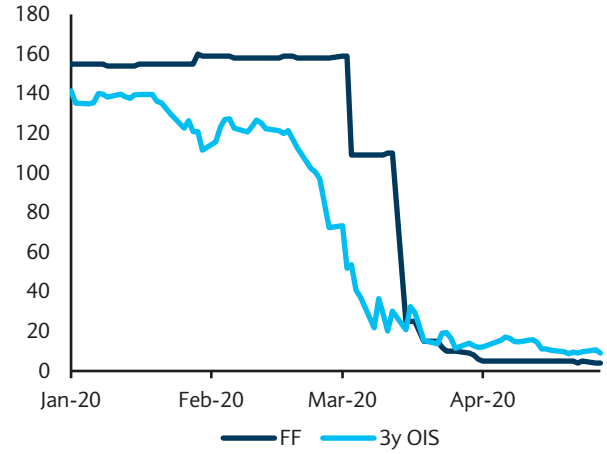
Fed Chair Powell made it clear in the press conference for the April FOMC meeting that the Fed remains focused on continuing to support the flow of credit and improving intermediation in financial markets. We expect the Fed will soon turn its attention away from risk management to the broader setting of monetary policy, which we believe will include stimulating economic activity through open-ended purchases of Treasuries and MBS. We think these purchases will be large, although perhaps not quite as large as its re-liquefication purchases, and will be intended by the Fed to reduce term premia in longer-term borrowing rates. Even though the pace of monthly purchases should slow dramatically

FIGURE 3
Dealer Treasury coupon holdings ($bn)



Source: Federal Reserve, Barclays Research

FIGURE 4
3y OIS (bp)



Source: Bloomberg, Barclays Research

relative to March, these open-ended purchases will increase the size of the Fed's balance sheet and bank reserves.

Asset purchases can strengthen forward guidance

Asset purchases, including yield curve targeting, could help strengthen threshold-based policy guidance

In addition to asset purchases to keep monetary conditions accommodative, our baseline US outlook would be consistent with the Fed adopting stronger forward guidance than it is using at present. The FOMC refrained from changing its forward guidance in April, but it seems clear to us that the Fed will re-shape its guidance once more is known about the economic outlook. While we do not know the Fed's baseline outlook at present, Chair Powell's qualitative description of the outlook broadly matches our own: an unprecedented drop in activity in Q2, elevated unemployment and below-target inflation for some time, and permanent losses in output and temporarily slower potential growth.

With this in mind, we look for the Fed to strengthen its guidance by linking the time it expects to spend at the zero-lower bound to specific outcomes on inflation and unemployment. We note that the degree to which the Fed is willing to accept higher inflation outcomes before lifting off zero will be dependent on the outcome of the framework review in June. In particular, the threshold on inflation would be dependent on whether the committee formally or informally adopts an inflation averaging framework with embedded make-up strategies.

In addition to tying the time spent at zero to mandate-consistent outcomes, we believe the Fed is considering yield curve control (YCC) applied to the front-end of the Treasury yield curve. Under YCC, the Fed effectively locks in term rates at a specific level with a commitment to purchase Treasury securities up to a specific maturity at a fixed rate. We think the Fed would apply this policy to Treasuries with maturities of two to three years since this matches the horizon of the Fed's Summary of Economic Projections – which contain the Fed's central tendency estimates for output, unemployment and inflation. It is possible the Fed could seek to pin down yields as far as five years into the future, but we would only expect this outcome if further downside risks materialize. Matching the forecast horizon of the SEPs also seems an appropriate place to start because it would complement the horizon of the "dot plot".

The benefit of yield curve control would become greater when the economy begins to recover…

With yields on two-year Treasury notes at less than 20bp and 2y OIS at just 5bp, the market already expects the Fed to keep rates pegged at near zero for at least two years. To create additional stimulus, the Fed would need to target longer maturities – say 5y, where OIS is almost 14bp – in order to lock in those rates at less than 10bp. That said, our view is that the Fed would use yield curve control to prevent shorter-term rates from rising as the economy recovers, thereby reinforcing guidance that the target range for the policy rate will remain at 0-25bp for the next several years.

