

Global Money Notes #2

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A Turbulent Exit

The Federal Reserve's historic liftoff from the zero lower bound is nearing.

Liftoff will be historic not only because the Fed has never tried to raise interest rates from such low levels before but also for at least three other reasons.

First, the Fed will raise interest rates using new tools.

Second, the money flows that liftoff will generate, both on and offshore, will dwarf those involved in past hiking cycles.

Third, liftoff will occur in a financial system completely redesigned through Basel III: bank balance sheets are now subject to liquidity and funding rules that have never been stress-tested in a hiking cycle before.

No matter how transparent the Fed has been about the start and pace of liftoff, the combination of new tools and a redesigned financial system **may** cause turbulence in money, FX and Treasury markets on purely "mechanical" grounds. This turbulence won't have anything to do with – but will be exacerbated by – the much discussed decline in market liquidity due to post-crisis re-regulation.

Forewarned is forearmed.

This second issue of Global Money Notes is a reference guide for trading the Fed's exit. We address the following questions: where will fed funds effective trade the day after liftoff? Will liftoff be a Libor-OIS widener? A curve flattener? Are rates the cleanest possible way to trade the Fed's historic exit? Or perhaps bank equities? How about the Euro/U.S. dollar exchange rate? In our view:

1. The Fed will opt for a full allotment o/n RRP facility on the day of liftoff.
2. Fed funds effective will print around 35 bps with risks to the upside.
3. 3-mo Libor will print around 55 bps with risks strongly to the upside.
4. Liftoff will benefit some banks but hurt others. A rising tide – rising interest rates – will not lift all boats as is typical during hiking cycles.
5. Volatility may spike in the 3-5 year segment of the U.S. Treasury curve as deposit flows force banks to calibrate their HQLA portfolios.
6. A full allotment RRP facility could accelerate FX reserve managers' shift out of euros for U.S. dollars.

For the Fed to control short-term interest rates effectively, it must live with the turbulence a full allotment RRP facility may unleash, despite all its communication efforts to ensure the opposite. Get ready for a turbulent exit...

DISCLOSURE APPENDIX AT THE BACK OF THIS REPORT CONTAINS IMPORTANT DISCLOSURES AND ANALYST CERTIFICATIONS.

Getting rid of excess reserves quickly is simple in principle.

The Fed could swap excess reserves for central bank bills (Fed bills), which banks could sell to anyone outside the banking system. This is something banks cannot do with reserves, which can only be held by banks. The sale of Fed bills would yield balance sheet relief for banks and increase the amount of short-term instruments (“collateral”) held by investors that are confined to holding bank deposits at present. The size of the Fed’s balance sheet would not change, but what were excess reserves before would now be Fed bills, and most reserves would once again be of the required kind. The Fed could go back to its pre-crisis operating regime of targeting a **level** for the federal funds rate, as opposed to a target **range** as at present – a goal the Fed has emphasized in the past.

There is only one problem with this simple and elegant roadmap to get “back to the future”: the Federal Reserve Act does not allow for Fed bills. This is a problem that other central banks – the Bank of England for instance – do not have. And short of Fed bills, the Fed’s exit strategy is being sketched out around the use of a reverse repo (RRP) facility instead.

A Monetary Hoover Dam

RRPs are not a new tool *per se*.

The Fed has been using them for decades, but will use them differently this time around: RRP’s will be fixed rate, not fixed size; they will be done with money funds (mostly), not dealers; and they will involve swapping reserves for RRP’s, not reserves for bonds.

The mechanics of liftoff will be as simple as the New York Fed posting two numbers on its website – 0.50% for IOER and 0.25% for o/n RRP’s – and standing ready to **passively** swap reserves for RRP’s to accommodate the order flow for one instrument versus another.

It is helpful to think about RRP’s as a dam – a monetary Hoover Dam.

Exhibit 1 shows the Colorado River in the Black Canyon, before construction of the Hoover Dam began. As an analogy, think about the banking system awash with excess reserves.

