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> “THE FED SHOULD REMAIN CAUTIOUS WHEN EXITING QT2. THE REGULATORY FRAMEWORK AND THE STIGMA ASSOCIATED WITH ITS LENDING WINDOWS STRONGLY ENCOURAGE IT.”

ECONOMIC RESEARCH

BNP PARIBAS

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Céline Choulet

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EXECUTIVE SUMMARY

QT2: THE FED IS TRYING TO FIND THE RIGHT PACE

Céline Choulet

• After being left reeling by the unexpected money-market crisis during its first round of quantitative tightening (QT1), the US Federal Reserve (Fed) intends to manage the second (QT2) with the utmost caution.

This means reducing its securities portfolio without creating a shortage in central bank money, in view of the liquidity requirements imposed on banks under the Basel 3 framework. As it is unable to estimate the optimum amount of central bank reserves needed to ensure that its monetary policy is properly implemented, the Fed aims to reduce the stock of reserves to a sufficiently «ample» level.

If QT2 is ended too early, it would have to activate its liquidity draining tools in order to limit the downwards pressure on short-term market rates. On the other hand, if QT2 is ended too late, reserves could become scarce, forcing it to inject central bank money as a matter of urgency.

• So far, QT2 has gone off without a hitch. However, as revealed in the Minutes of the January meeting of the Federal Open Market Committee (FOMC), some of its members are recommending putting it on hold until a new compromise on the federal debt ceiling can be found.

Temporarily deprived of access to debt markets, the US Treasury is currently financing its spending by drawing on its account with the Fed. However, the positive impact of this spending on reserves will be abruptly reversed when the US Treasury replenishes its account. This will temporarily reduce the Fed's visibility of monetary conditions. According to Fed parameters, QT2 would be completed before the end of the year.

• At the end of QT2, the Fed's ambition to avert any risk of stressed money markets conditions could nevertheless require it to improve its operational framework. There are three options worth considering.

The first would be to enhance its range of tools for detecting potential reserve shortages. In particular, the Fed could include Federal Home Loan Banks' deposits with banks and the remuneration offered in return.

A second avenue for improvement would be to eliminate some of the shortcomings of the new liquidity injection facility. Failing that, it will struggle to act as a leading indicator and keep short-term market rates in check if reserves are scarce. A

A third option would be to step up surveillance of the conditions under which the public deficit is financed, particularly on the repurchase agreement markets. In recent years, the share of US Treasury debt securities financed through these markets has increased. Admittedly, by easing the balance sheet constraints on market makers, the growth of centralised clearing of repurchase agreements is already helping to ease the tensions that can be felt when the accounts are closed at the end of the quarter. But the overall increase in repurchase agreement markets, which accompanies the rise in the public deficit, may already have increased the reserve requirements of the largest market makers.

QT2: THE FED IS TRYING TO FIND THE RIGHT PACE

So far, the US Federal Reserve (Fed) has managed its balance sheet reduction programme (QT2) without major problems. The principal risk it faced was to create a shortage of central bank reserves, in view of the liquidity requirements imposed on banks by Basel 3. Money market pressures over the past few months have been relatively modest given the reduction in the overall central bank money stock and have quickly dissipated. It is possible that the Fed will temporarily suspend QT2 — until a new compromise on the federal debt ceiling is reached — and end it definitively before the end of the year. Nevertheless, the Fed should remain cautious when exiting QT2. The regulatory framework and the stigma associated with its lending windows strongly encourage it. To this end, certain indicators could enhance its spread of tools for detecting possible reserve shortages and improve its visibility of liquidity redistribution conditions.

A shrinking balance sheet but reserves maintained

Up until now, the Fed has managed to reduce its securities portfolio (Quantitative Tightening, QT) in an orderly manner. The main risk that it faced was losing control of short-term market rates by drying up the money markets. The Fed's first experiment with quantitative tightening (QT1) failed in 2019 for this reason[1]. At the time, the Fed had grossly underestimated the effect of the new liquidity rules on banks' reserve requirements. It had exhausted the buffer of central bank money that the banks held, beyond their needs, preventing them from meeting the demand for cash on the money markets. Short-term market rates skyrocketed, forcing the Fed to inject emergency liquidity[2].

Central bank assets are essential to banking activity, particularly since the major financial crisis of 2008 (*Box 1*). However, as a central bank reduces its balance sheet, it automatically destroys part of the reserves that banks hold with it[3]. For the past year, the Fed has taken extra caution in managing its balance sheet. On the one hand, it has slowed the rate at which it is reducing its balance sheet[4] and raised its landing point; on the other, it has introduced new tools for monitoring the risks of reserve shortages and liquidity injections; and finally, it has lowered the rate of return on its reverse repurchase facilities[5].

Admittedly, for the time being, QT2 has had only a negligible impact on the amount of central bank reserves. From 1 June 2022 (start of QT2) to 5 March 2025, the Fed's balance sheet shrank by USD 2,100 billion, while reserves remained virtually unchanged. The fall (-USD 1,800 billion) in the Fed's repurchase agreements with money market funds[6] (MMFs), under the ON RRP (Overnight Reverse Repo; *Box 2 and Chart 1*) facility, almost entirely offset the impact of QT2. From April 2023, the shorter maturity of the debt issued by the US Treasury and the increased demand for financing on the repurchase agreement markets gradually reduced the attractiveness of the ON RRP facility. Rather than keeping their assets on the Fed's balance sheet, MMFs were encouraged to use them to underwrite T-bill issues (thereby partially replacing the Fed) and to lend on the repo markets (*Chart 2*).

THE DISTORTION OF US FEDERAL RESERVE BALANCE SHEET LIABILITIES

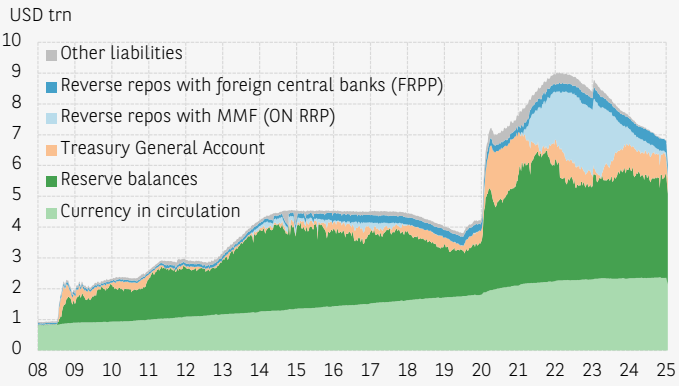

CHART 1

SOURCE: FEDERAL RESERVE (H.4.1), BNP PARIBAS

This helped cushion the effects of QT2 on reserves and thus delayed the risk of a shortage of central bank money (*Chart 3*). Given the residual outstandings on ON RRP transactions (around USD 140 billion at the beginning of March), this cushioning effect will no longer be effective.