…and Fed purchases kept front-end yields from rising

In other words, yield curve control would be more about preventing rates from rising during an expansion as opposed to generating additional stimulus at present. Indeed, the policy stance would become more accommodative over time, with rates pinned at zero out to some horizon even at phases of the cycle when market expectations would tend to put upward pressure on rates. In this framework, with the Fed implementing YCC at the front-end and conducting regular open market purchases of longer-term securities, asset purchases would both strengthen forward guidance and suppress term premia for longer-term yields.

Adding it up: Securities growth of $2.8trn through December 2021

We look for $1.1trn in additional Treasury and MBS purchases through December 2021

How aggressively – and of course, how many securities – the Fed needs to buy depends on how much it needs to do to convince markets of its resolve to keep rates at zero. In a way, the aggressiveness of the Fed's liquidity purchases may have already convinced the market that it "means business". At present, its existing verbal guidance, newly created tools, and the scale of asset purchases have already pinned yields out to three years at less than 10bp (Figure 4). As a result, it might be possible for the Fed to launch a YCC program that requires fewer purchases beyond what it has already undertaken to re-liquefy the market. With this in mind, and understanding the higher-than-normal degree of uncertainty in the outlook at present, we expect the Fed to begin its QE purchases at $75bn/mo in Treasuries and $50bn/mo in MBS. (Our Treasury strategist reviewed YCC and term premia *here*). Our outlook would be consistent with continuing these purchases through the end of 2021. This implies cumulative Treasury and MBS purchases of about $1.1trn between May 2020 and December 2021, bringing the total Treasury and MBS purchases since COVID 19 began to around $2.8trn.

Lending facilities: A wider mix of counterparties could lead to increased usage

The Fed's efforts to stimulate the economy are not limited to buying Treasury and MBS securities. Instead, the Fed jointly with the Treasury has created an alphabet soup of programs to provide funding to businesses, households, and municipalities.[2] While some of these programs were created during the financial crisis, the key difference now is the scale and scope of the Fed's efforts. As we discuss below, the Fed will be lending to a wider mix of counterparties, at significantly longer terms, and with fewer intermediaries than it did after the financial crisis. Significantly, the Fed's programs require heavy amounts of Treasury cooperation. Indeed, with the exception of a few programs that are effectively extensions of discount window credit, all of the programs require approval from the Treasury Secretary. And in each of these 13(3) "unusual and exigent" programs, the Fed is leveraging "seed money" from the Treasury that itself is funded from the CARES Act. But using money from the Treasury – and ultimately from Congress and the taxpayer – comes with some additional requirements for the Fed, which ultimately raises some thorny issues regarding monetary policy and the independence of the Fed.

[2] See *Federal Reserve liquidity programs*, May 1, 2020

Restoring market liquidity

Market liquidity programs…

Broadly, these programs can be split into two camps – ones that provide market liquidity and others that provide financing to specific types of borrowers. Market liquidity programs include the money market liquidity facility (MMLF), the term asset-backed lending facility (TALF), the secondary market corporate credit facility (SMCCF) and the primary dealer credit facility (PDCF).[3] Effectively, these programs are extensions of the Fed's liquidity purchases of Treasuries and MBS last month. In each, the Fed will buy a particular type of asset – money market instruments, ABS securities, investment grade corporates, and (a limited amount of) high yield ETFs. Just like the Treasuries, these assets will move onto the Fed's balance sheet and be held until maturity.

While most of these programs have yet to be launched, the two that are currently open have seen relatively little demand. The MMLF and PDCF have about $49bn and $32bn, outstanding respectively as of April 22. We believe both programs have restored liquidity in short-term markets, although the extent of their success is a bit unclear. While prime fund redemptions have ended and the CP market is thawing, Libor-OIS remains elevated but is falling quickly. That said, balances in each program are falling, which suggests that after an initial wave of Fed purchases, there has been no additional issuance. Instead, barring an unexpected deterioration in money markets or surge in prime fund withdrawals, we expect both the MMLF and PDCF programs will steadily unwind within three months.

