Goldman Sachs | Economics Research

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US Economics Analyst

Q&A on QT and the Future of the Fed's Balance Sheet

- In this week's *Analyst* we answer five questions on QT and the future of the Fed's balance sheet: What has happened so far? What is the current plan for ending runoff? What impact is runoff having on markets and the economy? Will the Fed change its plan and end runoff early? And will the Fed eventually sell MBS or shift its Treasury holdings toward shorter maturities?
- Since runoff began in October 2017, the Fed has reduced the size of its balance sheet by about $400bn. Total assets rose from about 6% of GDP before the crisis to 25% at the peak of QE and have now shrunk to 20% of GDP. With the monthly caps now at their peak levels, runoff will proceed somewhat more quickly on average in 2019 than in 2018.
- The Fed's long-standing plan to shrink its balance sheet to a point somewhat before signs of reserve scarcity emerge remains intact. These signs have not appeared yet, and our best guess remains that this point will be reached with $1tn in reserves and a roughly $3½ trillion total balance sheet in early 2020.
- Directionally, runoff should boost term premia, weighing on risk assets and economic growth. But we see two reasons to think that the effects are very small. First, estimates of term premia have actually fallen recently. Second, runoff is not simply QE-in-reverse: it lacks the signaling effect about interest rates of QE, it is associated with only the flow effects that are a modest share of the portfolio rebalancing effect of QE, and it is much smaller in scale.
- Fed officials appear sympathetic to possibly slowing the pace of reserve shrinkage by either tapering the runoff or ending runoff early and reducing reserves more gradually through the growth of nonreserve liabilities. Our analysis suggests both are plausible options, though a policy change does not seem essential.
- The Fed could take steps to alter the composition of its portfolio, but not until the balance sheet reaches its terminal aggregate size. MBS sales are possible and even at a gradual pace would accelerate somewhat the return to a primarily Treasury portfolio. A deliberate shift toward shorter Treasury maturities appears likely eventually, mainly because it would add room for Twist operations that could powerfully complement asset purchases in future QE programs.

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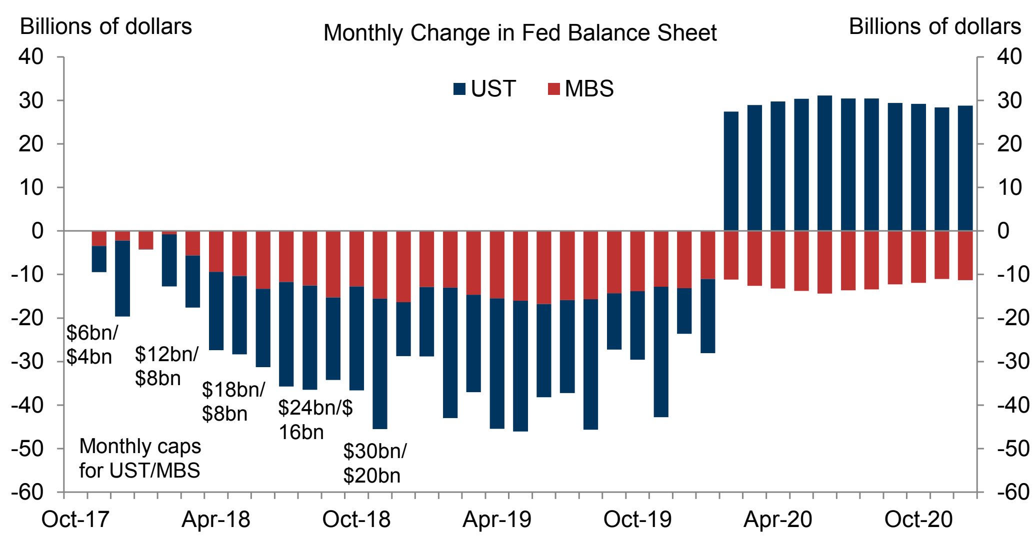
Q&A on QT and the Future of the Fed's Balance Sheet

In this week's US Economics Analyst we discuss a range of issues related to the Fed's balance sheet policy in Q&A form.

Q: What has happened since the Fed started QT?

A: About $400bn has gradually rolled off, a modest share of the increase during QE. The Fed began gradually reducing the size of its balance sheet in October 2017. The initial caps on runoff of US Treasuries and MBS increased in quarterly steps from an initial combined level of $10bn per month to reach the current peak level of $50bn per month in October 2018. Actual runoff has increased more gradually because maturing assets on the Fed's balance sheet fall short of the UST and MBS caps in most months. Runoff averaged about $28bn per month in 2018 and will average about $37bn per month in 2019 under our projections before concluding in early 2020, as shown in Exhibit 1.

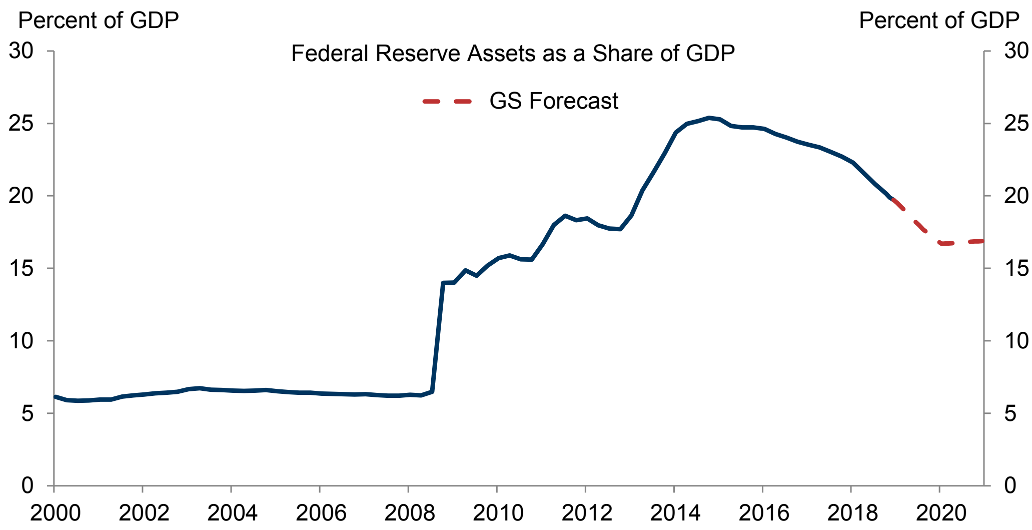
Exhibit 1: Runoff Averaged $28bn per Month in 2018 and Will Average about $37bn per Month in 2019



Source: Federal Reserve, Goldman Sachs Global Investment Research

To date, total assets on the Fed's balance sheet have declined from $4.5tn to $4.1tn (the SOMA portfolio has shrunk from $4.2tn to $3.8tn). The reduction so far has unwound only a limited share of the increase during QE: the Fed's balance sheet rose from roughly 6% of GDP before the recession to a peak of 25% and has now declined to about 20% of GDP, as shown in Exhibit 2.