However, the reintroduction of the federal debt ceiling will temporarily distort the structure of the liabilities on the Fed's balance sheet and, above all, reduce its visibility of money market developments. On 2 January, the suspension of the federal debt ceiling came to an end. Temporarily unable to issue securities, the US Treasury is resorting to extraordinary measures and drawing on its holdings with the Fed (Treasury General Account, TGA) to honour the repayment of its outstanding debt and finance its spending. On 5 March, the amount outstanding on the US Treasury account stood at around USD 520 billion.

1 Choulet C. (2018), Will central bank reserves soon become insufficient?, Conjoncture, BNP Paribas, December 2018; Choulet (2019), Pressure on central bank liquidity is going undetected, Ecoflash, BNP Paribas, April 2019; Copeland A., Duffie D. and Yang Y. (2021), Reserves were not so ample after all, FRBNY Staff Report No. 974, July 2021; Afonso G., Cipriani M., Copeland A., Kovner A., La Spada G. and Martin A. (2021), The market events of mid-September 2019, FRBNY, Economic Policy Review, Volume 27, Number 2, August 2021

2 Choulet (2019), The Fed's new role under Basel 3, Ecoflash, BNP Paribas, October 2019

3 Choulet (2023), Will the Fed's QT2 balance sheet reduction programme last the course?, Conjuncture, BNP Paribas, January 2023

4 Since June 2024, the Fed has planned to reduce its holdings of US Treasury securities by USD 25 billion a month and its portfolio of mortgage-backed securities (MBS) by USD 35 billion. Due to the weakness of mortgage prepayments, the monthly contraction in its MBS portfolio averaged only USD 15 billion.

5 On 18 December, the FOMC lowered the Fed's reverse repurchase rate (ON RRP) by 30 bps, bringing it to the bottom of the target range for the federal funds rate, i.e. 4.25%. In a context where central liquidity is becoming less abundant, maintaining a floor for short-term market rates (by ensuring the attractiveness of the ON RRP facility) is losing its appeal. Encouraging money market funds to allocate their assets to private repurchase agreement markets and T-bills could, on the other hand, limit upwards pressure on short-term interest rates. The rate on the Fed's repurchase facility with foreign central banks (FRRP) was also automatically lowered. Unless yields are very attractive and the price of currency hedging is moderate, however, it is not certain that foreign central banks will increase their exposure to Treasuries at the expense of their "deposits" under the FRRP (outstandings close to a record level of USD 390 billion on 5 March).

6 A repurchase agreement, a type of temporary disposal of securities, can be considered, from an economic standpoint, as a secured loan (cash against securities, less a discount on its value); from the lender of the cash, it is a reverse repurchase agreement (or reverse repo); from the standpoint of the borrower, it is a repurchase agreement (or repo). The repurchase agreement for a security comes with a commitment to repurchase it in future at an agreed price. The interest rate, or repo rate, is equal to the difference between the sale price and the repurchase price. The Fed defines the transaction based on its effect on its counterparty. Therefore, from the Fed's standpoint, a repo is similar to a secured loan and recorded as an asset, while a reverse repo is a secured borrowing and recorded as a liability.