While direct comparisons to the SMCCF and TALF are difficult given the differences between term corporate debt and money markets, it is possible that the Fed's purchases could be smaller than the $350bn ($250bn for the SMCCF and $100bn for the TALF) the Fed has allocated across both facilities. Ideally, the Fed would like to purchase the minimum amount necessary to restore liquidity in these markets. But gauging that amount is impossible. Importantly, the scale of purchases will depend on how much credibility these respective markets attach to the Fed's efforts.

Direct lending facilities

…and direct lending

The Fed's remaining programs involve direct or indirect lending to specific types of counterparties. Loans to corporations – from small to large sized institutions – include the Main Street Lending program, the primary corporate credit facility (PMCCF), and the commercial paper funding facility (CPFF). The municipal lending facility targets large municipalities while the paycheck protection program liquidity facility (PPPLF) indirectly supports household spending. Lending programs such as the CPFF, Muni facility and the PMCCF allow issuers to sell their debt directly to the Fed. Others, such as the Main Street lending program and the PPPLF work through the banking sector, with the Fed providing funding support for loans made to small and medium sized businesses. The Fed has recently approved some non-bank lenders for these programs.

These programs make up the bulk of the $2.6trn in economy-wide credit the Fed is leveraging from capital provided by the Treasury. More than the liquidity programs, the demand for direct lending will be determined by the depth of the economic contraction. As the epicenter of this crisis is the real-economy, we suspect that demand for these programs will quickly reach their maximums once they are launched. And, like was the case with the PPP program, there is a distinct possibility that the Fed will need to increase the size of its credit support programs. Recall, after the PPP loan program limit of $350bn was reached in only a few weeks, Congress moved to increase the allotment by another $250bn. This has also boosted the size of the Fed's PPPLF program. That said, one factor that is likely behind strong demand for the PPPLF is the fact that the loans can be forgiven, which turns them effectively into a grant.

[3] The PDCF does not require a Treasury equity contribution.

Disclosure rules and the potential for stigma

New disclosure rules may reduce the demand for some lending programs

One caveat with respect to estimating the potential size of these programs is the post-financial crisis disclosure rules which at the margin could reduce program demand. As we wrote several weeks ago, the Fed will resume publishing a monthly summary of all its liquidity and credit programs.[4] But unlike the updates published between 2009 and 2012, these summary reports will include un-redacted information on the borrower. Not only will the monthly updates include the borrower's name and details, but also the amounts borrowed as well as the rate at which the funds were borrowed. The Fed will also provide projections on the program's cost, revenue and fees. These new disclosure rules apply to any program that leverages cash provided by the Treasury through the CARES act. The Fed released its first 30-day update required under the Dodd-Frank revisions to the 13(3) lending programs. These updates covered the CPFF, MMLF, and the PDCF. While they provided data on outstanding balances and the interest rates, fees, and revenues the Fed had made to that point, they did not provide borrower details.

It is unclear if releasing borrower details contemporaneously with the program rather than after its ends will reduce program demand. After all, with portions of the economy in a coma, large swaths of borrowers face similar funding issues and as a result, may not be too sensitive about the public's knowledge. Indeed, there is an adage that when it comes to borrowing from the Fed, it is best not to be the first – or the largest.

But the sensitivity may be less about program use than which program is used. As some large institutional borrowers have discovered, their use of the PPP created some political issues – and even caused the Treasury to change the program's terms. This is especially true for franchises or for institutions that individually would meet small business requirements but that are part of a large conglomerate with (albeit limited) access to credit markets and bank loans. At a minimum, we think it may make some borrowers leery about using these facilities.

