



The Nitty Gritty of US M2 Changes

By John Greenwood

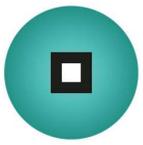
Introduction and Overview

- The US money supply M2 has turned upwards for the past three months after falling for nearly a year. What is the explanation? Does this mark the start of a new trend?
- Overnight Reverse Repos (O/N RRP) at the Fed, whose yields are set at the lower end of the Fed funds range plus 5 b.p., have been falling recently as Money Market Funds reduce the amount of O/N RRP they do with the Fed.
- It is these transfers from money (liabilities) on the Fed's balance sheet to deposits in the banking system that have boosted deposits in the banking system and hence M2 in the last 3 months.
- Nevertheless, at the same time, MMF assets have continued to rise.
- With MMF yields remaining higher than average time or savings rates on bank deposits, funds have continued to flow from deposits into MMFs.
- What explains the movement of funds into and out of RRP? Answer: the rise in short-term T-bill rates relative to the O/N RRP rate, or the spread of short-term T-bill yields over the Fed's O/N RRP rate.
- The big picture is that the major drivers of the decline in M2 (the slowdown in bank lending and the Fed's shrinkage of its balance sheet via QT) are still intact.
- This implies that the decline in M2 is highly likely to resume as soon as market participants expect the spread between the O/N RRP rates and the yield on short-dated T-bills to narrow again. The latest data suggest this might already be happening.
- In other words, the increase in M2 has been a temporary episode triggered by the change in market expectations about the trajectory for the Fed funds rate (and hence the O/N RRP rate) relative to the yield on very short-term T-bills.
- A full accounting shows that Money Market Fund flows out of RRP into M2 explain most of the recent upturn in US money growth; the contribution of the TGA is minimal.

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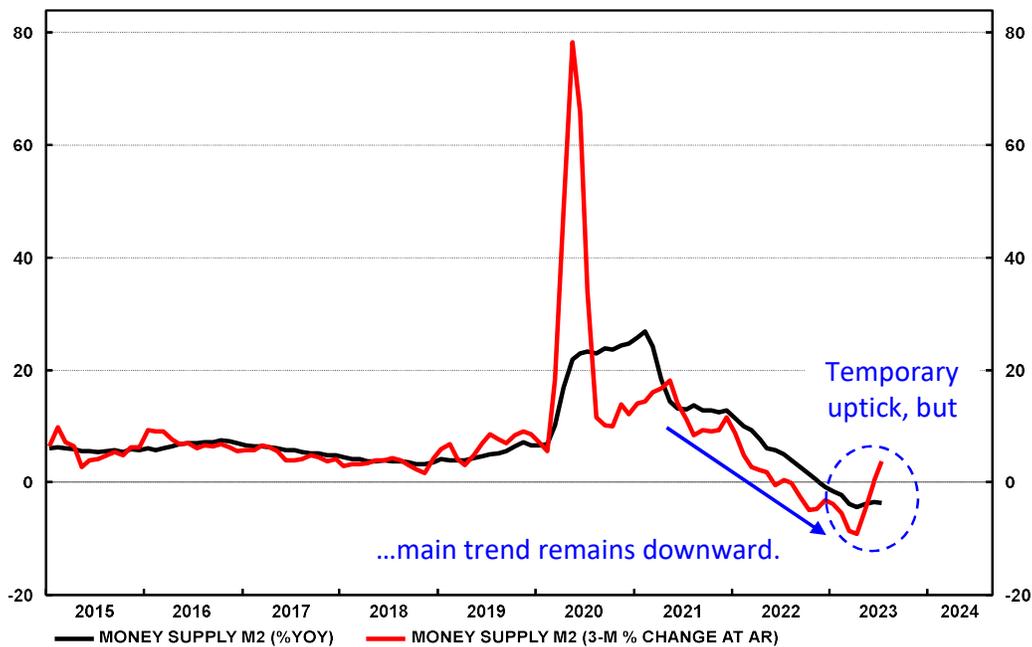


1. Introduction: recent trends in US M2 growth.

US M2 peaked in absolute terms in March/April 2022 and then remained roughly stable through the summer until September 2022 when it started to fall, declining continuously until April 2023. The decline was from \$21,703.6 billion in July 2022 to \$20,712.1 billion in April 2023, or a decline of nearly \$1 trillion, or -4.5%, the largest percentage decline in M2 since 1929-33 (-38.2%) or 1937-38 (-2.6%).

However, after roughly a year of being static or falling in the year to April 2023, the US money supply increased in May, June, and July 2023 to \$20,903 billion. Why, despite the much higher Fed funds rate over the year, and the continuing slowdown in bank lending, did M2 increase? Was it due to actions by the Fed, or due to actions by the commercial banks, or by money market funds? Does the recent increase indicate the start of a new uptrend of M2 growth?