Exhibit 2: So Far Runoff Has Unwound Only a Small Share of the Total Asset Purchases During QE



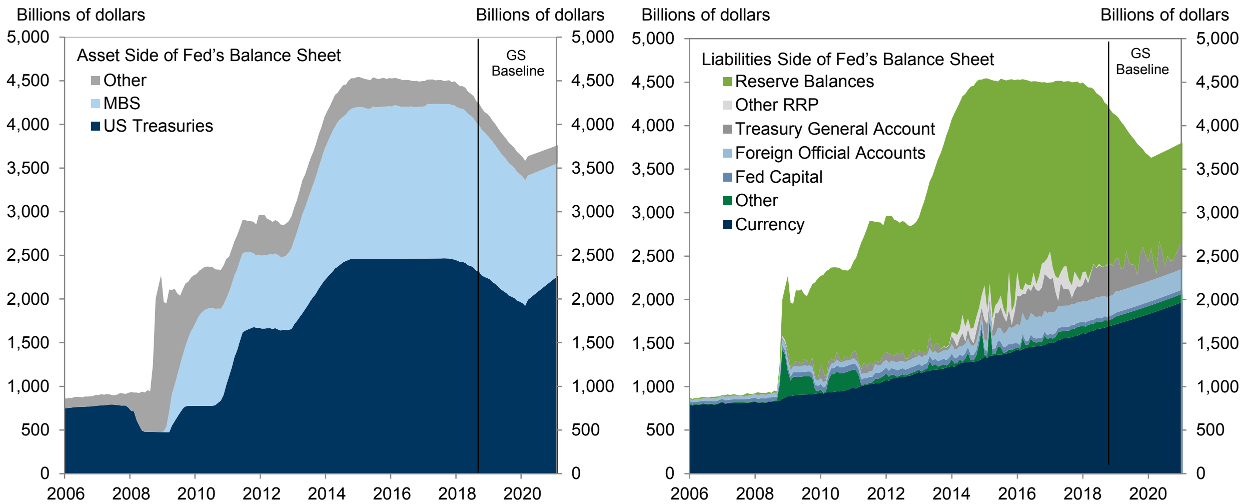
Source: Federal Reserve, Goldman Sachs Global Investment Research

Q: What is the Fed's current plan for ending runoff?

A: The plan is to end runoff somewhat before signs of reserve scarcity emerge, a point we expect to reach in early 2020. The FOMC's plan described in its 2014 Policy Normalization Principles and Plans is to "hold no more securities than necessary to implement monetary policy efficiently and effectively." With the Committee's formal adoption of a floor system for implementing monetary policy at its January meeting, this guidance implies that bank reserve balances on the liabilities side of the Fed's balance sheet must be kept sufficiently abundant to satisfy intraday liquidity and regulatory needs. Because both the supply of and demand for bank reserves will fluctuate from day to day, Fed officials have also indicated a preference for maintaining an additional "buffer" in order to minimize the frequency with which reserve scarcity emerges and creates heightened volatility in short-term interest rates, requiring the New York Fed to respond with open market operations. Consequently, the end point of runoff is best thought of as somewhat before bank reserve balances decline to the point of true scarcity.

Our best guess remains that this point will be reached when reserve balances fall to roughly $1tn. We interpret the results of the Fed's September 2018 Senior Financial Officer Survey, which polled respondents on their current and future demand for reserves, as consistent with this forecast. Reserves currently stand at $1.6tn but are being squeezed in two directions, first by the reduction in the total size of the balance sheet through runoff and second by the growth of nonreserve liabilities such as currency, as shown in Exhibit 3. Our projections imply that reserves will fall to roughly $1tn by early 2020, when the total size of the Fed's balance sheet stands at about $3.6tn.

Exhibit 3: We Expect Runoff to End in Early 2020 with Roughly $1tn in Reserves and a $3.6tn Balance Sheet

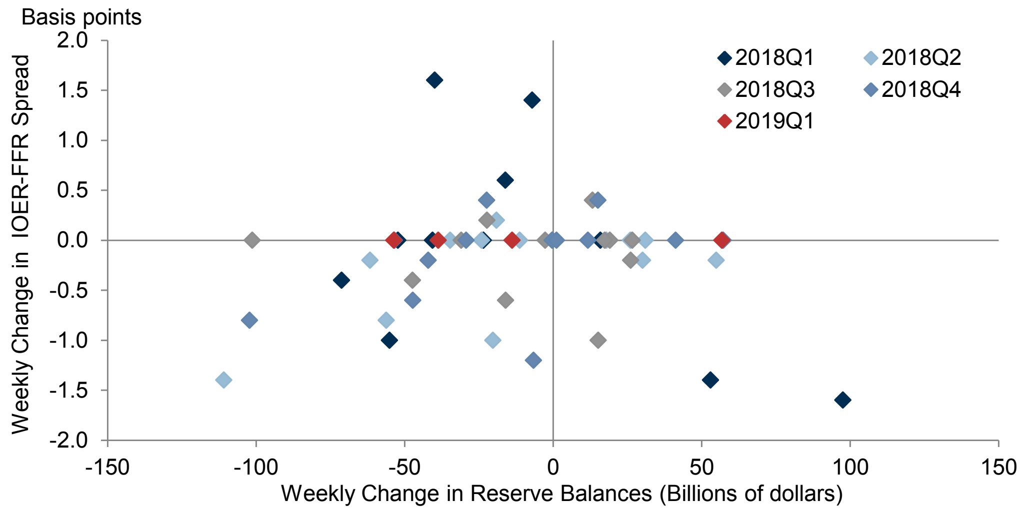


Source: Federal Reserve, Goldman Sachs Global Investment Research

Exactly when signs of scarcity will emerge is uncertain. Further realignments of IOER—we expect two more 5bp relative reductions by end-2019—could reduce demand for reserves by raising their opportunity cost and inducing banks to substitute toward other high quality liquid assets. Possible regulatory changes this year, both formal and informal, also add to the uncertainty. To avoid overshooting the desired end point, Fed officials will monitor indicators of scarcity such as inter-bank lending above IOER, an increase in banks’ daylight overdrafts, and steepness in the demand curve for reserves, as described by Simon Potter, manager of the System Open Market Account for the FOMC, in an October speech. Exhibit 4 shows that the last of these indicators—a clear relationship between changes in reserve balances and changes in overnight interest rates—has not yet appeared.