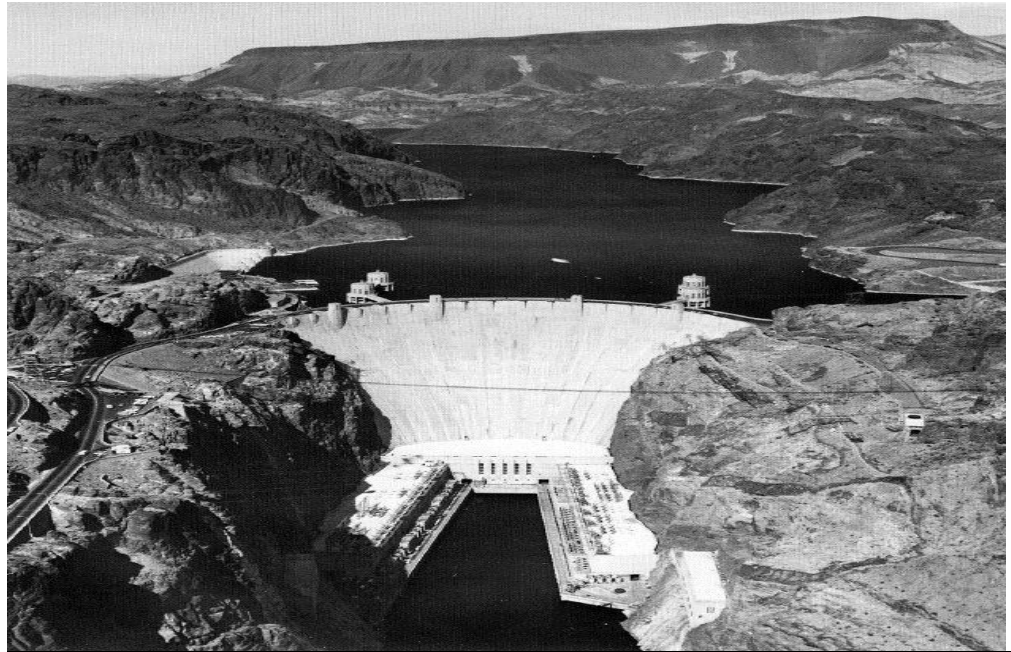
Exhibit 1: The Colorado River in 1930 – Think Excess Reserves



Source: http://waterandpower.org/Construction_of_Hoover_Dam.html

Exhibit 2 shows the Colorado River with the Hoover Dam in the middle. As an analogy, think about excess reserves cordoned off on one side of the dam as a large pool of RRP held by money market funds, and a small pond of reserves held by banks on the other. The river is still there (as is a large Fed balance sheet), but liquidity (central bank liabilities) has been redistributed: away from banks to money funds and from reserves to o/n RRP.

Exhibit 2: The Hoover Dam – Think RRP as a Monetary Hoover Dam



Source: http://waterandpower.org/Construction_of_Hoover_Dam.html

As long as the Fed's balance sheet remains large (and as the Fed has stated very clearly in its exit principles, it won't shrink it until well into the hiking cycle), a large RRP facility is the only way to drain reserves from the banking system, i.e., to reduce those liabilities on the Fed's balance sheet that are relevant for controlling conditions in the fed funds market.

Exhibit 3 shows the way the Fed's liabilities (those relevant for our discussion) are distributed in the financial system at present: about \$2.5 trillion in reserves are held by banks which in turn fund reserves with deposits and other wholesale liabilities, and about \$100 billion in RRP are held by money funds which fund RRP with stable NAV shares.

This is what the financial system looks like with a **small** RRP facility.

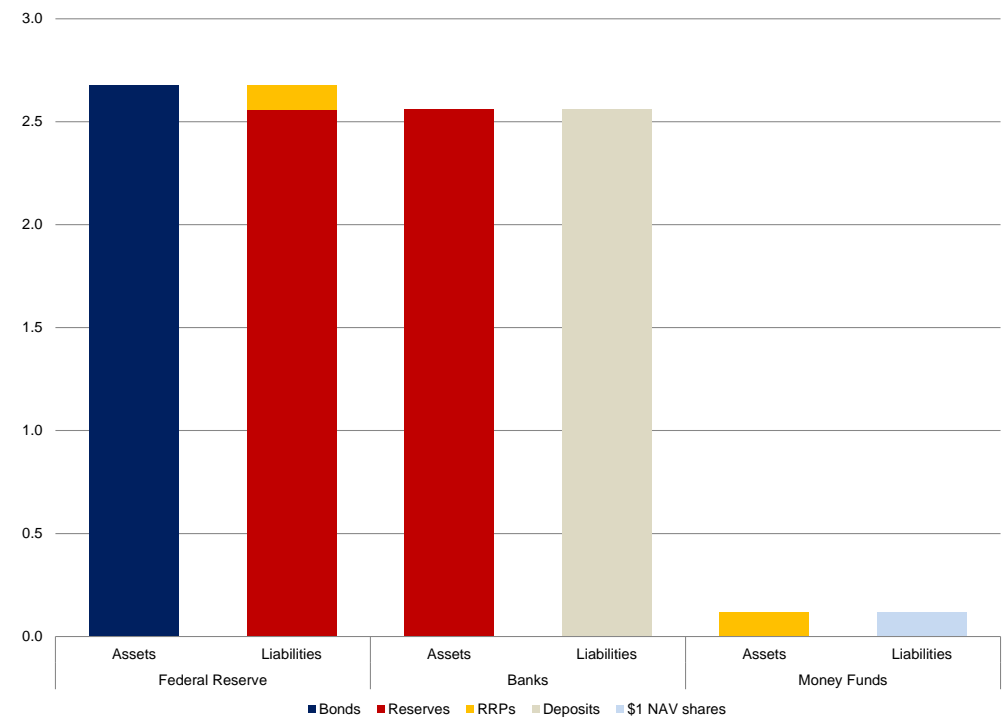
Exhibit 4 shows what the financial system looks like with a **large** RRP facility – the way the system could potentially look about six months to one year after liftoff.