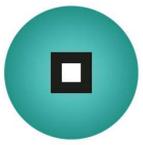
Figure 1. The 3-Month Upturn in M2 Growth.
US M2 (% YOY and 3-MONTH % CHANGE AT ANNUAL RATE)



2. The Decline in the Volume of Overnight RRPs

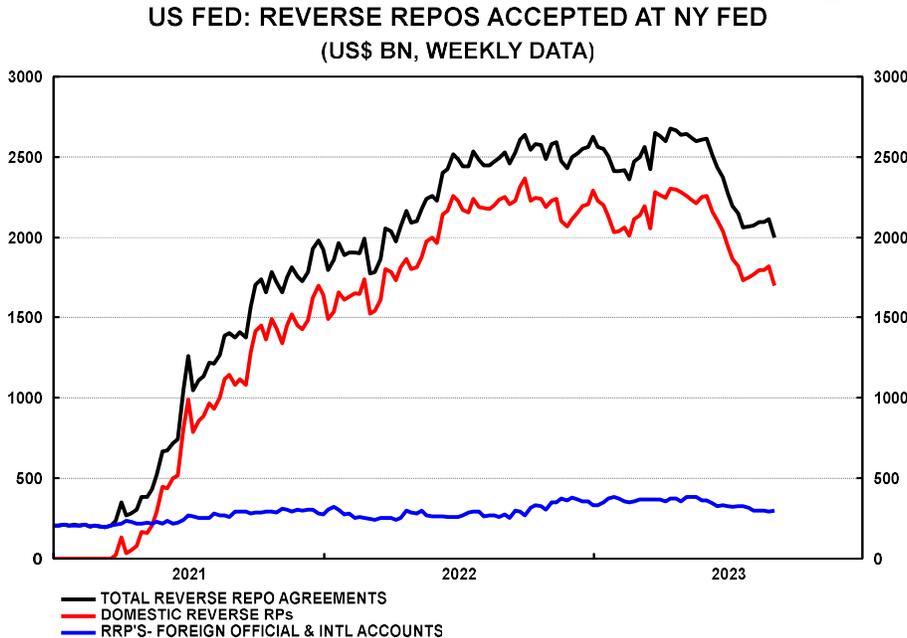
Many participants in financial markets have noted that the volume of outstanding Overnight Reverse Repos (O/N RRP) accepted by the New York Fed has fallen since early June. Domestic O/N RRP accounts fell from \$2.26 trillion in early June to \$1.651.6 trillion on August 31, while foreign official and international accounts fell from \$380 billion to \$302 billion over the same period (Figure 2 on p. 3).

By way of background, the NY Fed has long offered Reverse Repos to foreign official and international account holders (mainly central banks and government accounts).



Now that the Fed pays interest on reserves (IOR) to banks at the lower Fed funds rate plus 15 b.p., banks have no incentive to lend at rates below the Fed funds rate. But there are some institutions that are not eligible receive IOR. To improve its short-term interest rate control and ensure that the Fed funds target range is not undercut, the Fed extended the RRP facility to domestic, non-member banks (e.g., Federal Housing Associations or FHAs) and Money Market Funds, at the rate of the lower

Figure 2. The Volume of O/N RRP's at the Fed has been Falling.

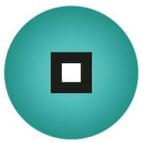


end of the Fed funds range plus 5 b.p. There is also a counterparty size limit that has been adjusted periodically. Currently there are over one hundred participating counterparties. While rates were effectively zero in 2020-21 there was very little demand for RRP's. However, as market rates started rising in early 2021 (ahead of any official Fed rate hikes), demand for RRP's started to increase as shown above.

The decline in O/N RRP volumes has been mainly due to Government MMFs choosing to shift their portfolios to hold short-term T-bills or to do repos on T-bills, rather than doing O/N RRP's with the Fed. It is these transfers from money (liabilities) on the Fed's balance sheet to deposits in the banking system that have boosted deposits in the banking system and hence M2 in the last 3 months.