In addition to a desire to avoid approaching the point of reserve scarcity too closely, limits on the Fed’s ultimate tolerance for further downward realignments of IOER combined with the need to keep the effective fed fund rate within the target range could also impose constraints on how far runoff can go.

Exhibit 4: No Sign Yet That Declines in Reserve Balances Are Substantially Raising Overnight Rates



Source: Federal Reserve, Goldman Sachs Global Investment Research

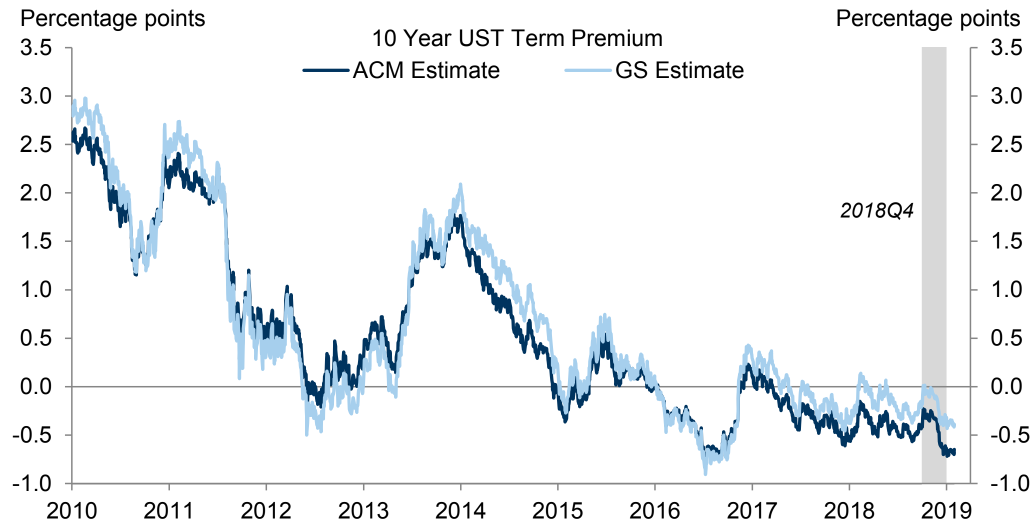
After the balance sheet reaches its terminal aggregate size, it will likely begin growing again in line with demand for the Fed's liabilities at roughly the pace of nominal GDP growth, as shown in Exhibit 3. In addition, the Fed will reinvest maturing MBS in UST in order to return to a portfolio consisting primarily of Treasury securities. These two factors will result in sizeable UST purchases, as shown in Exhibit 1.

Q: What impact is runoff having on financial conditions and the economy?

A: Both estimates of Treasury term premia and a large body of evidence on QE suggest that runoff is having minimal effects on interest rates and the economy. Recent market commentary has pinned much of the blame for the Q4 equity market sell-off on the Fed's balance sheet reduction. If QE boosted risk asset prices and supported the economy, the thinking goes, shouldn't QT have the opposite effect? While this argument is directionally correct, the tendency to see runoff as "QE-in-reverse" greatly exaggerates its recent impact. There are two ways to understand why.

The first is to look at the mechanism through which runoff affects markets and the economy. By returning duration to the market, runoff puts upward pressure on the term premium component of the risk-free rate, which should indeed weigh on risk asset prices and slow economic growth. But estimates of the 10y term premium actually fell about 50bp and approached historic lows in Q4, as shown in Exhibit 5, suggesting that any effect of runoff was likely modest and easily swamped by other forces.

Exhibit 5: The Sharp Drop in the Term Premium in Q4 Suggests QT Had Little Impact on Risk Assets



Source: Federal Reserve, Goldman Sachs Global Investment Research

The second way to see that the impact of runoff should be modest requires revisiting the evidence on how QE worked, summarized in Exhibit 6. Most studies suggest that QE was quite effective, with asset purchases equivalent to 1% of GDP reducing 10y yields by about 4bp, implying a 75bp impact at its peak. But for several reasons, one has to be careful about applying these estimates to the runoff process.

Exhibit 6: QE Worked Mainly via "Signaling Effects" about Short Rates and "Stock Effects" on Term Premia upon Program Announcement, Not via the "Flow Effects" Associated with Runoff

Impact of QE on 10yr Treasury Rate				
Study	**Sample**	**Impact on 10yr Yield per 1% of GDP (bp)**	**Relative Importance of Portfolio Rebalancing Channel (vs. Signaling)**	**Relative Importance of Flow Effect (vs. Stock)**
Modigliani-Sutch (1966, 1967)	Operation Twist	0bp	-	-
Greenwood-Vayanos (2008)	Postwar U.S. (pre-crisis)	4bp	-	-
Bernanke-Reinhart-Sack (2004)	U.S.	10bp	-	-
Krishnamurthy-Vissing-Jorgensen (2010, 2011)	Postwar U.S., QE1, and QE2	4bp	QE1: mostly portfolio rebalancing and liquidity vs. QE2: mostly signaling	-
Gagnon-Raskin-Remache-Sack (2011)	QE1	5-8bp	~75%	-
D'Amico-King (2013)	QE1 Treasury purchases	25bp	Mostly	40%
Hamilton-Wu (2011)	1990-QE2	4bp	-	-
Hancock-Passmore (2011)	QE1 MBS purchases	8bp	50% (rest improved market functioning)	-
Swanson (2011)	Operation Twist	4bp	-	-
Neely (2013)	Effect of U.S. QE1 on foreign bond yields	4bp	-	-
Christensen- Rudebusch (2012)	QE1, QE2	2.5bp	40% (rest signaling)	-
D'Amico et al (2012)	Pre-crisis	11bp	-	-
Bauer-Rudebusch	QE1, QE 2	4bp	50-60% (rest signaling)	-
Li-Wei (2013)	Pre-crisis	6bp	-	-
Goldman Sachs (2013)	QE1, QE2	4bp	Less important than signaling	-
Goldman Sachs (2017)	QE1, QE2	4bp	-	0%
IMF (2013)	Various DMs	-	Less important than signaling	-
Kandrac, Schlusche (2013)	QE1, QE2	-	-	Economically Insignificant
Median Result		**4bp**	**50%**	**20%**