What has changed?

\$2 trillion of deposits (hypothetical, for the sake of exposition) have left the banking system for money funds. Banks facilitated these outflows by giving up reserves. The outflows led to a shrinkage of bank balance sheets on both sides. On the flipside, money fund balance sheets increased on both sides. Money funds absorbed the corresponding inflows by issuing stable NAV shares and investing the proceeds in RRP with the Fed. Even as bank balance sheets shrank and money fund balance sheets grew, the size of the Fed's balance sheet remained the same. However, the composition of its liabilities changed: reserves fell from \$2.5 to \$0.5 trillion and RRP grew from \$100 billion to \$2.1 trillion.

Exhibit 3: The Financial System with a Small RRP Facility

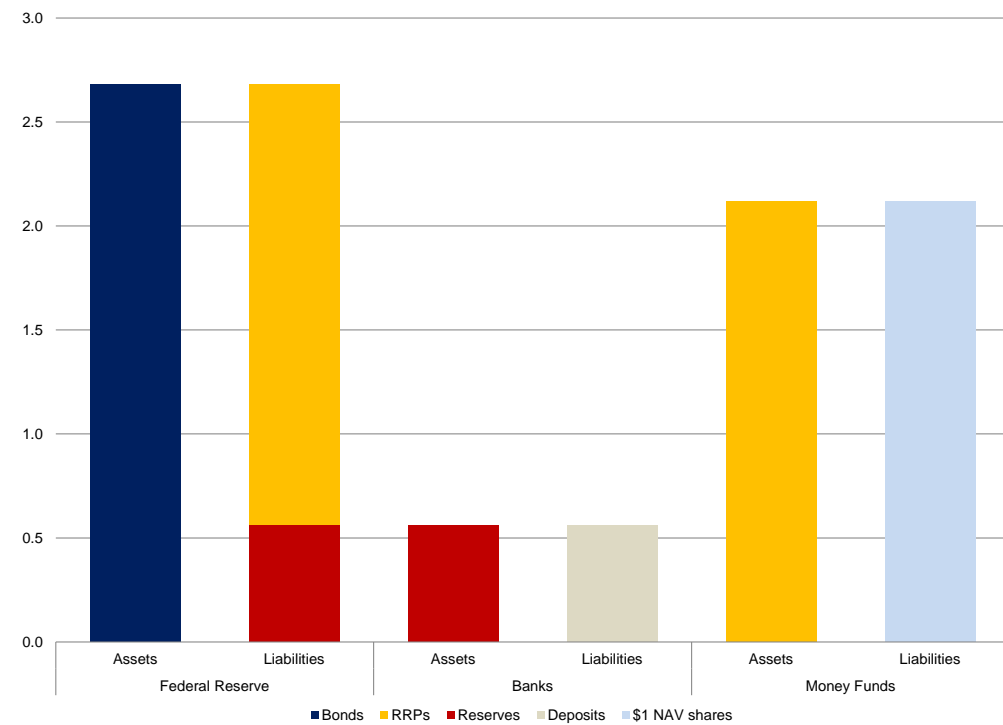
\$ trillions, 2015Q1 (T)



Source: Credit Suisse

Exhibit 4: The Financial System with a Large RRP Facility

\$ trillions, T + 12 months



Source: Credit Suisse

No one really knows the financial system's demand for reserves versus RRP. Required reserves only amount to about \$100 billion at present but some banks may actually prefer to hold on to some of their excess reserves for HQLA purposes in which case some reserves should be thought of as "preferred" – a grey area between required and excess reserves. Pulling off the type of flows we sketch in Exhibits 3 and 4, while not being sure about how big they will ultimately get, points to the need for a full allotment RRP facility.

