BofA SECURITIES

US Rates Viewpoint

Funding map: T-tables for Fed, banks, MMF

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ON RRP = overnight reverse repo facility

NIM = net interest margin

FHLB = Federal Home Loan Bank

MMF= money market mutual fund

BTFP = Bank Term Funding Program

QT = quantitative tightening

Money moves: simplifying the shifts

In this note we show how funding movement and borrowing from the Fed and FHLBs impact the balance sheets of the banking sector and money market mutual funds.

Liquidity providing has worked to stabilize the banking system. We offer our interpretation of how this process has worked, through a few stylized examples. Here is how we have understood recent money movements over recent weeks:

- Week of March 13 (post bank failures) = three key dynamics: (1) deposits in smaller banks leaving for larger banks (2) Fed lending to smaller banks (3) FHLB lending to banks & MMF funding FHLB debt issuance
- Week of March 20 (last week) = large bank deposits move to MMF & ON RRP

On net, these dynamics have resulted in a US financial system with: (1) larger Fed balance sheet (2) larger commercial bank balance sheet, driven by more borrowings & higher cash levels (3) smaller banks with more borrowing & fewer deposits (4) larger banks with more cash & deposits.

Liquidity backstops reduce likelihood of bank UST sales

Funding markets and liquidity buffers have worked: banks secured liquidity required for deposit movement without needing to sell securities holdings. We expect the following changes from banks:

- Banks with deposit outflows: unless flows reverse these banks will need to (1) continue relying on FHLBs/ Fed for financing (2) be more competitive in attracting deposits through higher rates.
- Banks with deposit inflows: larger banks that saw an influx of deposits are unlikely to be quick to buy securities and may be more hesitant in creating loans. Near-term banks will be focused on maintaining a liquidity buffer.

Deposit flow within the banking system so far has not garnered material asset sales and may not require them in the future. Banks would likely be selling these securities at a loss, reducing the willingness of banks to liquidate securities portfolios. However, if smaller banks are unable to recover deposit outflows and reduce reliance on Fed facilities, some reduction on asset side may be required.

We generally do not expect to see banks add to securities portfolios near term either. Smaller banks with deposit outflows will be unable to add to securities holdings for some time & will see compressed NIM; larger banks with deposit inflows may have capacity to add to securities holdings at some point, but near-term will be focused on maintaining a liquidity buffer.

Refer to important disclosures on page 8 to 9.
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Money map for banking stress

The tables below show the net movement of funding since banking system stress across the Fed balance sheet & aggregate commercial bank balance sheet.

On net, these dynamics have resulted in a US financial system with: (1) larger Fed balance sheet (2) larger commercial bank balance sheet, driven by more borrowings & higher cash levels (3) smaller banks with more borrowing & fewer deposits (4) larger banks with more cash & deposits. These dynamics can be seen Exhibit 1 & Exhibit 2. Even if bank stress subsides, we may see bank deposit outflows continue as MMFs attract deposits via higher yields and the Fed drains liquidity via QT.

We show how these US money movements work across 5 stylized balance sheets below: Fed, large banks, small banks, MMFs, and FHLBs. We do this to explain in detail recent money moves.

Bottom line for USD funding & US rates: (1) smaller banks will likely continue requiring funding from FHLBs and Fed (2) large banks that have seen influx if deposits will be focused on maintaining liquidity buffer.

Exhibit 1: Fed balance sheet, selected assets & liabilities ($bn)

Since the failure of SVB, Fed lending through DW and BTFP has grown by $160bn

	Assets						Liabilities					
Dates	Securities	Repo	Discount Window	BTFP	FDIC bank credit extension	CB Liquidity Swaps	Currency	Foreign RRP	ON RRP	TGA	Reserves	Total
3/8/2023	7,948	0	5	0	0	0	2,308	367	2,193	312	3,004	8,392
3/15/2023	7,940	0	153	12	143	0	2,311	367	2,056	278	3,444	8,689
3/22/2023	7,937	60	110	54	180	1	2,319	370	2,280	200	3,370	8,784
Chg from 3/8 to 3/15	-8	0	148	12	143	0	3	0	-137	-34	441	298
Chg from 3/15 to 3/22	-3	60	-43	42	37	0	8	3	224	-78	-74	94
Net change	-12	60	106	54	180	0	11	3	86	-112	366	392

Source: BofA Global Research, Bloomberg, Federal Reserve

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Exhibit 2: Banking sector balance sheet assets & liabilities ($bn)

Recent data shows a $470bn build in borrowing from FHLBs and Fed which have likely been relied on to plug deposit movement both within banking sector and into MMFs