Source: Goldman Sachs Global Investment Research

First, studies suggest that about half of the impact of QE came via "signaling" effects about future interest rate policy, as shown in column 4 of Exhibit 6. These effects wore off long ago in the run-up to liftoff and are at best inoperative during QT. While asset purchases and forward guidance were complements—ongoing purchases reinforced investor confidence that the Fed wouldn't hike—runoff and rate hikes are substitutes. This means that balance sheet reduction operates only via the other channel, the "portfolio rebalancing" effect on term premia.

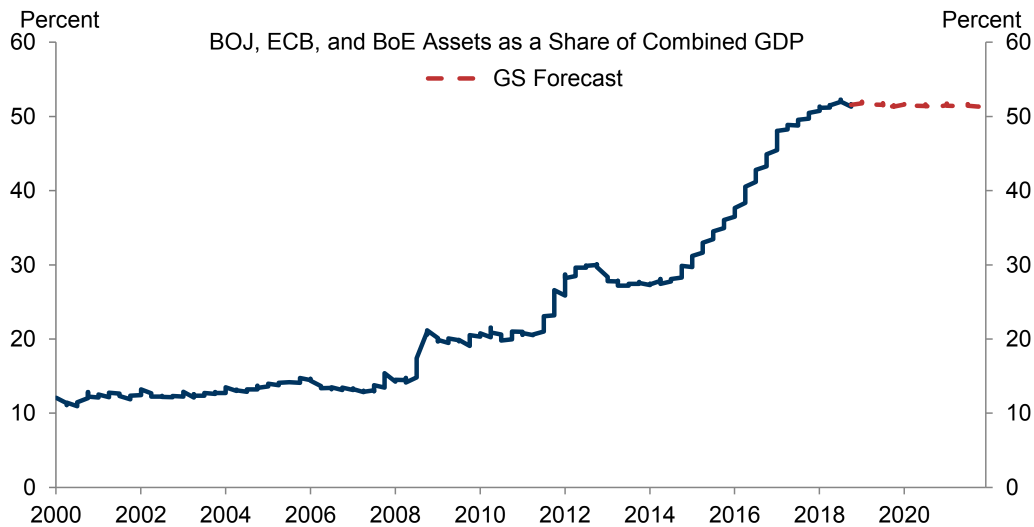
Second, these portfolio rebalancing effects are likely to be much smaller now because the balance sheet is likely to shrink as a share of GDP during QT by less than half as much as it grew during QE.

Third, the evidence also suggests that the portfolio rebalancing channel operates largely via "stock" effects on expectations about the future path of Fed holdings that are priced on announcement and are now long past, rather than via "flow" effects associated with asset purchases or runoff. We estimate that 20% of the portfolio rebalancing channel comes via flow effects, as shown in column 5 of Exhibit 6.

Accounting for these considerations suggests that the runoff flows that we expect as part of QT are only worth about 50% * 50% * 20% = 5% of the original 75bp impact of QE on 10yr rates, or about 4bp. About half of runoff and therefore half of this flow effect should come in 2019. While there is clearly a fair bit of uncertainty around this estimate, there is strong evidence for the basic point that the share of QE's peak impact that is being reversed by current runoff flows is very small.

The story changes little if we broaden the scope to global QE. While spillover effects from global QE contributed to the downward pressure on US rates in prior years, our projections for the ECB, BoE, and BoJ imply that their combined balance sheets should be roughly flat as a share of GDP in coming years, as shown in Exhibit 7, and the spillover impact on US interest rates should therefore be little changed.

Exhibit 7: Spillover Effects from Global QE Should Remain Fairly Steady in Coming Years



Source: Bank of Japan, European Central Bank, Bank of England, Goldman Sachs Global Investment Research

The modest effects of runoff on interest rates imply modest effects on the economy. We previously estimated a roughly one-to-one equivalence between the growth effects of a 1bp change in the funds rate and a 1bp change in the 10y term premium, allowing each to affect broader financial conditions. This implies that runoff is worth only a small fraction of a rate hike in terms of its economic impact.

With that said, it is clear that amidst the heightened market anxiety that followed the Q4 equity market selloff, a narrative took hold that balance sheet policy was to blame. A self-fulfilling prophecy effect was visible in the adverse reaction to Chairman Powell's comment at his December press conference that runoff was on "automatic pilot." The market reaction was a sharp contrast with the muted responses shown in Exhibit 8 to announcements in 2017 in which Fed officials indicated that runoff would begin earlier than expected, an actual policy change. The reaction appeared to unnerve Fed officials enough for them to offer a soothing change of tone and consider changes to the current plan for runoff.

Exhibit 8: After Risk Sentiment Soured in Q4, the Equity Market Began to React Strongly to Balance Sheet Comments from Fed Officials

Stock Market Reactions to Fed Balance Sheet Comments			
Date	**Speaker**	**Comment**	**S&P 500 Reaction (%)**
1/4/2017	Minutes	Firming outlook has implications for balance sheet	0.1
1/9/2017	Rosengren	Should think about size of balance sheet	-0.1
1/12/2017	Harker	Time to consider not reinvesting	-0.5
4/5/2017	Minutes	Change to reinvestment policy is soon appropriate	-0.3
5/24/2017	Minutes	Announces process for phasing out reinvestment	-0.1
6/14/2017	Statement	Guidance on potential cap sizes	0.2
9/20/2017	Statement	Normalization will begin in October	-0.4
12/19/2018	Powell	Balance sheet runoff is on autopilot	-2.6
12/21/2018	Williams	Can change B/S policy to meet goals	1.5
1/4/2019	Powell	Will not hesitate to change B/S policy to meet goals	1.1
1/30/2019	Statement	Prepared to adjust balance sheet normalization	0.9
			-2.6 0 +2.6

Note: The stock market reaction is measured from 30 minutes before the comment to its peak reaction.