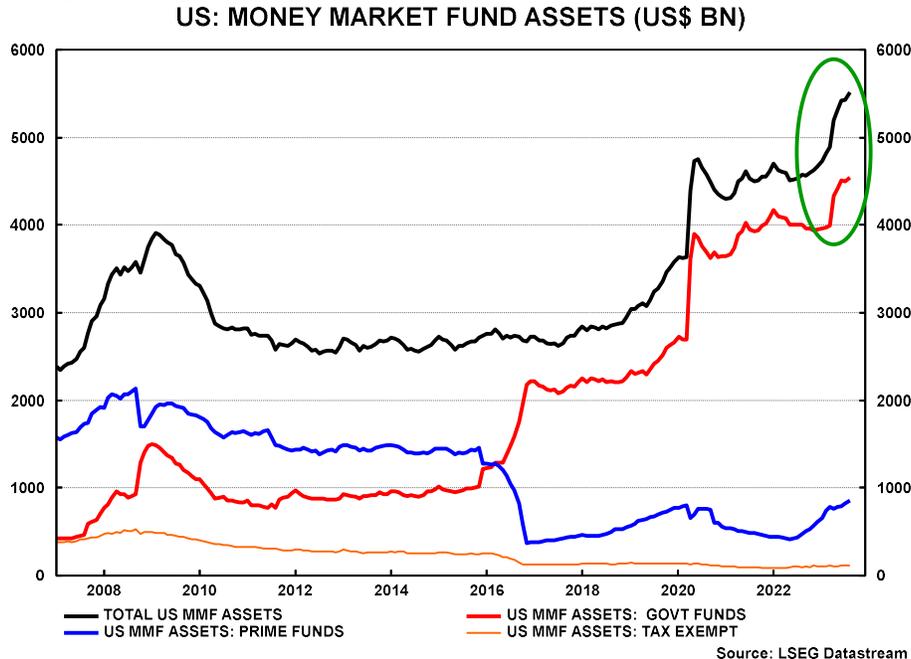
3. The Continued Increase in MMF Assets

The decline in O/N RRP's at the Fed is definitely not a result of any reduction in MMF assets. On the contrary, as shown by the black line in Figure 3, MMF assets had increased to \$5,516 trillion at the end of August, with the latest surge of \$1 trillion from \$4.5 trillion starting in mid-2022. This reflects the fact that MMFs quickly reflected rising competitive money market rates whereas the rates on bank deposits increased only slowly. With MMF yields remaining substantially higher than average



time or savings rates on bank deposits, funds have naturally continued to flow from deposits into MMFs.

Figure 3. Money has Continued to Flow into Money Market Funds.



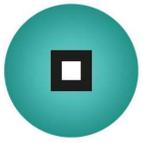
As the red line in the chart above shows, since the SEC’s reform of Money Market Funds in 2014 (implemented from 2016), “Government funds” have become the dominant class of MMF. A Government MMF is one that invests at least 99.5% of its total assets in cash, government securities, and/or repurchase agreements that are collateralized by cash or government securities.

4. The Options Facing Government MMF Managers

As explained above, MMF managers have a choice of (1) holding Treasury bills outright, or (2) doing repos on T-bills in the general repo market, or (3) placing funds with the Fed at the Overnight Repo rate, which is set at the lower end of the Fed funds range (currently 5.25%) plus 5 basis points, giving 5.30%.

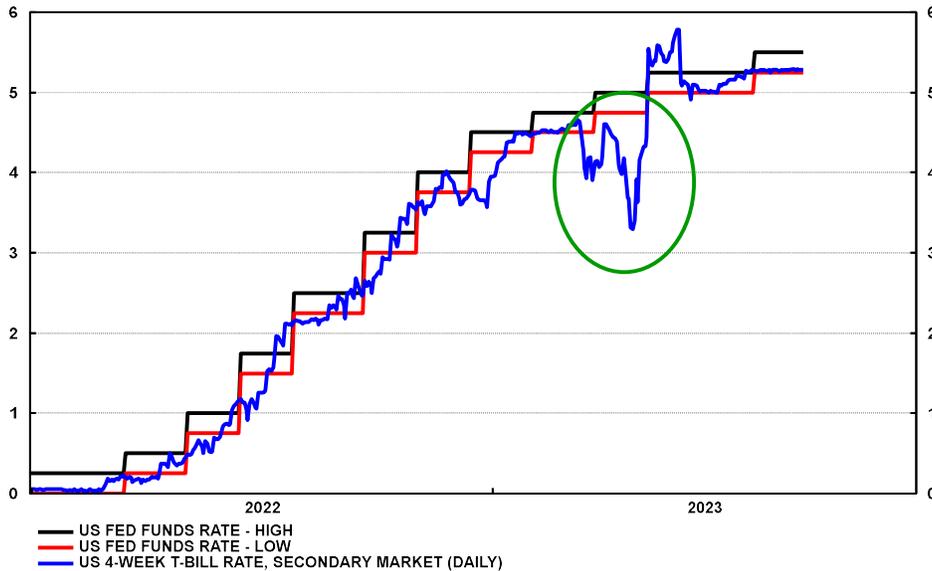
What explains the recent movement of funds from MMFs into and out of RRP at the Fed? The likely answer is the spread between the Fed’s O/N RRP rate and short-term T-bill yields. For much of 2022 and early 2023 the Fed’s rising rates led the way: despite Fed official’s rhetoric to the effect that rates needed to rise and stay high for an extended period in order to quell inflation, market participants were constantly expecting the Fed to back off and start cutting rates at any time in a “pivot” towards easier monetary conditions. As a result, the Fed funds rate regularly led T-bill rates upward as shown in Figure 4.