			Cash	UST & Agy	MBS	Repo & FF	Loans & Leases	Other	Deposits	Borrowings	Net due to related foreign offices	Other
Domestic	3/8/2023	19755	1688	1511	2709	263	11006	2578	16253	1054	-343	2791
Banks	3/15/2023	20236	2144	1512	2705	268	11049	2559	16265	1524	-339	2786
	Change	482	456	1	-5	4	43	-18	12	470	5	-5
Large	3/8/2023	12926	1268	1192	1962	220	6517	1768	10676	649	-374	1974
Banks	3/15/2023	13280	1621	1192	1957	223	6539	1747	10796	879	-371	1977
	Change	354	354	1	-5	3	22	-21	120	230	3	2
Small	3/8/2023	6829	420	319	748	44	4489	809	5577	405	31	817
Banks	3/15/2023	6957	523	320	748	44	4510	812	5469	645	33	810
	Change	127	102	0	0	1	21	3	-108	241	2	-7

Source: BofA Global Research, Bloomberg, Federal Reserve

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Simplified balance sheet across Fed, banks, MMFs

The Fed, banks, money market mutual funds, and FHLBs together comprise key components of US money markets. Exhibit 3 shows a simplified balance sheet across these institutions which we will refer to in specific examples that follow.

Exhibit 3: Simplified balance sheet scenario
Fed, FHLBs, banks, and MMFs are the core actors in US money markets

Federal Reserve		Money Market Funds	
Assets	Liabilities	Assets	Liabilities
Loans to banks	Reserves	ON RRP	Shares
Securities (USTs & MBS)	ON RRP	FHLB debt	
Banks		**FHLB**	
Assets	Liabilities	Assets	Liabilities
Reserves	Deposits	Advances	Debt
	Loans from Fed		
	FHLB advances		

Source: BofA Global Research

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Before the recent banking crisis, the Fed was draining reserves & ON RRP from the system as it let assets mature. Some banks that saw deposit outflows on the back of Fed QT borrowed from FHLBs to supplement funding (see our report: FHLB lender of second to last resort). As shown in Exhibit 4, borrowing from FHLBs gives banks an alternate source of funding vs deposits. It also means that FHLBs fund bank lending with debt, which largely gets bought by MMFs. MMF buying of FHLB debt can lower ON RRP. QT can also operate by allowing banks to shrink their balance sheet via lower cash & lower deposits, but we reflect the interaction with FHLBs to demonstrate this concept.

Exhibit 4: Banks borrow from FHLB, MMFs buy FHLB debt
Fed's balance sheet was able to decline as banks were borrowing from FHLBs to stem deposit destruction

Federal Reserve			
Assets		Liabilities	
Loans to banks		Reserves	$0
Securities	-$100	ON RRP	-$100
Total Change			-$100

Money Market Funds			
Assets		Liabilities	
ON RRP	-$100	Shares	$0
FHLB debt	$100		
Total Change			$0

Banks			
Assets		Liabilities	
Reserves	$0	Deposits	-$100
		FHLB advances	$100
Total Change			$0

FHLB			
Assets		Liabilities	
Advances	$100	Debt	$100
Total Change			$100

Source: BofA Global Research

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Initial response of money flows to banking crisis

The initial response of money flows to the banking risk events can be captured by three dynamics: (1) deposits in smaller banks leaving for larger banks (2) Fed lending to banks, especially smaller banks (3) FHLB lending to banks & MMF funding FHLB debt issuance.

Deposits in smaller banks leaving for larger banks: Much of the data that we have been tracking suggests that bank deposits have shifted within the banking system. The Fed's H8 data last Friday for the week ending March 15 showed a net movement of over $100bn in deposits from small banks to large banks (see our report: Weekend homework).

Exhibit 5 shows what this transfer would look like if small banks had the liquidity available as deposits were shifting within the banking system. Reserves would not be created or destroyed and instead would be transferred from one bank to another. The Fed's balance sheet and balance sheet of MMFs would be unaffected.

Exhibit 5: Small bank deposits move to large bank deposits, reserves shift

If money was moving from small to large banks without reliance on Fed or FHLBs lending, would be no impact on Fed's balance sheet or MMFs

Federal Reserve			
Assets		Liabilities	
Loans to banks		Reserves	
		ON RRP	
Total Change			$0

Money Market Funds			
Assets		Liabilities	
ON RRP		Shares	
FHLB debt			
Total Change			$0

Small Banks			
Assets		Liabilities	
Reserves	-$100	Deposits	-$100
		Loans from Fed	
		FHLB advances	
Total Change			-$100

Large Banks			
Assets		Liabilities	
Reserves	+$100	Deposits	+$100
		Loans from Fed	
		FHLB advances	
Total Change			$100

Source: BofA Global Research

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Fed lending to smaller banks: in practice, banks likely did not have liquidity needed to meet the deposit outflows. These banks had to tap FHLB financing, Fed Discount Window (DW), or Bank Term Funding Program (BTFP) for liquidity.