Source: Federal Reserve, Haver Analytics, Goldman Sachs Global Investment Research

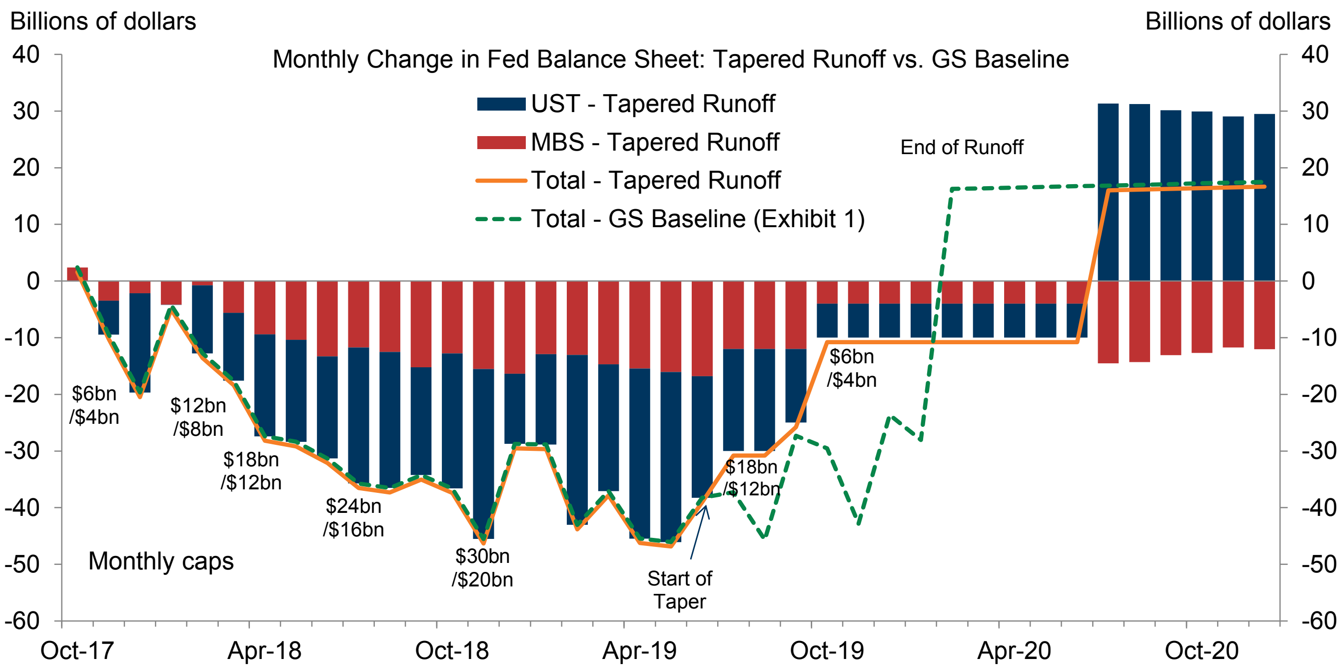
Q: Will the Fed change its plan and end runoff early?

A: Fed officials appear sympathetic to possibly slowing the pace of reserve shrinkage, but it is hard to know at this point. In his January press conference last week, Chairman Powell noted that the market is now looking for greater clarity on the Fed's balance sheet plans. The formal choice of implementation framework at the January meeting clears the way for the FOMC to provide further guidance or make a change to its current plans at one of its future meetings. We see three options.

First, without changing its current plan, the FOMC could provide information about the likely end-date of runoff. This could involve offering explicit Committee guidance, or simply summarizing the results of the Senior Financial Officer Survey or private sector projections such as those in the Primary Dealer Survey, where the median forecast is now roughly in line with our expectations. The disadvantage—and the likely reason Fed officials have not done this yet—is that it could limit policy flexibility by projecting false certainty about what end point will ultimately be appropriate. But the hope would be to calm markets.

Second, the FOMC could taper runoff, a possibility mentioned in the December minutes. A slower pace of portfolio redemptions could mean, for example, a gradual reduction in the runoff caps similar to the gradual increase at the outset. Exhibit 9 illustrates a hypothetical scenario in which the FOMC reduces the UST/MBS caps to \$18bn/\$12bn at its June meeting (effective in July) and then reduces them further to \$6bn/\$4bn three months later. Relative to our baseline shown in Exhibit 1, this would delay the end of runoff by 1-2 quarters because the lower caps would be binding in many months. A potential concern with tapering is that it might be misinterpreted as a major change in the monetary policy stance or as implying that runoff will necessarily end once and only once the final cap is reached.