The expectation that the Fed had completed its program of rate increases was especially strong in March and April 2023 (circled) when market rates (the chart uses 4-week T-bill yields) fell as low as 3.29% on April 21st compared with the



prevailing Fed funds range of 4.75%-5.00%. On May 3rd the FOMC announced that, far from pausing rate hikes or commencing any rate reductions, it was raising rates to 5.00%-5.25%. T-bill yields and other market rates promptly adjusted upwards.

Figure 4. Market Expectations deviated from the Fed's Action Path
RANGE FOR FED FUNDS RATE AND 4-WEEK T-BILL RATE (% P.A.)

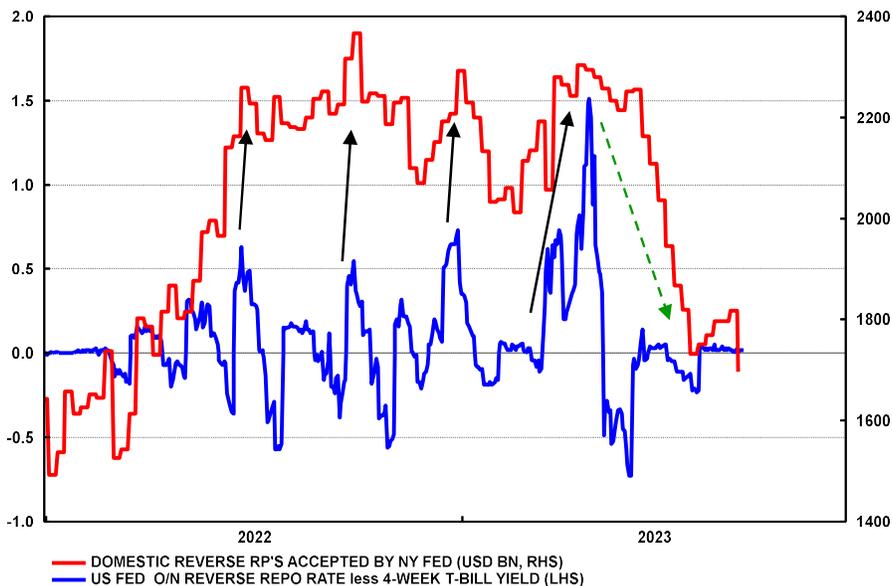


Source: LSEG Datastream

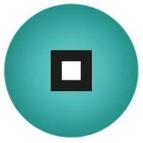
Accordingly, when the lower end of the Fed funds range plus 5 basis points (i.e., the O/N RRP rate) was more attractive than T-bill yields, money from MMFs poured in (Figure 5, black arrows), but when, from May onwards, the market thought T-bill

Figure 5. The Behaviour of MMF Managers

US: THE INCENTIVE FOR MMFs TO DO O/N RRP'S (1)
DIFFERENCE BETWEEN O/N RRP RATES & 4-W T-BILL RATE



Source: LSEG Datastream



yields were going to remain more attractive, funds flowed out of the O/N RRP facility into T-bills (green dashed arrow).

5. What does this imply for M2 growth?

What do these details of the incentives facing MMF asset managers and the resulting transactions imply for the broader outlook of the US financial markets and the economy? In my view, the most important implication bears on the question of what is happening and what will happen to the US money supply M2.

Figure 6. The Main Drivers of M2 Growth Continue to be Weak.
US: CONTRIBUTIONS TO ANNUAL CHANGE IN M2 (%YOY)