How big? On the way to a $10trn balance sheet

We expect the Fed's balance sheet to reach $9.2trn by December 2020 and almost $10trn by December 2021

Although there may be some wariness around program disclosure rules, given the depth of the recession, we conservatively assume the full $2.6trn in the Fed's available credit facilities will be used. Once launched, we expect these programs will quickly reach maximum use. Together with our assumptions about the Fed's QE-stimulus purchases, we expect the Fed's balance sheet will grow from $6.6trn to $9.5trn by the end of 2020 (Figure 5). Additional asset purchases and the term structure of these programs mean the Fed's balance sheet will move higher in 2021 – to $9.8trn.

The liquidity used to finance this lending and asset buying will come from an expansion in bank reserves. We expect the level of bank reserves will climb from just over $3trn currently to just over $6.1trn at the end of this year. As recently as January, there was an active debate about encouraging banks to use their reserve balances more efficiently – through intraday credit and discount window borrowing. Going back further, the spike in repo rates last September was largely caused by the thinness of bank reserves – which had shrunk to less than $1.4trn. In six months, the level of bank reserves has doubled – and is set to double again in another seven months.

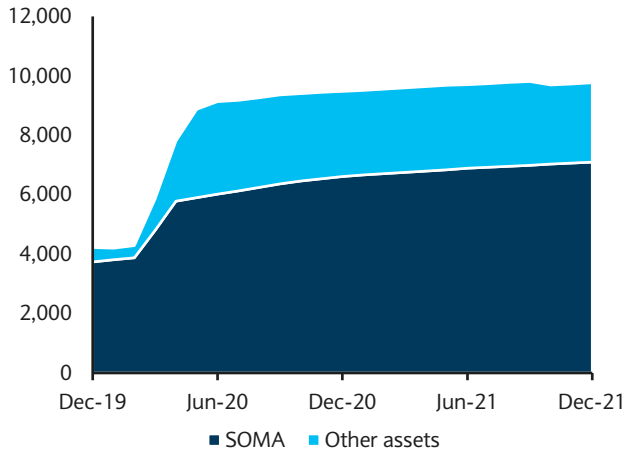
Déjà vu all over again: A return to reserve super-abundance

Reversal rate or reversal reserves?

But this super-abundance of bank reserves may create issues for the effectiveness of monetary policy. There is a growing literature on "reversal rates" – that is, the situation where interest rates have been reduced so much that instead of stimulating the economy these low rates become contractionary. This might occur if, for example, regulations

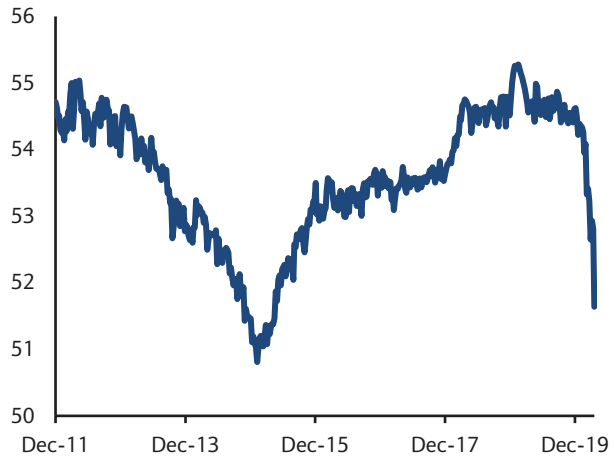
[4] See *Liquidity Programs: How much will be disclosed and when?*, April 2, 2020

FIGURE 5
Barclays forecast for the Federal Reserve balance sheet ($bn)



Source: Federal Reserve, Barclays Research

FIGURE 6
Large bank loans (% assets)



Source: Federal Reserve, Barclays Research

prevent banks from charging retail customers for deposits but securities and loans are all priced at sub-zero rates. But while much of the literature has focussed on interest rates, we wonder if there might also be a QE analogue. That is, is there some level where further bank reserve expansion is contractionary – or at least, less expansionary?