THE REBALANCING OF US MONEY MARKET FUND PORTFOLIOS

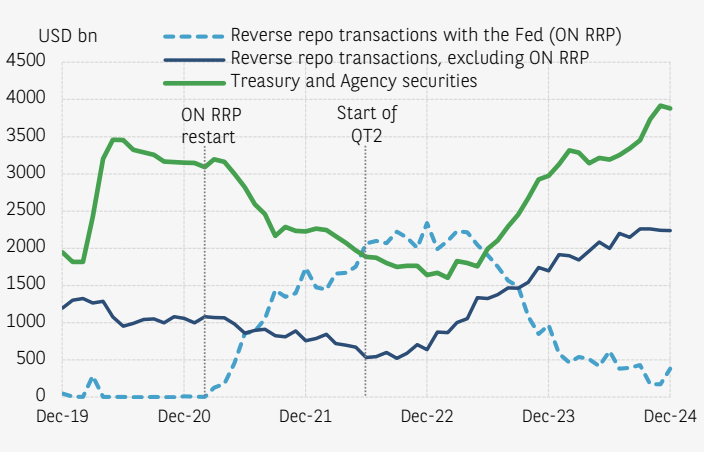

CHART 2 SOURCE: OFFICE OF FINANCIAL RESEARCH, BNP PARIBAS

SINCE THE START OF QT2, THE REDUCTION IN FED ASSETS HAS BEEN MAINLY OFFSET BY THE FALL IN REPURCHASE AGREEMENTS

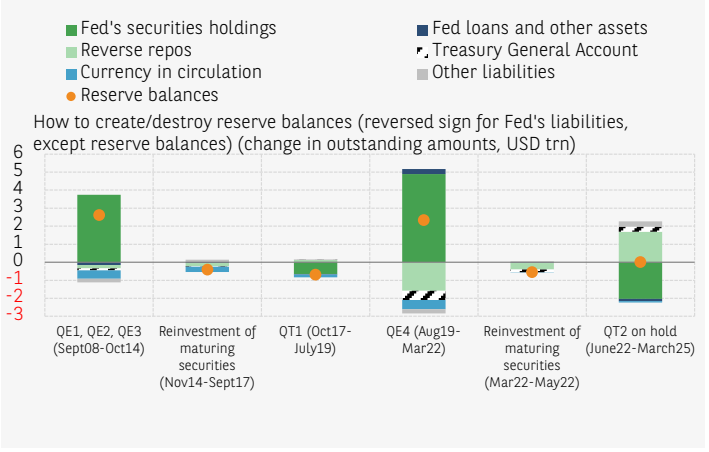

CHART 3 SOURCE: FEDERAL RESERVE (H.4.1), BNP PARIBAS

SINCE MID-2024, THE ON RRP FACILITY HAS BECOME LESS ATTRACTIVE THAN TRI-PARTY REPURCHASE AGREEMENTS

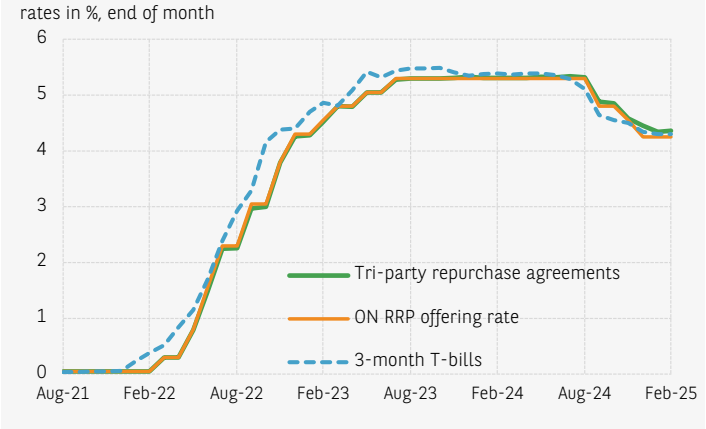

CHART 4 SOURCE: MACROBOND, BNP PARIBAS

IN 2019, THE REPO MARKET CRISIS OCCURRED ONE MONTH AFTER THE SUSPENSION OF THE FEDERAL DEBT CEILING

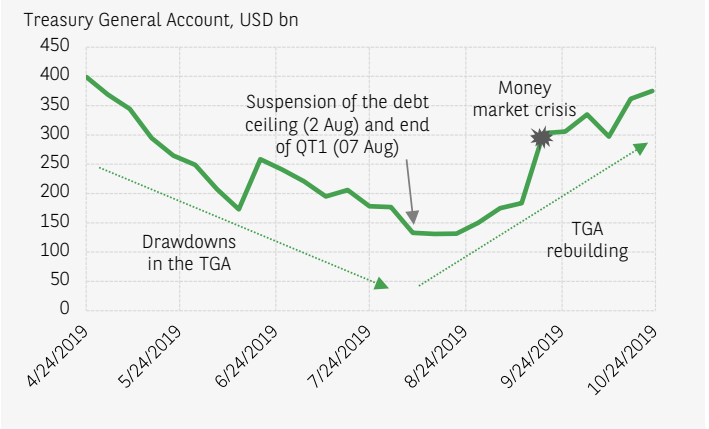

CHART 5 SOURCE: FEDERAL RESERVE (H.4.1), BNP PARIBAS

All other things being equal, the public spending achieved by drawing on the TGA will automatically lead to an increase in bank reserves with the Fed (*Box 3*). However, this positive impact could be partially, if not entirely, offset by money market fund arbitrage. With T-bill issues becoming scarcer, money market funds are likely to increase their "deposits" with the Fed via the ON RRP facility (which will automatically destroy part of the banks' reserves, *see Box 2*). Between 19 February and 5 March, the US Treasury withdrew USD 216 billion from its account. However, bank reserves only increased by USD 105 billion over the same period, due, on the one hand, to the continuation of QT2 (Fed assets down by USD 26 billion) and, on the other, to an increase in MMF "deposits" (USD 70 billion), and an increase in other Fed liabilities (USD 15 billion). If loans on the private repo markets remain more attractive than the ON RRP facility (as is currently the case, *see Chart 4*), the effect of the reduction in the TGA on reserves will be very positive and will cushion the impact of QT2 for a few months. Otherwise, there will be little or no effect.

In any case, the overall pool of central bank liquidity (bank reserves and MMF deposits with the Fed) will increase during the debt ceiling negotiation phase. Later, a political compromise will enable the US Treasury to replenish its account with the Fed by issuing securities. The low attractiveness of the ON RRP facility will encourage MMFs to leave it and invest in T-bills. In the event of a partial replenishment of US Treasury assets, the net effect on reserves of this episode (excluding the QT effect) could be positive. However, it is likely that the US Treasury will have to replenish them in full (especially if the new administration estimates that its cash requirements should there be a cyber attack are at the same level as the previous administration), and that the net effect will be zero. **Whatever the net effect, for a few months, the indicators monitored by the Fed (see below) are likely to become less relevant.** In August 2019, QT1 was ended. At the same time, the ceiling on federal debt was suspended, allowing the US Treasury to replenish its holdings with the Fed. The amount of central bank money proved insufficient just one month later (*Chart 5*).

The difficulty of assessing banks' reserve requirements

As it does not know precisely what the optimum amount of reserves should be (neither too little nor too much, but sufficiently "ample" to avoid any risk of stress that would require it to inject central bank money as a matter of urgency), **the Fed has set itself the objective, since the launch of QT2, of keeping its reserve supply above a floor, close to the level at the time of the crash in 2019.** In May 2024, it presented two possible trajectories for the evolution of its balance sheet[7]. They both assume that the reduction in the balance sheet will end in 2025 and that, after a one-year pause[8], asset purchases will resume in order to preserve the stock of reserves at 8% (low assumption) or 10% (high assumption) of GDP. On the basis of reserve demand curve simulations, Afonso, Giannone, La Spada and Williams (2022)[9] also estimated that a reserves-to-bank-assets ratio of less than 11% would suggest a scarcity of reserves, a ratio of more than 11% but less than 12-13% would indicate a sufficiently "ample" stock of reserves, and above 13%, an "abundant" stock.

Banks' outstanding reserves with the Fed averaged around USD 3,200 billion in the first two months of 2025, equivalent to 11.3% of GDP and 14% of banking assets (compared with USD 1,400 billion, equivalent to 8% of GDP and the same amount of banking assets, at the time of the September 2019 repo market crisis). **According to the parameters adopted by the Fed, it would therefore still have room for manoeuvre to reduce the size of its balance sheet.** By mid-February, however, the stock of reserves in excess of the threshold that marks the borderline between sufficient and insufficient reserves stood at just USD 370 billion. Assuming that the current pace of QT2 is maintained, the Fed's securities portfolio should shrink by a further USD 400 billion by the end of the year. All other things being equal, and based on our GDP growth forecasts, **QT2 could be completed by summer 2025.**

However, there is a risk that these floors have lost their relevance. For various reasons, banks' reserve requirements are changing (*Box 1*). The difficulty lies in assessing to what extent.

In the United States, the minimum level of reserves desired by the large-scale banks is all the more important given that their liquidity constraints are particularly stringent (see below), and the stigma associated with the Fed's lending windows deprives them of access to central bank money when needed. Various solutions are being considered to correct the very negative perception of this issue by banking supervisors and bank managers since 2008. The main breakthrough in this area since the March 2023 bank run is the clarification provided by the Fed in its publication of "frequently asked questions" last summer[10]. In this publication, it states that, as part of their internal liquidity stress tests (ILST), banks may consider replenishing their stock of reserves by mobilising their assets pre-positioned with the Fed (via the discount window or the Fed's reverse repurchase facility) or with Federal Home Loan Banks[11] (via FHLB-secured loans), provided that they mobilise "highly liquid" assets (identical to the securities eligible for high-quality liquid assets in the LCR numerator)[12].

THE REDUCTION IN THE GLOBAL SUPPLY OF CENTRAL BANK MONEY IS BEGINNING TO BE FELT ON THE MONEY MARKETS

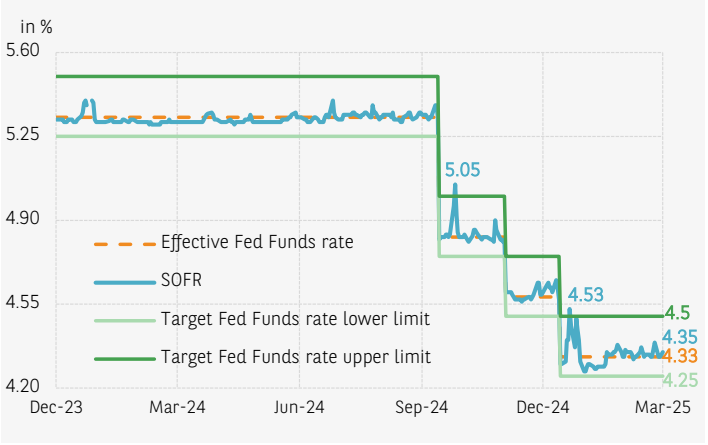

CHART 6 SOURCE: MACROBOND, BNP PARIBAS

This easing aims to offset the stigmatising effect - in the eyes of bank supervisors and managers - of using the Fed's emergency facilities. It must convince them of their usefulness, within the regulatory framework, in meeting banks' immediate liquidity needs (and encourage banks to prepare to make use of them by pre-positioning assets). By giving US Treasury securities and mortgage-backed securities (MBS) issued by mortgage guarantee and refinancing agencies the status of quasi-substitutes for central bank reserves, within the framework of ILST (which is the most restrictive liquidity requirement in the United States), this easing could also reduce the desired minimum level of reserves. However, it risks crowding out the holding of less liquid or illiquid assets (such as loans to the economy) in favour of liquid assets (Treasuries, MBS) and diverting the discount window from its primary purpose (transforming illiquid assets into liquidity for solvent banks faced with a liquidity shock)[13]. In addition, its ability to reduce the stigma attached to the Fed's lending facilities has yet to be demonstrated.