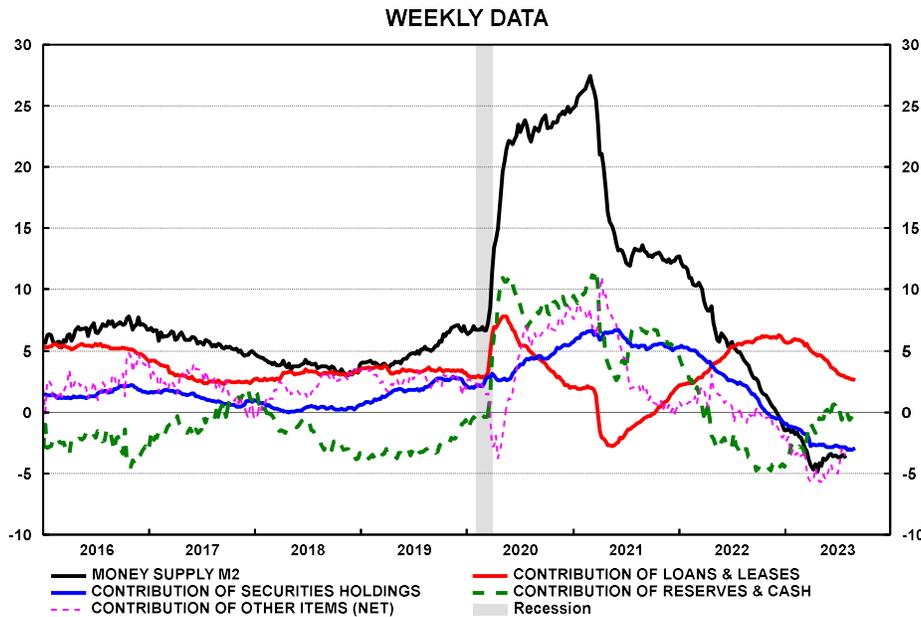


Figure 6 shows the credit counterparts of M2 growth. (Note that I do not use the BOE/ECB formulation of credit counterpart analysis since it does not separate the behaviour of the commercial banks from the behaviour of the central bank, whereas my method makes it clear which entities are doing what, and how their actions contribute to changes in monetary growth.) The simple equation or identity underlying this chart is as follows:

$$\Delta M = \Delta BL + \Delta BS + \Delta R + \Delta \text{Other items (net)}$$

In the equation, ΔM is the change in M2, ΔBL is the change in bank lending, ΔBS is the change in bank holdings of securities, ΔR is the change in banks’ reserve deposits at the central bank, and $\Delta \text{Other items (net)}$ is a catch-all that represents any other contributing elements to changes in M2 such as changes on the liability side of commercial banks’ balance sheets (e.g., debt or equity issues), or other changes on the liability side of the Fed’s balance sheet. In the equation, $\Delta BL + \Delta BS$ are the result of decisions by the banks, whereas ΔR is the result of decisions by the central bank (e.g., QE or QT). In effect, the equation shows the changes in M2 resulting from (a) decisions by the banks or (b) decisions by the Fed.

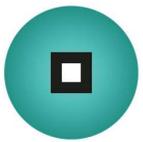
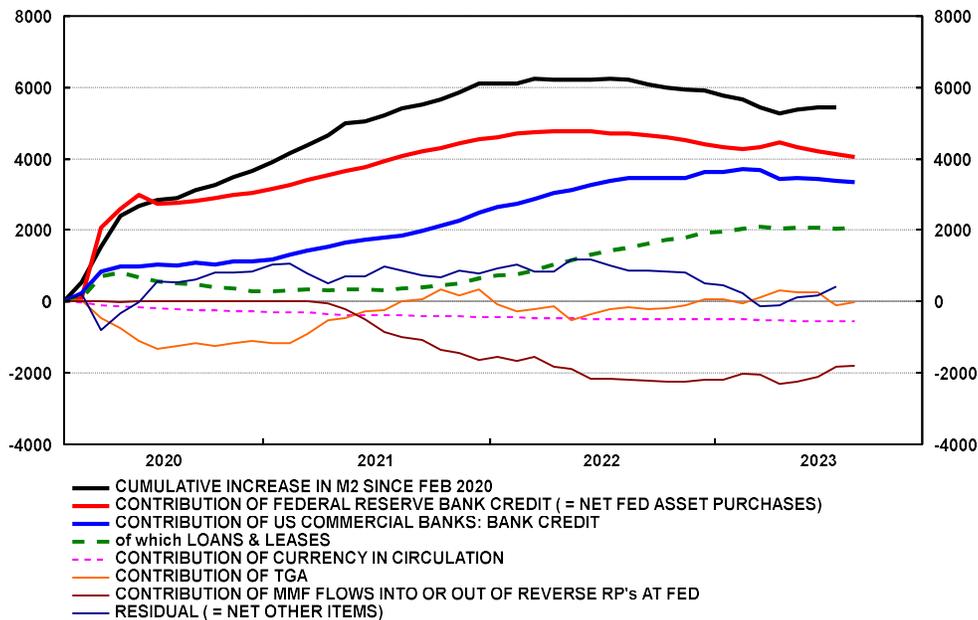


Figure 6 shows clearly that the decline in M2 over the past year has mainly been the result of the Fed’s decision to reduce reserves by doing QT (the green dashed line) but declines in commercial bank holdings of securities (the blue line) and reduced lending by the banks (the red line) have also contributed. The residual (the pink dashed line) has also been a negative contributor.