In Exhibit 6, we show the balance sheet impact of a bank borrowing from the DW or BTFP. The small bank that sees deposits leave to the large bank borrows the required liquidity from the Fed. This ultimately will grow both the banking sector and the Fed's balance sheet by the amount of liquidity the bank needs.

Exhibit 6: Small bank borrows from the Fed, the Fed creates reserves as money moves from small to large bank

When banks borrow from the Fed, both Fed and banking sector balance sheet grow

Federal Reserve			
Assets		Liabilities	
Loans to banks	$100	Reserves	$100
		ON RRP	
Total Change			$100

Money Market Funds			
Assets		Liabilities	
ON RRP		Shares	
FHLB debt			
Total Change			$0

Small Banks			
Assets		Liabilities	
Reserves	$0	Deposits	-$100
		Loans from Fed	$100
		FHLB advances	
Total Change			$0

Large Banks			
Assets		Liabilities	
Reserves	$100	Deposits	$100
		Loans from Fed	
		FHLB advances	
Total Change			$100

Source: BofA Global Research

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FHLB lending to banks & MMF funding FHLB debt issuance: As banks were able to tap the Fed lending facilities, they may also have borrowed from FHLBs to build a cash buffer. In Exhibit 7 we show the balance sheet impact of: 1/deposits moving from small to large banks, 2/ small banks borrowing from the Fed, 3/ small banks borrowing from the FHLB to build a cash buffer.

The small bank tapping Fed facilities grows the size of the Fed's balance sheet and creates reserves. The banking sector's balance sheet grows by the new reserves created, but this growth is concentrated in the bank that absorbs the deposits, not the one that borrowed from the Fed. As shown in Exhibit 7, the small bank that has the loan from the Fed sees the deposit outflow, and so the large bank balance sheet is the one that experiences most of the growth.

Exhibit 7: Small bank borrows from the Fed and FHLB, the Fed creates reserves as money moves from small to large bank, ON RRP declines to accommodate FHLB debt

Banking sector balance sheet grows from borrowing from Fed & FHLBs

Federal Reserve

Assets		Liabilities	
Loans to banks	$100	Reserves	$150
		ON RRP	-$50
Total Change			$100

Money Market Funds

Assets		Liabilities	
ON RRP	-$50	Shares	$0
FHLB debt	$50		
Total Change			$0

Small Banks

Assets		Liabilities	
Reserves	$50	Deposits	-$100
		Loans from Fed	$100
		FHLB advances	$50
Total Change			$50

Large Banks

Assets		Liabilities	
Reserves	$100	Deposits	$100
Total Change			$100

FHLB

Assets		Liabilities	
Advances	$50	Debt	$50
Total Change			$50

Source: BofA Global Research

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In this scenario we also have the expansion of the FHLB's balance sheet from the small bank building up a cash buffer. The small bank's balance sheet grows by the size of the buffer that is built form borrowing from the FHLB. For the FHLB to finance bank advances, it issues debt which gets purchased by MMFs who then allocate out of ON RRP. In total, the banking sector balance sheet grows by $150bn: $100bn comes from the Fed's balance sheet, $50bn comes from FHLBs.

This is generally consistent with the pattern of flows that we saw from data in the week immediately following the SVB collapse: Fed and bank balance sheet grew, FHLB borrowing expanded, reserves increased while ON RRP declined.

Deposit movement out of banking sector

In the week of March 20, we believe there was some deposit movement out of the banking system. This occurred after the small to large bank deposit flows during the week of March 13. The shift out of bank deposits may have occurred as new depositors in large banks shifted their holdings into higher yielding alternatives, including MMF. MMF then increase their allocation to the Fed ON RRP by $120bn during the week of Mar 20.

Looking over the broader period we have seen about $268bn in MMF inflows from March 13-27. However, ON RRP has only gone up by about $50bn suggesting that much of MMF cash has likely been recirculated back into the banking system. If MMF inflows occur alongside no increase in ON RRP or TGA (Treasury General Account) then there is no deposit destruction, since MMFs are likely buying something that will result in larger deposits elsewhere (like FHLB debt).

As shown in Exhibit 8, the simple flow out of the banking system into MMFs, and ultimately into ON RRP results in the destruction of deposits. If banks are borrowing form the Fed to finance this outflow, then ON RRP offsets the increase in loans on the Fed's balance sheet.