A list of leading indicators to be added

The Fed has added to its range of tools for detecting potential reserve shortages. In particular, since October 2024, it has published a "real-time" estimate of the elasticity of the effective federal funds rate to a change in the aggregate stock of reserves (Reserve Demand Elasticity, RDE)[14]. According to the Fed, this estimate would make it possible to distinguish between periods when reserves are "abundant" and those when they are "ample" or even scarce[15]. At the beginning of February, the RDE remained close to zero.

7 Choulet (2024), The Fed tries to prevent the money markets from potentially drying up, Chart of the Week, BNP Paribas, May 2024
8 At the end of QT2, its holdings of Treasuries will increase at the expense of its portfolio of mortgage-backed securities (MBS).
9 Afonso G., Giannone D., La Spada G. and Williams J. (2022), Scarce, abundant, or ample? A time-varying model of the reserve demand curve, Staff reports, FRBNY Staff Report No. 1019, May 2022, Revised April 2024
10 Federal Reserve Board - Frequently Asked Questions about Regulation YY
11 The FHLBs make up a network of 11 private credit unions. Their main task is to support the financing of the residential property market through secured loans to the institutions in their network.
12 Any asset that meets the liquidity and quality criteria, presented in advance, deposited with or given as collateral to a central bank or a Government-Sponsored Enterprise (GSE), but which has not been used to raise liquidity, continues to be recorded as liquid assets outstanding, in accordance with regulatory requirements. This pre-positioning would therefore have no effect on regulatory ratios.
13 Banks mainly use consumer or corporate loans as collateral for the discount window.
14 The elasticity is calculated using confidential daily data on aggregate deposits by deposit-taking institutions at the Fed (normalised by total banking assets). To take account of rate changes linked to monetary policy decisions, the interest rate on reserves is subtracted from the weighted daily average of the effective federal funds rate. Reserve Demand Elasticity - FEDERAL RESERVE BANK of NEW YORK
15 When reserves are abundant and banks' needs for central bank money are largely met, this elasticity is assumed to be zero (the reserve demand curve is flat); when the stock of reserves is sufficient to meet banks' needs, this elasticity is assumed to be negative but low (the curve slopes gently); when reserves become scarce, the elasticity is assumed to be negative and high (the curve slopes steeply).

Other indicators are also monitored[16], such as the proportion of interbank payments settled at the end of the day (after 5 p.m.)[17], the size of banks' daylight overdrafts with the Fed[18], the volume of borrowings by US banks on the federal funds market[19] and the share of repurchase agreements charged at or above the interest rate on reserves[20].

Based on these indicators, the Fed considers that reserves remain abundant for the time being (Logan, 2024 and Perli, 2024 and 2025)[21]. In fact, the pressure seen on repo market rates in the second half of 2024 (*Chart 6*)[22] was largely caused by specific calendar events (when financial accounts are closed at the end of the quarter and at the end of the year, financial intermediaries are encouraged to reduce their balance sheet exposures, in particular by not renewing their repo loans; on the settlement dates for issues of US Treasury securities or tax payments, the stock of reserves is automatically eroded). Against a backdrop of shrinking global liquidity, the Fed does not consider these tensions to be alarming, especially as they were modest and quickly dissipated (Gowen, Perli, Remache and Riordan, 2025)[23].

The indicators monitored by the Fed nevertheless need to be supplemented. In particular, the Fed seems to be underestimating the effects of the growth in centrally cleared repurchase agreements for Treasuries, which reduces quarter-end tensions but increases banks' reserve needs (*see below*). In addition, while the average value of banks' daylight overdrafts with the Fed remains low, a sign of the abundance of reserves at the aggregate level, the peaks in daylight overdrafts widened significantly in the second half of 2024, returning to their 2019 level[24]. Finally, **the Fed's focus on the federal funds market raises a few questions.** This is because 1) daily outstanding loans are very modest (an average of around one hundred billion dollars lent each day, compared with at least[25] USD 4,000 billion on the Treasuries repurchase agreement markets), and 2) the number of participants is normally limited for regulatory reasons (the GSEs make up most of the loans and the US branches of foreign banks make up most of the borrowings[26]).

Admittedly, in 2018 and 2022, as liquidity needs became more pressing, the US regional banks made greater use of the federal funds market. **However, the recommendations published in August 2024 by the Fed and the FDIC on the resolution plans imposed on category 2 and 3 banks[27] could reduce their interest in this market.** The supervisors are not advocating a framework as restrictive as that applied to systemic banks, but are recommending daylight monitoring of liquidity risks. However, borrowing federal funds is not suitable for meeting this type of requirement. On the federal funds market, loans are overnight. Borrowed funds are generally repaid in the morning (around 5.30 a.m. to 6 a.m. New York time) and borrowings renewed at midday. The banks are therefore left with no liquidity for a few hours. Borrowing federal funds enables banks to obtain central bank money to settle an interbank debt, cover a payment delay or meet the Basel LCR liquidity constraint, but it is not suitable for meeting the liquidity requirements specific to the resolution plans.