Because the residual has been quite large at times, I decided it would be worthwhile to deepen the analysis by breaking out more of those “Other items” constituting the residual. The result is shown in Figure 7. To make it easier to follow, the data in this chart is presented in the form of the cumulative changes from February 2020. In other words, the chart shows the impact of all the key changes on the Fed and commercial bank balance sheets that have contributed to changes in M2 since the onset of the Covid pandemic in March 2020.

Figure 7. Three Quarters of the M2 Created during Covid Came from Fed Asset Purchases.

**US: CONTRIBUTIONS TO CUMULATIVE CHANGES IN M2 (USD BN)
BY FED, COMMERCIAL BANKS, TGA, & MMFs FROM FEBRUARY 2020**



Source: LSEG Datastream

The more detailed equation or identity for Figure 7 is:

$$\Delta M = \Delta BL + \Delta BS + \Delta FRC - \Delta CC - \Delta TGA - \Delta RRP + \Delta \text{Other items (net)}$$

The added elements in Figure 7 consist of items from the liability side of the Fed’s balance sheet: the currency issued, the Treasury’s General Account (TGA), and the RRP facility. Whereas the Fed can control exactly the items on the asset side of its balance sheet (e.g., whether it does outright purchases or T-bonds, T-bills, or private sector securities; or whether it makes loans), the items on its liability side are largely controlled by the decisions of the banks, the non-bank public, and the Treasury. Thus the banks decide how much to hold in reserve balances versus cash in their vaults;



the non-bank public can vary the amount of cash it chooses to hold relative to deposits; and the Treasury can decide whether to build up or run down its cash balances at the Fed. These are not decisions controlled by the Fed.

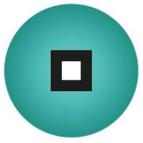
Since the new items are all liabilities on the Fed's balance sheet, any increases in their size will contribute negatively to overall changes in the money supply. For example, increases in the TGA or RRP balances must be funded by a reduction of deposits held by the non-bank public in M2.

The story told by the credit counterparts since February 2020 is that three quarters of the cumulative increase in M2 has resulted from Fed asset purchases (\$4 trillion out of \$5.4 trillion), while commercial bank credit (loans plus bank holdings of securities) has accounted for \$3.4 trillion out of \$5.4 trillion, of which \$2 trillion was bank lending. The new, added items have contributed negatively. Currency in circulation (which has to be funded either out of the non-bank public's deposits or out of banks' reserves at the Fed) has increased by \$0.5 trillion; the TGA, having made a major negative contribution in 2020-21 as the Treasury accumulated funds at the start of the pandemic, has largely run down its balances so that its cumulative contribution is now only a trivial \$28 billion; and finally the amount of RRP's accepted by the New York Fed had been making a large negative contribution as funds have been transferred from bank deposits to MMFs and thence to the Fed's RRP facility – until the RRP's last peak in April 2023, since when the RRP cumulative negative contribution has shifted marginally from -\$2.3 trillion to -\$1.8 trillion, implying a small (net) positive contribution to M2 recently since May.

For a full accounting treatment of the transactions between MMFs and the Fed's O/N RRP and their impact on M2, please see the appendix, pp. 10-11. ***A key point to note is that in order to buy T-bills, the MMFs must first switch briefly from O/N RRP's into a commercial bank deposit, which is part of M2.*** So, given the availability of the O/N RRP facility, M2 can increase – or decrease – solely as a by-product of MMF portfolio decisions.

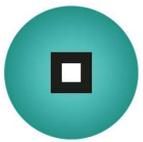
The big picture, then, is that the major drivers of the decline in M2 (the slowdown in bank lending and the Fed's shrinkage of its balance sheet via QT as shown in Figures 6 & 7) are still intact. This implies that the decline in M2 is highly likely to resume as soon as market participants expect the spread between the O/N RRP rates and the yield on short-dated T-bills to narrow again or stay close to zero. The latest data suggest this might already be happening.

In other words, the recent increase in M2 has been a ***temporary episode*** triggered by the change in market expectations about the trajectory for the Fed funds rate (and hence the O/N RRP rate) relative to the yield on very short-term T-bills. The full accounting which I have carried out shows that Money Market Fund flows out of RRP's into M2 explain most of the recent upturn in US money growth; the contribution of the TGA is minimal.