Exhibit 8: Bank deposits move to MMF, MMF lends cash in ON RRP, reserves decline Fed ON RRP take-up increases

If money was leaving banking sector into MMFs without creation of reserves, would expect growth in ON RRP

Federal Reserve			
Assets		Liabilities	
Loans to banks	+$100	Reserves	$0
		ON RRP	+$100
Total Change			$100

Money Market Funds			
Assets		Liabilities	
ON RRP	+$100	Shares	+$100
FHLB debt			
Total Change			$100

Small Banks			
Assets		Liabilities	
Reserves at the Fed		Deposits	
		Loans from Fed	
		FHLB advances	
Total Change			$0

Large Banks			
Assets		Liabilities	
Reserves	$0	Deposits	-$100
		Loans from Fed	+$100
		FHLB advances	
Total Change			$0

Source: BofA Global Research

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Comprehensive flow of money in bank crisis

The more complete flow of money in recent weeks was likely a combination of the scenarios discussed above: deposits moved from small to large banks; small banks increased funding with Fed & FHLB to cover deposit outflows; new large bank deposits shifted into MMF & ON RRP.

Exhibit 9 shows a simplification of the impact on balance sheets across the system. We use the Fed's balance sheet data from March 8-22, with our reserve figure capturing the change attributable to the increase in loans and ON RRP. We use daily MMF flow data from March 8-22 to proxy deposit outflows. Other numbers are stylized and for presentation purposes. We continue to track and discuss actual flow data in our report: Follow the money.

Exhibit 9: Bank deposits move within banking sector and into MMFs, bank borrows from the Fed to offset deposit movement and builds a cash buffer from FHLBs

Fed, MMFs, FHLBs and banks' balance sheets all grow

Federal Reserve			
Assets		Liabilities	
Loans to banks	$160	ON RRP	$85
		Reserves	$75
Total Change			$160

Money Market Funds			
Assets		Liabilities	
ON RRP	$85	Shares	$245
FHLB debt	$160		
Total Change			$245

Small Bank			
Assets		Liabilities	
Reserves	$0	FHLB advances	$150
		Loans from Fed	$100
		Deposits	-$250
Total Change			$0

Large Bank			
Assets		Liabilities	
Reserves	$75	FHLB advances	$10
		Loans from Fed	$60
		Deposits	$5
Total Change			$75

FHLB			
Assets		Liabilities	
Advances	$160	Debt	$160
Total Change			$160

Source: BofA Global Research

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The small bank sees $250bn in outflows from deposits—$5bn goes to large bank, $245bn goes into MMFs. Small bank taps FHLBs for $150bn in advances to cover deposit outflow and borrows $100bn from the Fed. While the large bank sees some inflows from the small bank, it also faces outflows to MMFs and uses the Fed's lending facility and FHLB advances to cover outflows or build a liquidity buffer.

MMFs which saw $245bn in inflows takes down the additional FHLB debt issued to cover advances to banks and has $85bn left over to invest in ON RRP. The balance sheets of FHLBs and the Fed expand by $320bn = the increase in balance sheet of banks + MMFs.

The net flows across money markets can be summarized as:

1. Fed and FHLB balance sheet grows to finance borrowing from banks
2. Banking sector balance sheet has grown by how much it has had to borrow (from FHLBs and Fed) less outflows to other alternatives like money funds
3. Money funds have seen inflows alongside the banking sector outflows, but inflows have been recycled back into banking system to cover FHLB debt
4. ON RRP continues to serve as a plug for MMFs that have no cheaper alterative

Liquidity backstops reduce likelihood of bank UST sales

Money market plumbing is working well: banks can secure liquidity required for deposit flows from Fed and FHLBs without needing to sell securities holdings.

Deposit flow within the banking system so far has not garnered material asset sales and may not require them in the future. Banks would likely be selling these securities at a loss, reducing the willingness of banks to liquidate securities portfolios. However, if smaller banks are unable to recover deposit outflows and do reduce reliance on Fed facilities, some reduction on asset side may be required.

We generally do not expect to see banks add to securities portfolios near term either. Smaller banks with deposit outflows will be unable to add to securities holdings for some time & will see compressed NIM; larger banks with deposit inflows may have capacity to add to securities holdings at some point, but near-term will be focused on maintaining a liquidity buffer.

Bottom line for USD funding & US rates: (1) smaller banks will likely continue reliance on official sector funding or will need to draw deposits back with higher rates (2) while large banks that saw deposit inflows may have capacity to add security holdings, they will likely retain a liquidity buffer for now.

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