FHLB DEPOSITS PROVIDE EARLY SIGNS OF PRESSURE ON LIQUIDITY

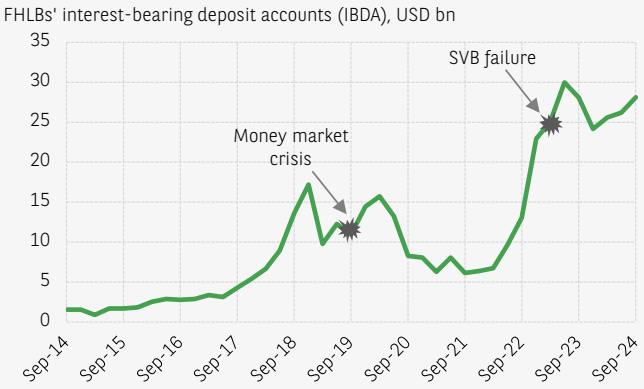

CHART 7 SOURCE: FHLB OFFICE OF FINANCE, BNP PARIBAS

THE FHLBS' DEPOSITS EARN HIGHER INTEREST THAN FED FUND LENDING

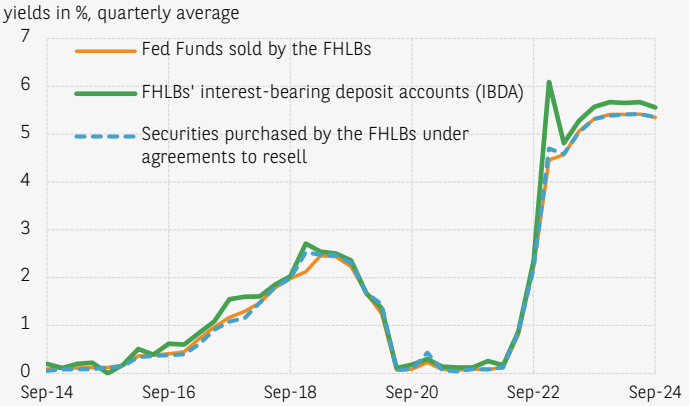

CHART 8 SOURCE: FHLB OFFICE OF FINANCE, BNP PARIBAS

16 A New Set of Indicators of Reserve Ampleness - Liberty Street Economics
17 Throughout the day, banks use their accounts with the Fed to make payments to other banks, transferring their reserves via the Fedwire Funds Service. When the reserve supply decreases, banks tend to postpone their payments until the end of the day to ensure that they have sufficient reserves.
18 Because of the time lag between incoming and outgoing payments, a bank's account balance with the Fed may be negative over the course of a day. As reserves become less abundant, banks' use of Fed daylight credit is likely to increase.
19 As long as the central bank reserves remain abundant, US banks have little interest in borrowing federal funds (commission paid to the FDIC, leverage requirement, penalty associated with interbank debt for calculating the LCR), unlike US branches of foreign banks (access to dollar refinancing, appeal of the return offered by the Fed on reserves, no commission to be paid to the FDIC). If central bank money were to become scarcer, US banks could make greater use of it.
20 The repurchase agreement market and the federal funds market are close substitutes for some banks. Central bank money drying up is likely to hamper banks' ability to intermediate in the repurchase agreement market and put upwards pressure on repurchase agreement rates.
21 https://www.dallasfed.org/news/speeches/logan/2024/lkl241021; Balance Sheet Normalization: Monitoring Reserve Conditions and Understanding Repo Market Pressures - Federal Reserve of New York; Current Issues in Monetary Policy Implementation - Federal Reserve of New York
22 At the end of Q3 2024, the reference rate on overnight repo transactions (SOFR) deviated from the effective federal funds rate by 22 bps (by 5 bps from the upper limit of the Fed's rate corridor), by 20 bps on 26 December (by 3 bps respectively); the highest spreads since March 2020.
23 Gowen B., Perli R., Remache J. and Riordan W. (2025), Monitoring money market dynamics around year-end, FRBNY, January 2025
24 Federal Reserve Board - Data: Peak and Average Daylight Overdrafts and Related Fees
25 This volume does not take into account bilateral transactions without centralised clearing, for which the Fed has only fragmentary information.
26 See note 19. The FHLBs, on the other hand, have an incentive to lend on this market (their account with the Fed does not earn interest, and loans from the federal funds constitute liquid assets needed to comply with their regulatory constraints and to offer secure loans to banks).
27 Banks with a balance sheet size exceeding USD 100 billion but which are not considered systemically important; Federal Reserve, Federal Deposit Insurance Corporation (2024), Guidance for resolution plan submissions of domestic triennial full filers, Federal Register, vol.89, No. 158, August 2024

On the other hand, FHLB deposits with banks are relevant leading indicators, which would be a welcome addition to the list of those already monitored by the Fed. The speed of their expansion, first in 2018 and then during 2022, on the eve of two episodes of extreme liquidity tension (September 2019 and March 2023), and the remuneration offered in return (which may have exceeded that of the banks' reserves with the Fed) suggest that, unlike borrowing federal funds, they improve the daylight and daily liquidity positions of the large-scale banks (*Charts 7 and 8*). Their supervision seems all the more opportune as, since last January, the exposure limits per counterparty, applied to the deposit accounts of the FHLBs, have been raised to the same level as those set for their federal funds loans[28].

The pitfalls of the new liquidity injection tool

With the introduction of the Standing Repo Facility (SRF) in July 2021, the Fed has acquired both a new leading indicator of possible pressure on liquidity and a tool for injecting central bank money[29]. The SRF was intended to enable banks to temporarily convert securities placed under repurchase agreements with the Fed into central bank money, to replenish their stock of central bank reserves[30], and thus to meet demand for cash on the money markets. In addition to the ON RRP facility, it aims to introduce a corridor for borrowing rates on the repurchase agreement markets.

However, should there be a shortfall in central bank money, the facility's ability to alleviate monetary tensions is compromised. The first stumbling block is the lack of centralised clearing for repo loans taken out with the Fed. The US central bank's transactions are carried out on the tri-party repo platform (on which Bank of New York Mellon, as third-party agent, manages the movements of securities and cash between the two counterparties), but without centralised clearing of positions via the Fixed Income Clearing Corporation (FICC). However, the primary purpose of the service provided by the FICC is to enable positions to be cleared multilaterally. For each type of underlying asset given, it calculates the net balance of the positions (subject to clearing) for each of its members vis-à-vis all their counterparties. Centralised clearing therefore enables primary dealers not only to reduce their exposure to (counterparty and operational) risks and unrealised cash flows when transactions are settled, but also to reduce their balance sheets. As the liquidity offered by the Fed through the SRF is provided without the intervention of the FICC, it is therefore inaccessible to primary dealers or deposit-taking institutions that are most constrained by their leverage requirements, particularly in the run-up to accounting cut-offs. This is all the more detrimental given that some market participants (such as brokers without primary dealer status, small deposit-taking institutions and hedge funds), who have no access to the SRF or money market funds, rely heavily on primary dealers and large-scale banks to provide them with liquidity.

A second limiting factor is the timing of transactions. They are settled in a relatively late time window (between 1.30 p.m. and 1.45 p.m.), which is the preferred time for bilateral repo agreement market participants to finance their books or obtain liquidity. The opening of the SRF counter from 30 December to 3 January between 8:15 a.m. and 8:30 a.m., in addition to the usual opening hours, was intended precisely to correct this problem, to reassure market participants that liquidity would be available at the right times and to avert the risk of tensions on the money markets when the year-end accounts were closed. Finally, the stigmatisation risk associated with its use is a third factor likely to discourage banks from using it.