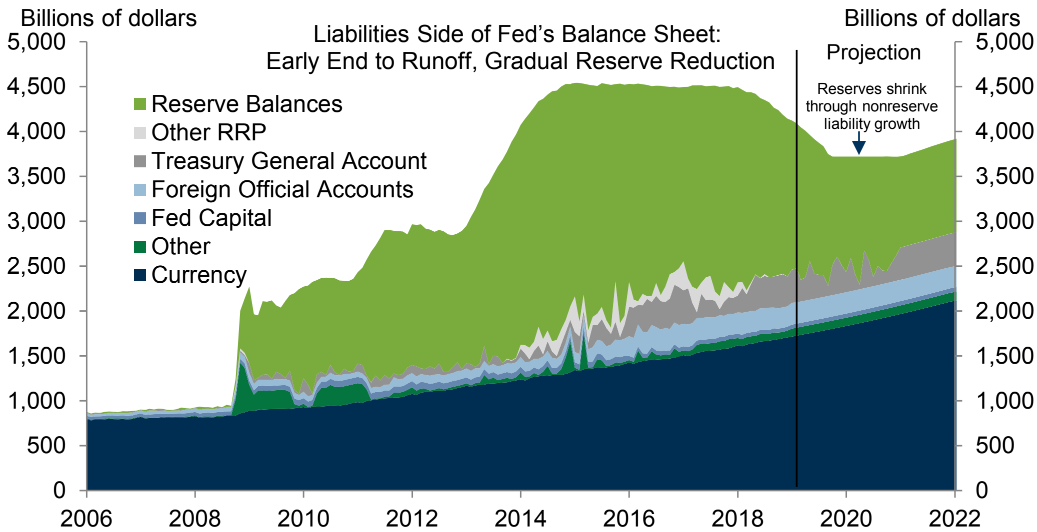
Exhibit 9: Option 1: Taper Runoff



Source: Federal Reserve, Goldman Sachs Global Investment Research

Third, the FOMC could end runoff early but continue to shrink reserves more gradually through growth of nonreserve liabilities, an option also mentioned in the December minutes. Exhibit 10 illustrates a scenario in which the FOMC ends runoff in September but keeps the total size of the balance sheet flat so that reserves are squeezed from one side rather than two, unlike the current approach illustrated above in Exhibit 3. Only once full normalization in the sense of hitting the appropriate terminal level of reserves is reached—end-2020, in our example—would the Fed resume growing its balance sheet in line with growth in demand for its liabilities.

Exhibit 10: Option 2: End Runoff Early and Reduce Reserves Gradually via Nonreserve Liability Growth



Source: Federal Reserve, Goldman Sachs Global Investment Research

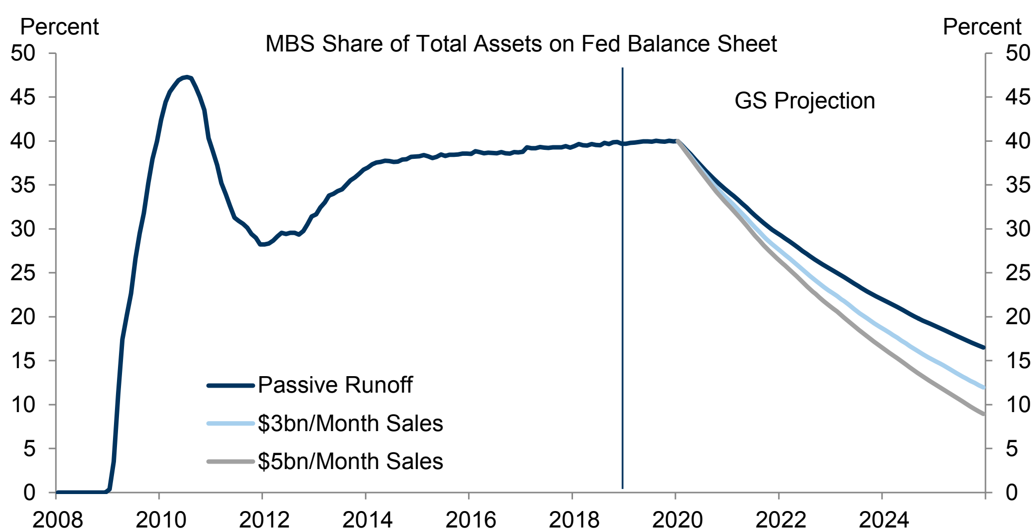
The motivation for possibly slowing the pace of reserve shrinkage through these latter two options is to lessen the risk that runoff overshoots. As the December minutes note, if upward pressure on the funds rate arises, it could be "challenging to distinguish between pressures that were transitory and likely to abate as financial institutions adjust and those that were more persistent and associated with aggregate reserve scarcity." Fed officials appear sympathetic to "approaching that point quite carefully," as Powell put it in his January press conference. But the runoff caps were chosen to be conservative in the first place, and it is not clear that a policy change is necessary. A simpler alternative noted in the minutes might be to simply use open market operations to smooth any particularly large fluctuations in reserves.

Q: Will the Fed sell MBS or reduce the average duration of its portfolio?

A: MBS sales are possible and a deliberate shortening of the maturity composition of Treasury holdings appears likely, but not this year. After the Fed's balance sheet reaches its terminal aggregate size, two changes to the composition of the portfolio—both of which have been discussed for years and featured in the December minutes—appear possible.

The first proposal is to sell MBS. The motivation is that returning to a primarily Treasury portfolio is likely to take a long time under passive runoff. Our projections imply that without sales, MBS would still represent over 15% of Fed assets by end-2025. Exhibit 11 shows that this process could be accelerated by sales at even a "very gradual" pace, as mentioned in the December minutes. For example, if the FOMC were to supplement passive runoff of maturing MBS with $5bn in monthly sales—a meaningful but plausible addition to the roughly $10-20bn current pace of monthly net issuance in the MBS market–the MBS share of total assets would instead decline to under 10% by end-2025.

Exhibit 11: Without Active Sales, the MBS Share of the Balance Sheet Will Decline Quite Slowly