We suspect that such an effect might exist for large banks, stemming from their regulatory capital requirements. Banks have a fixed amount of "real estate" on the asset side of their balance sheet, which is determined by their regulatory capital requirements. The Fed's reserve expansion will push cash onto the balance sheets of the largest banks. Recall that the Fed's credit programs require banks to act as intermediaries. Making these loans will expand bank balance sheets and add to their risk weighted asset holdings. Given their fixed capital bases, this cash will crowd out their other asset holdings. Individually, banks may attempt to minimize their excess reserve balances – by buying more securities or making more loans – but all this accomplishes is to shift their balances onto other banks balance sheets (who are also engaging in the same activity). Cumulatively, there is no change in the level of reserves.

Crowding out risks lead to regulatory forbearance

To see this, we looked at the composition of bank balance sheets during the latter stages of QE between January 2013 and April 2105. Bank reserves increased to $2.7trn from $1.6trn which makes that period comparable – in size at least – to the last month. Between January 2013 and April 2015, large bank asset holdings shifted. Cash holdings, largely reserve balances, rose from 8.4% of assets to 14.3%. At the same time, their loan portfolios shrank from 54.5% to 51.3% (Figure 6). Securities holdings over the period were unchanged. A similar shift – both in direction and scale – has occurred in the last four weeks. The composition of large bank assets in mid-April 2020 looks nearly identical to five years earlier. One important caveat with this comparison is that the Fed's QE purchases were designed to take Treasuries off of bank balance sheets and replace them with cash reserves. By contrast, the Fed's current efforts to stimulate lending may instead crowd out cash or securities holdings as the loan share of bank assets grows.

The Fed is temporarily excluding bank reserves from the SLR calculation

Given the projected growth in bank reserves, it is not surprising that the Fed has moved to exclude Treasuries and bank reserves from calculation of the supplemental leverage ratio (SLR).[5] Recall that large banks are required to meet a minimum SLR of 3% – that is, Tier 1 capital divided by total exposures. Total exposures include on and off balance sheet items and, for the calculation of the SLR, exposures are not risk-weighted. In addition, the largest banks have an enhanced SLR (eSLR). The eSLR requires the US GSIB banks to maintain an additional 2% capital buffer in order to avoid limitations on capital distributions and discretionary bonus payments. As the SLR is not risk-weighted banks have argued for years that it is effectively a "size tax" that penalizes banks on their holdings of bank reserves and Treasuries – particularly as large holdings of each are required to meet liquidity requirements under the LCR.

The Fed estimated that the relaxation of the SLR to exclude cash balances at the Fed and Treasuries would free up $1.6trn of leverage exposure capacity. But much of this extra capacity is likely to be consumed by the expansion in bank lending to support programs like the Main Street lending facility. Even though bank reserves will not require capital, lending under these programs will add to the banks' risk weighted assets and thus consume bank capital. Some programs are likely to be more balance sheet intensive than others. For example, there is little (risk-weighted) capital relief for loans made under the Main Street lending facility which will provide up to $600bn in 4y funding to medium-sized businesses. That said, bank supervisors have moved to loosen accounting rules governing loan losses. On the other hand, the PPPLF will not add to a banks' risk weighted assets or increase its exposures under the leverage ratio because the loans are guaranteed by the Small Business Administration. As we expect the demand for these loans to reach $550bn within weeks, this capital relief will add to the support the Fed is providing by excluding cash reserves and Treasuries from the SLR calculation.[6]

Additional steps to reduce crowding out

It is unclear what additional steps the Fed will take to reduce the pressure on bank balance sheets. One such example that received a bit of attention after the SLR announcement was the possibility of excluding Treasury repo from the capital requirements. We are skeptical that this will occur as repo markets have rapidly unfrozen in the past few weeks. Instead, our sense is the Fed's focus is to prevent the expansion in bank reserves from crowding out economically important lending. That said, the Fed's SLR exclusion is temporary (through March 2021). We expect bank reserves will still be enormous at over $6trn in March 2021 and without a longer exception period these balances at the Fed would consume a significant amount of bank asset real estate.

We believe the Fed needs to be more explicit about where they are comfortable with the banks operating relative to their capital ratios by either providing new (lower) targets or exempting specific activities tied to the Fed's lending programs. This would limit the potential consequences for investor confidence and long-term regulatory implications of breaching capital buffers if they start to fall. The Fed's best option may be to further remove credit risk from its loan programs – by extending loan guarantees on these programs or perhaps excluding them entirely from regulatory ratios.