CENTRAL CLEARING ON TREASURY REPO MARKETS ON THE RISE

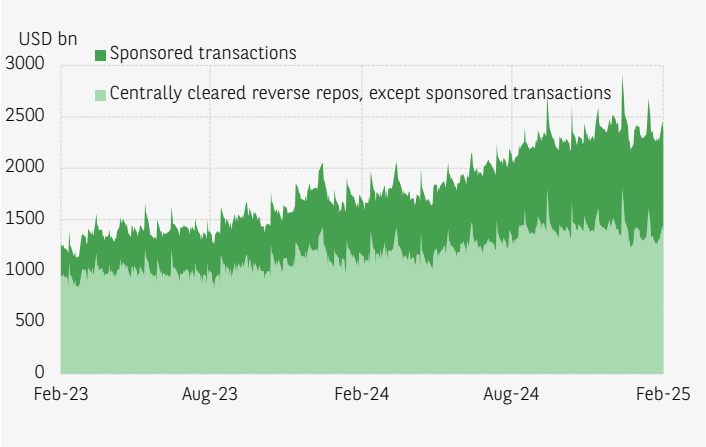

CHART 9 SOURCE: OFFICE OF FINANCIAL RESEARCH, DTCC, BNP PARIBAS

In the past, the limited use of the Fed's repurchase agreement facility during episodes of intense tension on the money markets (in December 2019 and March 2020) had already illustrated the facility's limited ability to contain rates on the repurchase agreement markets. Beyond the USD 256 billion of liquidity "borrowed" from the Fed, as part of its reverse repurchase agreements on 31 December 2019, dealers had partially refinanced their inventories of securities through repo loans with MMFs, which were cleared via the FICC at USD 276 billion. In March 2020, faced with rapidly deteriorating financial conditions, the Fed significantly increased the ceiling for its reverse repurchase agreements. However, demand from primary dealers remained low when compared against the Fed's liquidity supply, and only the promise of "unlimited" outright security purchases, followed by the removal of reserves and Treasuries from the leverage ratio calculation helped to stabilise the markets.

The last two quarter-ends (September and December 2024) did not really allow the effectiveness of the facility to be tested. In fact, in September 2024, only two institutions used it for a total amount of USD 2.6 billion, and in December 2024, only USD 4 million was borrowed. Several factors may have played a part: 1) the aggregate volume of reserves, which is still abundant; 2) fears of tensions at year-end, which prompted some market participants to take out term loans earlier in the month in order to protect themselves against the risk of rising overnight rates, thereby reducing the demand for cash at the turn of the year; 3) the record level of Treasuries repurchase agreements, with centralised clearing (USD 2,900 billion at 31 December, including USD 1,000 billion in the form of sponsored reverse repo, *Chart 9*)[31].

28 Choulet (2024), FHLB deposits, leading indicators of pressure on liquidity, Graphs of the Week, BNP Paribas, October 2024 and FHFA Announces Final Rule Expanding Access to Liquidity for the Federal Home Loan Bank System | FHFA
29 Choulet (2021), The Fed, the new preferred repo counterparty in times of tension, Ecoflash, BNP Paribas, December 2021
30 Under the SRF, certain counterparties (primary dealers and deposit-taking institutions with a balance sheet of more than USD 10 billion or a portfolio of eligible securities of more than USD 2 billion) may put Treasuries, debt securities and MBS issued by the GSEs and public agencies under repurchase agreements with the Fed. Each eligible counterparty can "borrow" up to USD 120 billion in cash from the Fed on a daily basis. Transactions are charged at the marginal lending facility rate (4.5% since 18 December) and capped overall at USD 500 billion. The Fed records the repo in its assets as a receivable and credits the intermediary bank's current account (central bank reserves), in its liabilities. Currently, the Fed's list of SRF counterparties includes 37 deposit-taking institutions in addition to 25 primary dealers.
31 The FICC's Sponsored Service enables dealers to sponsor the indirect membership of some of their counterparties (such as money market funds and hedge funds) in the FICC and to route their repurchase agreements through centralised clearing.

The importance of the bilateral repurchase agreement market

As shown by the indicators that it favours and the introduction of its SRF in 2021, the Fed is focusing its attention on a limited segment of the US Treasury securities repurchase-agreement market, that of tri-party transactions without centralised clearing (USD 730 billion on average in 2024, excluding the Fed's ON RRP facility and SRF). Tracking the borrowing rate on this market segment (Tri-Party General Collateral Rate, TGCR) is preferred to tracking the overnight rate on the SOFR (Secured Overnight Financing Rate) repo market. The latter corresponds to the median rate for all repurchase agreements (for which the Fed has data) carried out on a tri-party basis, with or without centralised clearing (USD 750 billion), or on a bilateral basis with centralised clearing (USD 1,250 billion). The SOFR calculation is therefore based on a much larger total amount of transactions (USD 2,000 billion on average in 2024).

However, the SOFR offers better visibility of the conditions for access to liquidity, because it covers a wider range of financial institutions, both banks and non-banks (such as dealers and hedge funds). On repurchase agreement markets, dealers facilitate the circulation of cash and collateral. They typically borrow cash on the tri-party segment from financial institutions, such as money market funds or FHLBs, and lend it on the bilateral segment to institutions, such as hedge funds, that require cash to finance their securities portfolios.

The Fed deplores the fact that the costs inherent in the brokerage activity of dealers[32] disrupt the trend in the SOFR rate and make it difficult to interpret. In our view, **this "noise" can, on the contrary, be used to assess the conditions under which liquidity is redistributed** (at least partially, since data on repurchase agreements without centralised clearing is very fragmented). The growth of primary dealers' holdings of Treasuries and the growing importance of hedge funds among holders of Treasuries - two types of financial institution that are largely financed on repurchase agreement markets - have increased the share of Treasuries financed through repurchase agreements (*Chart 10*), outside the tri-party segment (*Chart 11*). The growth in centralised clearing of repo markets has eased the balance sheet constraints of primary dealers (and reduced the risk of quarter-end tensions on money market rates). However, **the expansion of repo markets may also have increased the need for reserves on the part of major dealers, in order to fulfil their role as market makers for non-banks, but also for small dealers or small banks, without direct access to money market funds or to the Fed's SRF.**