Summary and Investment Implications

- The US money supply M2 has turned upwards for the past three months after falling for nearly a year. What is the explanation? Does this mark the start of a new trend?
- Overnight Reverse Repos (O/N RRP) at the Fed, whose yields are set at the lower end of the Fed funds range plus 5 b.p., have been falling recently as Money Market Funds reduce the amount of O/N RRP they do with the Fed.
- It is these transfers from money (liabilities) on the Fed's balance sheet to deposits in the banking system that have boosted deposits in the banking system and hence M2 in the last 3 months.
- Nevertheless, at the same time, MMF assets have continued to rise.
- With MMF yields remaining higher than average time or savings rates on bank deposits, funds have continued to flow from deposits into MMFs.
- What explains the movement of funds into and out of RRP? Answer: the rise in short-term T-bill rates relative to the O/N RRP rate, or the spread of short-term T-bill yields over the Fed's O/N RRP rate.
- The big picture is that the major drivers of the decline in M2 (the slowdown in bank lending and the Fed's shrinkage of its balance sheet via QT) are still intact.
- This implies that the decline in M2 is highly likely to resume as soon as market participants expect the spread between the O/N RRP rates and the yield on short-dated T-bills to narrow again. The latest data suggest this might already be happening.
- In other words, the increase in M2 has been a temporary episode triggered by the change in market expectations about the trajectory for the Fed funds rate (and hence the O/N RRP rate) relative to the yield on very short-term T-bills.
- A full accounting shows that Money Market Fund flows out of RRP into M2 explain most of the recent upturn in US money growth; the contribution of the TGA is minimal.
- The implications of this analysis for investors are that caution should continue to be exercised about the size of equity exposures. Further declines in M2 are in prospect, implying a tightening squeeze on the purchasing power of firms and households.
- Already the financial markets could be described as running on fumes rather than on new supplies of gasoline. Asset prices - equities and house prices – could fall suddenly and steeply at any time during the next few months as the impact of the prolonged squeeze of M2 growth finally starts to impact.
- The economy would then be acutely vulnerable to a steep and unexpected downturn as everything from home sales to retail sales to new hiring and corporate investment spending plummeted. Recession would hit across the board.
- Finally, what had been official anxieties about the so-called second round effects of inflation – the alleged ability of wages to push up inflation – would suddenly turn into equally anxious concerns that the economy will be going from inflation into deflation. Of course, this scenario has been clear to anyone who has followed the behaviour of broad money and understands its



consequences. The problem is that the men and women who sit around the FOMC table eight times per year simply pay no attention to such key fundamentals.

APPENDIX

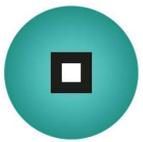
Impact of a Reduction by MMFs of O/N RRP's at the Fed on M2

The data in the tables below show the assets and liabilities of the Fed, US commercial banks, MMFs, and the non-bank public, and the changes in those amounts resulting from a reduction of O/N RRP's by MMFs.

The left-hand columns show the starting positions of the balance sheets at their current size in late August/early September in billions of US\$ (rounded). In the explanatory text below I omit the billions. The right-hand columns show the **changes** in assets and liabilities after MMFs have taken the portfolio decision to reduce their holdings of O/N RRP's by \$100 billion and (temporarily) increase their holdings of deposits at banks. (Of course, the MMFs will quickly shift from their newly acquired bank deposits into short-term T-bills.) The items in red are the entries that actually change. Any item in black is unaffected by the transactions.

| \$ bn | ASSETS | | LIABILITIES & CAPITAL | CHANGES IN: | | | | |
|---|--------------------------|--------|-----------------------------|-----------------|--------|----------------------|--------|-----|
| FEDERAL RESERVE | | | | Fed Assets | | Fed Liabilities | | |
| 1 | Securities Held Outright | 8,000 | Reserves of Banks | 3,200 | 8,000 | +100 | 3,300 | (1) |
| 2 | Loans & Other | 100 | Currency Issued | 2,300 | 100 | | 2,300 | |
| 3 | Repo Facility | 0 | Treasury General Account | 500 | 0 | | 500 | |
| 4 | | | Reverse Repos | 2,000 | | -100 | 1,900 | (1) |
| 5 | | | Capital and other | 100 | | | 100 | |
| 6 | Total Assets | 8,100 | Total Liabilities & Capital | 8,100 | 8,100 | | 8,100 | |
| COMMERCIAL BANKS | | | | Bank Assets | | Bank Liabilities | | |
| 7 | Loans | 12,000 | Deposits | 17,300 | 12,000 | +100 | 17,400 | (2) |
| 8 | Securities Held | 5,100 | Borrowings (inc CDs) | 2,250 | 5,100 | | 2,250 | |
| 9 | Cash (inc Reserves) | 3,200 | | | +100 | 3,300 | | (2) |
| 10 | Other | 2,500 | Capital & other | 3,250 | 2,500 | | 3,250 | |
| 11 | Total Assets | 22,800 | Total Liabilities & Capital | 22,800 | +100 | 22,900 | 22,900 | (2) |
| MONEY MARKET FUNDS | | | | MMF Assets | | MMF Liabilities | | |
| 13 | Treasuries | 3,050 | Shares issued | 5,600 | 3,050 | | 3,050 | |
| 14 | Repos on Treasuries | 400 | | | 400 | | 400 | |
| 15 | O/N Reverse Repos | 2,000 | | | -100 | 1,900 | | (3) |
| 16 | Deposits at Banks | 150 | | | +100 | 250 | | (3) |
| 17 | Total Assets | 5,600 | Total Liabilities & Capital | 5,600 | 5,600 | | 5,600 | |
| NON-BANK PUBLIC (Firms, Households, & Non-profits) | | | | Non-Bank Assets | | Non-Bank Liabilities | | |
| 18 | Cash | 2,300 | Loans from banks | 12,000 | 2,300 | | 12,000 | |
| 19 | Deposits | 17,300 | | | +100 | 17,400 | | (4) |
| 20 | CDs and other | 1,400 | | | 1,400 | | | |
| 21 | Money supply M2 | 21,000 | | | +100 | 21,100 | | (4) |