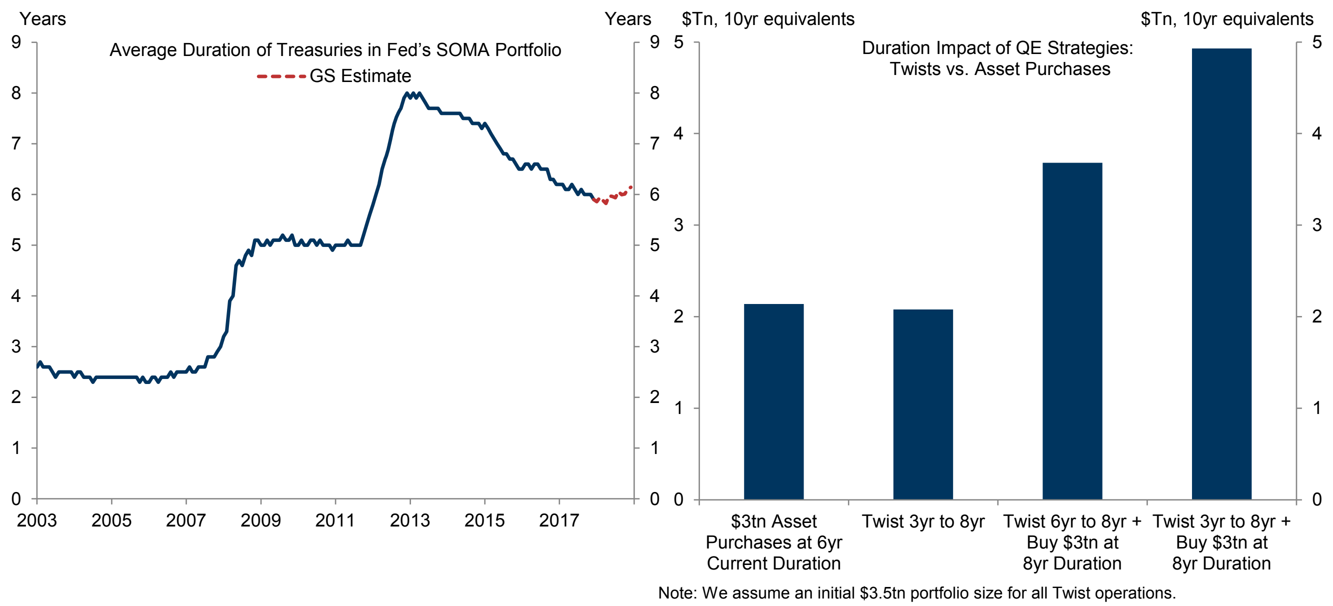


Source: Federal Reserve, Goldman Sachs Global Investment Research

The second proposal is to shift the composition of the Fed's Treasury portfolio toward shorter maturities. The motivation, noted in the December minutes, would be to "provide greater flexibility to lengthen maturity if warranted by an economic downturn."

The left panel of Exhibit 12 shows that the average duration of the Fed's Treasury holdings increased sharply during the crisis and remains well above the pre-crisis level. The right panel shows that extending the maturity of existing UST holdings—a "twist" operation—can be a powerful complement to asset purchases. For example, extending the average duration of a $3.5tn portfolio from roughly the pre-crisis level to the QE-era peak would be as powerful as purchasing an additional $3tn at the current average duration of the Fed's UST portfolio. Using both tools together would provide even more firepower for future QE programs, as shown by the last two bars. Moreover, this could help to alleviate any soft political constraints on the total size of the Fed's balance sheet. As a result, we see an eventual deliberate shift toward shorter Treasury maturities—including bills—as likely.

Exhibit 12: Shortening the Maturity Composition of UST Holdings Would Add Room for Powerful Twist Operations Alongside Asset Purchases



Source: Federal Reserve, Goldman Sachs Global Investment Research

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The US Economic and Financial Outlook

THE US ECONOMIC AND FINANCIAL OUTLOOK

(% change on previous period, annualized, except where noted)

	2016	2017	2018 (f)	2019 (f)	2020 (f)	2021 (f)	2022 (f)	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4
OUTPUT AND SPENDING															
Real GDP	**1.6**	**2.2**	*2.9*	*2.4*	*2.0*	*1.6*	*1.7*	**2.2**	**4.2**	**3.4**	*2.5*	*1.7*	*2.4*	*2.0*	*2.0*
Real GDP (Q4/Q4)	**1.9**	**2.5**	*3.0*	*2.0*	*1.9*	*1.5*	*1.8*	--	--	--	--	--	--	--	--
Consumer Expenditure	**2.7**	**2.5**	*2.7*	*2.8*	*2.2*	*1.8*	*1.9*	**0.5**	**3.8**	**3.5**	*3.3*	*2.4*	*2.6*	*2.5*	*2.3*
Residential Fixed Investment	**6.5**	**3.3**	*-0.3*	*-1.4*	*4.6*	*2.9*	*2.3*	**-3.4**	**-1.4**	**-3.5**	*-4.8*	*-2.0*	*-1.0*	*4.0*	*4.0*
Business Fixed Investment	**0.5**	**5.3**	*6.9*	*3.3*	*2.8*	*2.7*	*3.0*	**11.5**	**8.7**	**2.5**	*4.6*	*2.4*	*2.2*	*2.9*	*2.9*
Structures	**-5.0**	**4.6**	*5.0*	*0.9*	*2.0*	*2.0*	*2.0*	**13.9**	**14.5**	**-3.4**	*-3.9*	*2.0*	*2.0*	*2.0*	*2.0*
Equipment	**-1.5**	**6.1**	*7.4*	*2.6*	*2.4*	*2.5*	*2.8*	**8.5**	**4.6**	**3.4**	*6.7*	*0.0*	*1.0*	*2.5*	*2.5*
Intellectual Property Products	**7.5**	**4.6**	*7.3*	*5.8*	*3.9*	*3.5*	*3.8*	**14.1**	**10.5**	**5.6**	*8.0*	*6.0*	*4.0*	*4.0*	*4.0*
Federal Government	**0.4**	**0.7**	*2.8*	*3.4*	*1.2*	*0.0*	*0.0*	**2.6**	**3.6**	**3.5**	*4.0*	*1.0*	*7.0*	*2.5*	*2.5*
State & Local Government	**2.0**	**-0.5**	*0.9*	*1.4*	*0.4*	*0.0*	*0.0*	**0.9**	**1.8**	**2.0**	*0.8*	*1.5*	*1.5*	*1.0*	*1.0*
Net Exports ($bn, '09)	**-786**	**-859**	*-914*	*-976*	*-1,023*	*-1,062*	*-1,102*	**-902**	**-841**	**-950**	*-962*	*-953*	*-966*	*-984*	*-1000*
Inventory Investment ($bn, '09)	**23**	**23**	*39*	*29*	*20*	*20*	*25*	**30**	**-37**	**90**	*72*	*35*	*35*	*25*	*20*
Industrial Production, Mfg.	**-0.8**	**1.2**	*2.4*	*1.3*	*0.9*	*0.8*	*0.8*	**2.0**	**2.3**	**3.6**	*2.1*	*0.1*	*0.7*	*0.7*	*0.8*
HOUSING MARKET															
Housing Starts (units, thous)	**1,177**	**1,208**	*1,276*	*1,268*	*1,314*	*1,379*	--	**1,317**	**1,261**	**1,234**	*1,294*	*1,262*	*1,248*	*1,282*	*1,279*
New Home Sales (units, thous)	**560**	**616**	*644*	*680*	*700*	*727*	--	**656**	**633**	**607**	*680*	*681*	*673*	*681*	*685*
Existing Home Sales (units, thous)	**5,441**	**5,536**	**5,343**	*5,210*	*5,259*	*5,310*	--	**5,507**	**5,413**	**5,273**	**5,180**	*5,192*	*5,204*	*5,216*	*5,228*
Case-Shiller Home Prices (%yoy)*	**4.9**	**6.2**	*4.4*	*3.3*	*2.8*	*2.6*	*2.3*	**6.6**	**6.2**	**5.5**	*4.3*	*3.4*	*3.7*	*3.4*	*3.3*
INFLATION (% ch, yr/yr)															
Consumer Price Index (CPI)	**1.3**	**2.1**	**2.4**	*1.8*	*2.2*	*2.3*	*2.3*	**2.3**	**2.6**	**2.6**	**2.2**	*1.7*	*1.8*	*1.9*	*1.9*
Core CPI	**2.2**	**1.8**	**2.1**	*2.3*	*2.4*	*2.5*	*2.4*	**1.9**	**2.2**	**2.2**	**2.2**	*2.1*	*2.3*	*2.3*	*2.4*
Core PCE**	**1.7**	**1.6**	*1.9*	*2.0*	*2.2*	*2.2*	*2.2*	**1.7**	**1.9**	**2.0**	*1.9*	*1.9*	*1.9*	*2.0*	*2.1*
LABOR MARKET															
Unemployment Rate (%)	**4.9**	**4.4**	**3.9**	*3.7*	*3.5*	*3.7*	*3.7*	**4.1**	**3.9**	**3.8**	**3.8**	*3.9*	*3.8*	*3.6*	*3.6*
U6 Underemployment Rate (%)	**9.6**	**8.5**	**7.7**	*7.4*	*6.8*	*7.0*	*7.1*	**8.1**	**7.8**	**7.4**	**7.5**	*7.9*	*7.4*	*7.2*	*7.0*
Payrolls (thous, monthly rate)	**199**	**180**	**221**	*156*	*88*	*64*	*85*	**214**	**232**	**222**	**216**	*190*	*160*	*150*	*125*
GOVERNMENT FINANCE															
Federal Budget (FY, $bn)	**-590**	**-666**	**-779**	*-1,000*	*-1,125*	*-1,250*	*-1,325*	--	--	--	--	--	--	--	--
FINANCIAL INDICATORS															
FF Target Range (Bottom-Top, %)^	**0.5-0.75**	**1.25-1.5**	**2.25-2.5**	*2.5-2.75*	*2.5-2.75*	*2.5-2.75*	*2.5-2.75*	**1.5-1.75**	**1.75-2**	**2.0-2.25**	**2.25-2.5**	*2.25-2.5*	*2.25-2.5*	*2.25-2.5*	*2.5-2.75*
10-Year Treasury Note^	**2.45**	**2.40**	**2.69**	*3.00*	*2.85*	*2.80*	*2.80*	**2.74**	**2.85**	**3.05**	**2.69**	*2.75*	*2.90*	*3.00*	*3.00*
Euro (€/$)^	**1.06**	**1.20**	**1.15**	*1.20*	*1.25*	*1.30*	*1.35*	**1.23**	**1.17**	**1.16**	**1.15**	*1.16*	*1.19*	*1.20*	*1.20*
Yen ($/¥)^	**117**	**113**	**110**	*105*	*105*	*100*	*97*	**106**	**111**	**113**	**110**	*108*	*107*	*106*	*105*