Article completed on 11 March 2025

Céline Choulet

THE SHARE OF TREASURIES FINANCED THROUGH REPURCHASE AGREEMENTS IS RISING

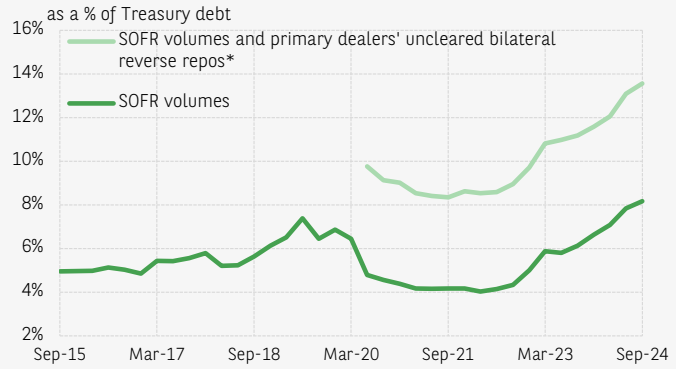

CHART 10 SOURCE: FEDERAL RESERVE, FRBNY, BNP PARIBAS

MAIN SEGMENTS OF THE TREASURY REPO MARKET

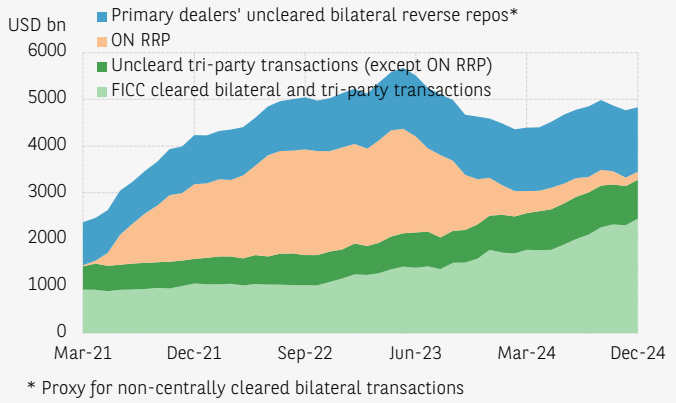

CHART 11 SOURCE: OFFICE OF FINANCIAL RESEARCH, FED, FRBNY, BNP PARIBAS

32 Certain "special" transactions are excluded from the calculation: Statement on the Implementation of Modifications to the Secured Overnight Financing Rate (SOFR) - FEDERAL RESERVE BANK of NEW YORK.

SUPPLY OF AND DEMAND FOR CENTRAL BANK RESERVES

The aggregate stock of central bank reserves evolves with the size of the central bank's balance sheet and the financial behaviour of non-bank agents. For a given balance sheet size, an increase in one of the liability items on the central bank's balance sheet (coins and banknotes in circulation, US Treasury deposit account, and repurchase agreements with money market funds or foreign central banks) results in the stock of reserves being reduced.

Banks' central bank money needs are driven by a range of constraints. The banks hold some:

1) for their day-to-day transactions as a means of settlement on the interbank market,

2) to cover any delays in payment or unforeseen outflows of deposits,

3) since the Basel 3 agreements, to meet regulatory liquidity requirements.

These rules require them to hold sufficient high-quality liquid assets, such as central bank reserves or US Treasury securities, to cover theoretical net cash outflows in the event of a liquidity crisis. At 30 days, as part of the Basel standard for short-term liquidity (Liquidity Coverage Ratio, LCR), and at various horizons (overnight, 30 days, 90 days, 1 year) as part of internal liquidity stress tests (ILST, calibrated on LCR assumptions); not on a daily but a daylight basis, as part of the resolution plans. The liquidity provided by the reserves is, however, unique. It is the only asset that does not need to be monetised, is available at any time of day and has a constant value. The minimum level of reserves desired by large-scale banks is all the more important given that their liquidity constraints are particularly demanding, and the stigma associated with the Fed's lending windows deprives them of access to central bank money when needed.

It is difficult to quantify the scale of central bank money requirements. Structural factors, such as the internal management of liquidity risk, time lags between large dealers' incoming credit and outgoing debit payments, and shallow money markets at the end of the day tend to increase it (Copeland, Duffie and Yang, 2021; Afonso, Duffie, Rigon and Shin, 2022[1]). In recent years, the distortion of bank balance sheets caused by successive quantitative easing programmes (which increased the liquid deposits subject to withdrawals), the record level of unrealised losses on bank bond portfolios (which reduced the liquidity of securities), the bank run of March 2023 (which highlighted how quickly deposit leaks could occur in the digital age), and the surge in US debt (which is accompanied by increased financing needs on the repurchase agreement markets), have all certainly increased banks' reserve requirements.

Due to the confidential nature of certain information, such as liquidity risk management, in the resolution plans submitted to the supervisor or the results of the ILSTs, a detailed analysis of the banks' liquidity position cannot be undertaken. In terms of the Basel LCR requirement (not very decisive in the United States, but the only observable one), the liquidity position (immediately available) of the eight largest US banks remained satisfactory in the fourth quarter of 2024 (average LCR ratio of 117.4%) compared with the minimum requirement (100%) but close to the Fed's expectations (115%).

1 Copeland A., Duffie D. 7 and Yang Y. (2021), Reserves were not so ample after all, FRBNY Staff Report No. 974, July 2021; Afonso G., Duffie D., Rigon L. and Shin H.S. (2022), How abundant are reserves? Evidence from the wholesale payment system, Staff reports, FRBNY Staff Report No. 1040, November 2022

BOX 1

THE EFFECTS OF AN INCREASE/DECREASE IN THE FED'S REPURCHASE AGREEMENT FACILITY (ON RRP)

Under the ON RRP facility, the Fed places the US Treasury securities that it holds on its balance sheet under repurchase agreements with counterparties (banks, primary dealers, Government Sponsored Enterprises and money market funds) and is committed to repurchasing the securities when the agreement expires. This transaction can be interpreted as a secured «loan» from a financial institution to the Fed (cash for Treasuries) or as a «deposit» by a financial institution with the Fed, in exchange for the transfer of ownership, for a specified period, of the securities used as collateral. The aim of this facility is to establish a floor for short-term market rates. It encourages eligible counterparties to «lend» some of their cash to the Fed rather than lending it on the federal funds market or private repo markets. The Fed performs most of its reverse repo transactions (via banks) with money market funds, which are the only institutions with an incentive to take advantage of them.

From March 2021, as it expanded its balance sheet (QE, Quantitative Easing), the Fed reactivated the ON RRP programme. Repurchase agreements on the Fed's balance sheet are channelled through bank balance sheets. The Fed records the reverse repo agreement in its liabilities as a debt and debits the intermediary bank's current account (central bank reserves) for the same amount (*Figure 1*). Taken in isolation, a repurchase agreement has no effect on the size of the Fed's balance sheet, but it does change the composition of its liabilities (substitution of a repo borrowing for reserves).

Taken in isolation, QE expands the Fed's balance sheet and bank reserves. When the Fed buys securities (QE) and places them under repurchase agreement (ON RRP), its balance sheet expands, as does its repurchase agreement debt. Repurchase agreements cancel out the beneficial effect of QE on reserves.

FIGURE 1

Impact of QE and a repurchase agreement of the Fed (ON RRP facility) with a money market fund

A commercial bank acts on behalf of a money market fund, which takes 100 units of securities on pension from the Fed.
Stage 1: a customer sells 100 units of US Treasury debt securities to the Fed
Stage 2: the money market fund takes on repurchase agreements for securities held by the Fed

Central Bank				Commercial bank				Customer				Money market fund			
Assets		Liabilities		Assets		Liabilities		Assets		Liabilities		Assets		Liabilities	
Securities	+100	Reserves	+100	Reserves	+100	Deposits	+100	Securities	-100			Deposits	-100	Fund shares	
			-100		-100		-100	Deposits	+100			ON RRP	+100		
		ON RRP	+100												
Balance sheet size: +100 (ON RRP +100)				Balance sheet size unchanged				Balance sheet size unchanged				Balance sheet size unchanged			

From April 2023, MMFs reallocated some of the cash deposited with the Fed to T-bills and private repo markets as the Fed continued to reduce its balance sheet (QT). When a money market fund reduces the amount of cash that it «deposits» with the Fed, the Fed records a reduction in its repurchase agreement borrowing. It credits the current account of the intermediary bank, which in turn credits the money market fund's deposit account (in practice, compared with the previous day, it debits a lower amount from the current account of the commercial bank, which debits a lower amount from the money market fund's deposit account, since repurchase agreements are renewed on a daily basis). The assets of the bank (reserves) and the money market fund (deposits) temporarily increase (*Figure 2*). The placement of newly-issued US Treasury securities with the money market fund results in a reduction in the fund's deposits and a transfer from the intermediary bank's account to the Bank of New York Mellon's (BONY) account with the Fed. The size and composition of the intermediary bank's balance sheet ultimately remain unchanged.