Part (1): the Fed. A MMF manager makes a portfolio decision to shift assets from RRP's to holding T-bills. The manager calls the Fed and/or his/her bank to instruct them to transfer 100 units of the MMF's maturing overnight reverse repos (O/N RRP's) that it holds at the Fed to its deposit account at its bank. On the books of the Fed, Reverse Repos are down by \$100



(line 4); reserves of banks are up by \$100 (line 1). Note that Fed total assets and liabilities are unchanged; only the composition of its liabilities has shifted due to the portfolio decision of the MMF manager.

Part (2): the Commercial Banks. The Fed remits the proceeds of the RRP withdrawal to the deposit account of the MMF at a commercial bank which seeks settlement from the Fed, resulting in a credit to the bank's reserve account at the Fed. On the asset side of bank balance sheets, reserves of banks increase by \$100 from \$3,200 to \$ 3,300 (line 9). On the liability side of banks' balance sheets, deposits increase by \$100 from \$17,300 to \$17,400 (line 7). The overall size of banks' balance sheets increases -- both assets and liabilities (line 11).

Part (3): MMFs. The RRP account of the MMF at the Fed has declined by \$100 (line 4); correspondingly, O/N RRP held as assets by the MMF decline by \$100 (line 15). A payment of \$100 is routed from reserves at the Fed to the deposit account of the MMF at its designated commercial bank. Deposits held by the MMF at banks increase by \$100 (line 16). On the books of the MMF, reverse repos at the Fed decline by \$100 from \$2,000 to \$1,900, but deposits increase by \$100 from \$150 to \$250. There is no change in overall asset size of MMFs.

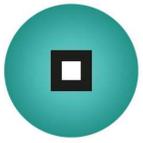
Part (4): Impact on Money Supply, M2. The MMF has received a transfer from the Fed of \$100 which it now holds in its deposit account at a commercial bank. Deposits, the main component of M2, have increased by \$100 (line 19). The money supply M2, which consists of cash currency held by the non-bank public (line 18) plus deposits of the non-bank public at commercial banks (line 19) plus certain other deposits such as CDs (line 20), has increased by \$100 (line 21).

Summary. To summarise, "money" can be transferred from banks at low rates on time or savings deposits to Government MMFs where it generates a much more attractive yield by funding T-bills and the federal deficit. But if the MMFs transfer the funds to the Fed's O/N RRP facility, although the money remains accessible to MMF shareholders, it no longer forms part of the measured money supply, M2. The cumulative withdrawal of such funds from M2 has amounted to \$2 trillion over the past two years. (This is the amount held in the O/N RRP facility.)

In the short-term, incentives in the money markets have caused MMFs to shift out of O/N RRP at the Fed into bank deposits (temporarily boosting M2), and from there into T-bills (so the seller of the T-bill ends up receiving and holding the money). These shifts are the subject of this paper.

In the medium-term, the pressures for further declines in M2 will re-assert themselves: withdrawals from O/N RRP will cease while reduced bank lending and continued QT cause M2 to shrink further. I expect this pattern to prevail until the US economy enters a serious recession, probably in 2024, at which point the Fed will abruptly change its policy.

In the very long run, however, we must expect the entire balance of funds in the O/N RRP facility to be unwound, boosting M2 by close to \$2 trillion. I expect this to start happening in the second half of 2024.



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