* Weighted average of metro-level HPIs for 381 metro cities where the weights are dollar values of housing stock reported in the American Community Survey.
** PCE = Personal consumption expenditures. ^ Denotes end of period.
Note: Published figures in bold.
Source: Goldman Sachs Global Investment Research.

Quarter*	GS Modal Path of Target Range^	Hike Probability GS	Cut Probability GS	No Change Probability GS	Expected Value of Funds Rate^ GS**	Expected Value of Funds Rate^ Market
Current value	**2.25%-2.50%**	--	--	--	**2.40**	**2.40**
2019Q1	**2.25%-2.50%**	<5	5	90	**2.39**	**2.40**
2019Q2	**2.25%-2.50%**	25	5	70	**2.43**	**2.43**
2019Q3	**2.25%-2.50%**	45	10	45	**2.49**	**2.44**
2019Q4	**2.50%-2.75%**	55	10	35	**2.58**	**2.44**
2020Q1	**2.50%-2.75%**	45	10	45	**2.64**	**2.35**
2020Q2	**2.50%-2.75%**	40	10	50	**2.69**	**2.29**
2020Q3	**2.50%-2.75%**	20	15	65	**2.66**	**2.26**
2020Q4	**2.50%-2.75%**	20	20	60	**2.61**	**2.22**
	Modal Number of Hikes				**Expected Value of Number of Net Hikes**	
2019	**1**				**0.7**	**0.2**
2020	**0**				**0.2**	**-0.9**

^ Denotes end of period.
* Probabilities represent the likelihood of a policy change at either meeting in a given quarter.
** We assume hikes are 25bp per quarter and cuts average 50bp per quarter. The GS expected value of the funds rate is equal to the prior quarter value + 0.25 * the hike probability - 0.5 * the cut probability.

Source: Goldman Sachs Global Investment Research

Economic Releases and Other Events

Date		Time (EST)	Indicator	Estimate GS	Consensus	Last Report
Mon	**Feb 04**	**10:00**	**Factory Orders (Nov)**	**-0.1%**	**+0.3%**	**-2.1%**
Wed	**Feb 05**	**10:00**	**ISM Nonmanufacturing Index (Jan)**	**56.7**	**57.0**	**58.0**
Thu	**Feb 06**	**8:30**	**Trade Balance (Nov)**	**-$54.5bn**	**-$54.0bn**	**-$55.5bn**
		8:30	**Initial Jobless Claims**	**215,000**	**223,000**	**253,000**
		8:30	Continuing Claims	n.a.	n.a.	1,782,000
Fri	**Feb 07**	15:00	Consumer Credit (Dec)	n.a.	+$15.3bn	+$22.1bn

Source: Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Jan Hatzius, Alec Phillips, David Mericle, Spencer Hill, Daan Struyven, Brian Chen, David Choi, Blake Taylor and Ronnie Walker, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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