Taken in isolation, QT reduces the Fed's balance sheet and destroys central bank reserves. When the Fed reduces its securities portfolio (QT) and its repurchase agreements (ON RRP), its balance sheet reduces, as does its repurchase agreement debt. The decrease in repurchase agreements cancels out the negative effect of the QT on the reserves.

FIGURE 2

Impact of QT and reallocation of money market fund assets outside the ON RRP facility to T-bills

A money market fund subscribes for the new US Treasury issue and reduces its repos with the Fed
Stage 1: the primary dealer subscribes to the issue of 100 units of US Treasury debt securities using its holdings with BONY
Stage 2: 100 units of the US Treasury debt securities portfolio held by the Fed mature
Stage 3: the money market fund reduces its reverse repurchase agreements with the Fed
Stage 4: the primary dealer places the securities with a money market fund

BOX 2

Central Bank

Assets		Liabilities	
Securities	-100	Reserves	-100
			+100
			-100
			+100
		TGA	+100
			-100
		ON RRP	-100

Balance sheet size: -100 (ON RRP -100)

Commercial bank

Assets		Liabilities	
Reserves	+100	Deposits	+100
	-100		-100

Balance sheet size unchanged

US Treasury

Assets		Liabilities	
TGA	+100	Securities	+100
	-100		-100

Balance sheet size unchanged

Money market fund

Assets		Liabilities
Deposits	+100	Fund shares
	-100	
ON RRP	-100	
Securities	+100	

Balance sheet size unchanged

Primary dealer

Assets		Liabilities
Deposits	-100	Repo
	+100	
Securities	+100	
	-100	

Balance sheet size unchanged

BONY

Assets		Liabilities	
Reserves	-100	Deposits	-100
	+100		+100

Balance sheet size unchanged

Similarly, if a private investor obtains an MMF repo loan in order to finance its purchase of Treasuries, the money market fund's participation in the ON RRP facility (at a given balance sheet size) is reduced (*Figure 3*). Ultimately, and all other things being equal, the Fed's balance sheet will be reduced exclusively by reducing its repo borrowings with money market funds, without destroying reserves. In a way, this reduction frees up the previously sterilised central bank money (*Figure 1*).

FIGURE 3

Impact of QT and reallocation of money market fund assets outside the ON RRP facility to repurchase agreement markets

A hedge fund subscribes for the new US Treasury issue by borrowing from a money market fund

Stage 1: the US Treasury issues 100 units of debt securities

Stage 2: 100 units of the US Treasury debt securities portfolio held by the Fed mature

Stage 3: the money market fund makes a repo loan to a hedge fund (and reduces its repo loan to the Fed)

Stage 4: the primary dealer places the securities with the hedge fund

Central Bank

Assets		Liabilities	
Securities	-100	Reserves	-100
			+100
			-100
			+100
		TGA	+100
			-100
		ON RRP	-100

Balance sheet size: -100 (ON RRP -100)

BONY

Assets		Liabilities	
Reserves	-100	Deposits	-100
	+100		+100

Balance sheet size unchanged

US Treasury

Assets		Liabilities	
TGA	+100	Securities	+100
	-100		-100

Balance sheet size unchanged

Money market fund

Assets		Liabilities
Deposits	+100	Fund shares
	-100	
ON RRP	-100	
Repo	+100	

Balance sheet size unchanged

Primary dealer

Assets		Liabilities
Deposits	-100	Repo
	+100	
Securities	+100	
	-100	

Balance sheet size unchanged

Commercial bank

Assets		Liabilities	
Reserves	+100	Deposits	+100
	-100		-100

Balance sheet size unchanged

Hedge fund

Assets		Liabilities	
Deposits	+100	Repo	+100
	-100		
Securities	+100		

Balance sheet size unchanged

THE EFFECTS OF INCREASING/REDUCING THE US TREASURY ACCOUNT WITH THE FED (TGA)

When the proceeds from net issues of government securities, or from the collection of tax revenues, are not immediately used to finance additional spending, but are partially accumulated in the US Treasury's account with the central bank, the banks' reserves are reduced by an equivalent amount. In a way, the US Treasury (temporarily) «sterilises» the money in circulation and, since the transaction passes through the banks' balance sheets, (temporarily) destroys reserves. For example, when a money market fund subscribes to a US Treasury securities issue, its deposit account with a commercial bank is reduced (*Figure 4*). If the US Treasury chooses to increase its account with the Fed rather than spend, then cash is transferred from the commercial bank's current account with the Fed (reserves) to the US Treasury's account (TGA).

Taken in isolation, an increase in the TGA has no effect on the size of the Fed's balance sheet, but it does change the composition of its liabilities (substitution of US Treasury deposits for bank deposits with the Fed).

FIGURE 4

Impact of an increase in the TGA

The US Treasury issues 100 units of debt securities and increases its account with the Fed

Central Bank			Commercial bank			US Treasury			Money market funds		
Assets		Liabilities	Assets		Liabilities	Assets		Liabilities	Assets		Liabilities
Securities		Reserves -100	Reserves	-100	Deposits -100	TGA	+100	Securities +100	Deposits	-100	Fund shares
		TGA +100							Securities	+100	
Balance sheet size unchanged			Balance sheet size unchanged			Balance sheet size unchanged			Balance sheet size unchanged		

In the same way, the reduction in the US Treasury's assets allows the previously "sterilised" money to be reinjected into the economy and the stock of reserves to be increased. For example, when the US Treasury honours a debt repayment by drawing on its account with the Fed, there is a transfer of central bank assets from the US Treasury's account to the account of the commercial bank (*Figure 5*).

FIGURE 5

Impact of a reduction in the TGA

The US Treasury draws on its account with the Fed to honour a debt repayment

Central Bank			Commercial bank			US Treasury			Money market funds		
Assets		Liabilities	Assets		Liabilities	Assets		Liabilities	Assets		Liabilities
Securities		Reserves +100	Reserves	+100	Deposits +100	TGA	-100	Securities -100	Deposits	+100	Fund shares
		TGA -100							Securities	-100	
Balance sheet size unchanged			Balance sheet size unchanged			Balance sheet size unchanged			Balance sheet size unchanged		

BOX 3

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