However, concerns emerged that a full allotment facility would (1) rely on money funds, (2) disintermediate banks and (3) increase the likelihood of runs. And this led to the dilution of the full allotment idea to a fixed rate, fixed allotment facility – an oxymoron, as one can either fix quantities and let prices adjust, or fix prices and let quantities adjust, but not both (for a discussion and critique of these concerns, see the Appendix at the end of this Note).

Full Allotment After All?

But the FOMC's initial concerns over a full allotment facility seem to have faded over time.

The March FOMC [minutes](#) signaled that the Fed is presently considering two alternatives: "a temporarily elevated aggregate cap" or "a temporary suspension of the cap" on the o/n RRP facility to ensure control over short-term interest rates at the time of liftoff.

The minutes make it abundantly clear that come October or December, or whenever liftoff will finally occur, the Fed will either put a very big number on the RRP facility (think \$1 trillion), or make it full allotment outright – just as a few on the FOMC originally intended.

We believe the FOMC will go for full allotment.

From a communication perspective, a full allotment facility is preferable to a facility with a large number attached to it, as a large number could easily have a sticker shock effect.

Just imagine the Fed moving IOER to 0.50% and the RRP rate to 0.25% and announcing that the RRP facility will be upsized from \$300 billion to \$1 trillion.

Markets may interpret this as a more hawkish move than intended:

"Gee, the Fed not only hikes, but also **drains** \$1 trillion in reserves. What if it over-drains? What will that do to the liquidity that's been pushing stocks higher all along? Sell!"

Of course, such concerns are misplaced – the amount of reserves in the system have nothing to do with where stocks trade. But markets being markets, it's never about how the world actually works, but how the markets think the world works. The Fed should care about the potential communication downsides involved in putting a large number on the RRP facility and make the facility full allotment, with no numbers attached.

A full allotment facility would be the exact opposite of what Chairman Volcker did in 1979 when he switched the Fed's operating regime from targeting the fed funds rate, to targeting the volume of reserves. When the Fed went monetarist, the fed funds rate quickly shot up to over 20%. When the Chairman had to appear in front of Congress to explain why interest rates got so high, he said something to the effect of "I did not hike rates; markets did." By slowing the pace of adding reserves to the system (a control of quantities), banks – given the pace at which they were lending and creating deposits at the time – suddenly faced a shortage of reserves and bid interest rates up accordingly.

In today's context, a full allotment RRP facility would leave it up to the market to determine the right mix of reserves versus RRP and help the Fed set interest rates precisely where it wants them to be (a control of the price of money, that is, interest rates).

The Fed does intend to have control over short-term interest rates. Over the past five years, we have heard nothing but assurances to that end. The Fed's ability to control short-term interest rates has never been in doubt before. If the Fed does not seem to be in control after all, uncomfortable hearings in front of Congress would follow, and heat around the Fed's independence (already under heightened scrutiny) would intensify.

The Fed is keenly aware of these risks.

According to the March, 2015 FOMC [minutes](#), “a number of participants **emphasized** that maintaining control over short-term interest rates would be **paramount** in the initial stages of normalization” – (our emphases) unusually strong words for a central bank to use. The word “paramount” appears in FOMC minutes very rarely and participants at FOMC meetings rarely “emphasize” things – they typically note, recommend, agree, consider, judge, discuss, anticipate, repeat and sometimes underscore, but only rarely emphasize.

These are the key arguments against calibrating the size of the RRP facility with an incremental, trial by error approach at liftoff and going for a full allotment facility instead.

Vice Chairman Fischer noted last December that “very little works exactly as planned, and what are the alternatives if [o/n RRPs] do not work? I think about that a great deal.”

An o/n RRP facility should work absolutely fine – at least as far as establishing a floor under short-term interest rates is concerned (see below) – as long as it’s full allotment.

Where Will Fed Effective Trade a Day After Liftoff?

Assuming we get a full allotment RRP facility, where will fed funds effective trade “T+1”?

Around 35 bps. Here is why.

At present, the size of the fed funds market is about \$50 billion, down sharply from \$250 billion before the crisis. The reason for the collapse is obvious: with so many excess reserves in the system, few banks have to borrow to meet reserve requirements.