A hint of this came early in the week from a letter written by the Fed's Vice Chair for Financial Supervision, Randal Quarles.[7] Quarles noted that in order to encourage banks to put their capital to work in stimulating the economy, Congress should consider modifying Section 171 of the Dodd-Frank act. This provision establishes minimum leverage and risk capital requirements for banks. Specifically, Quarles is asking that Congress consider adding

[5] See *Bank regulatory relief more defense than offense*, April 14, 2020
[6] The MMLF is also exempt from the bank capital requirements.
[7] See *Quarles letter to Mike Crapo, Housing Banking Committee*, April 22, 2020

some regulatory flexibility to the Tier 1 leverage requirements. How much flexibility Congress is willing to grant – and for how long – remains to be seen.

Reserve sterilization

There may be other ways that the Fed could consider to alleviate the pressure on banks created by the expansion in bank reserves. We recently discussed the automatic stabilizers on the Fed's balance sheet.[8] This includes the RRP programs as well as the GSE and Treasury cash deposit balances. Each of these programs removes cash reserves from banks and shifts them into other Federal Reserve liabilities that belong to non-bank counterparties.

In the RRP program, a mix of counterparties including money funds, GSEs as well as foreign official institutions and banks are able to leave cash at the Fed. The Fed collateralizes this cash with the Treasuries it holds in the System Open Market Account. As the Fed is effectively "borrowing cash" from these counterparties on a secured basis, the rate it pays is the lowest rate in the economy. It is difficult to think of any borrower (other than the US Treasury) that would be able to borrow at a lower rate than the central bank. By design, the IOER rate is higher than the RRP rate so banks rarely use the RRP program. Of course, with market rates near zero, most of these non-bank counterparties may be indifferent between leaving cash at the Fed or lending it into the repo market. Legally, the GSEs can leave their cash at the Fed in non-RRP accounts but these do not pay any interest.

The Fed could sterilize some of the expansion in bank reserves by increasing the RRP rate and counterparty limits

Thus, one way for the Fed to sterilize reserves would be to make it more attractive for these counterparties to leave their cash at the Fed. We think it is unlikely that Congress would agree to allow the Fed pay interest on the GSEs' deposits at the Fed. But the Fed can increase the rate it pays on the RRP program to draw more cash in from the banking sector and bank reserves. Given the size of the Fed's liquidity expansion, the Fed might also need to consider increasing the counterparty limits in the RRP program from $30bn to perhaps $60bn or more. Indeed, we were a bit surprised that the Fed did not decide to increase the RRP rate (or IOER) at the April FOMC meeting. The fed funds rate is already trading below 5bp, and as bank reserves double, we expect the rate will move to 0. We think this may create distortions in the Fed's policy rate. After all, the FHLBs – who account for most of the cash sold in the fed funds market may decide to leave their cash unremunerated at the Fed for effectively the same return as lending it the unsecured overnight market. Trading volumes might evaporate as a result,

Separately, the Treasury may decide to keep more cash on deposit at the Fed. The Treasury typically keeps a minimum of 5d of expected future cash outflows in its account at the Fed. Prior to the COVID 19 crisis, this was roughly $400bn. But the wave of CMB issuance in the past month as created an echo effect of maturing paper in May and June. At a minimum, we think this will boost the 5d expected future outflows by $250bn (to $650bn). Adding in outflows associated with the stimulus checks and the PPP program could bring this total closer to $1trn. This, of course, is only a temporary reserve drain. As coupon issuance picks up and its stimulus spending cools, we expect the Treasury's precautionary cash buffer at the Fed will decline. But while it may permanently be higher than $400bn, it is hard to argue for the Treasury to keep more than the minimum 5d outflow amount at the Fed – solely to help the Fed drain bank reserves.

[8] See *Adjusting the RRP rate*, April 6, 2020

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We, Joseph Abate and Michael Gapen, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

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