Whatever is left of the fed funds market is mostly between Federal Home Loan Banks (FHLBs) on the lending side and U.S. and foreign banks on the borrowing side.

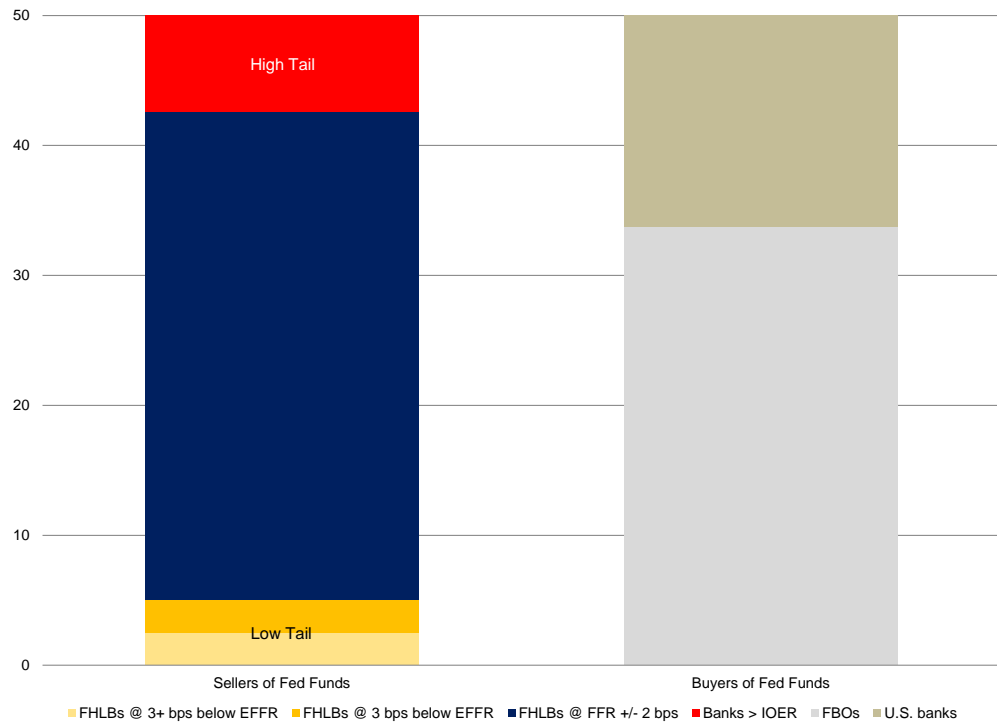
Exhibit 5 shows a snapshot of the market during the first quarter of 2015. On the lending side, we show three types of transactions: high tail, median and low tail transactions.

The “high tail” of fed funds trades (see the red portion of the left-hand column) involves **banks** with a surplus of reserves lending to **banks** with a shortage of reserves at rates above IOER. During the first quarter of 2015, the volume of such trades was about \$8 billion. We know that high tail trades occur only between banks, not between banks and the FHLBs. This is because the borrowing banks tend to be small, regional players which are not rated at all or are not rated creditworthy enough for the FHLBs to lend to them.

Based on our analysis of call report data, banks that borrow at a rate above IOER are clustered in states such as North Dakota, Texas and Utah. These states benefit from healthy demographics or are home to industrial loan companies that benefit from strong growth in auto loans (Utah); or benefit from the shale revolution (North Dakota and Texas). In each of these cases, what drives demand for reserves is strong loan growth.

Exhibit 5: The Fed Funds Market Today

\$ billions, 2015Q1



Source: FDIC, Federal Reserve Bank of New York (FR2420), Federal Home Loan Banks, Credit Suisse

The “median” of fed funds trades (see the blue portion of the left-hand column) involves trades between FHLBs and banks, and are executed at rates that are +/- 2 bps within the effective fed funds rate (EFFR). These account for the majority of fed funds trades at present. Their motivation is to arbitrage the difference between fed effective and interest on reserves (these trades exploit the feature of the U.S. money market whereby only banks can earn the IOER rate on their cash balances at the Fed, not the FHLBs; FHLBs earn zero). During the first quarter of 2015, the volume of such trades was \$37 billion.

The “low tail” of fed funds trades (see the orange portion of the left-hand column) involves trades where FHLBs lend to banks at least 3 bps below the EFFR and sometimes below the o/n RRP rate. These trades involve cash balances that the FHLBs receive late in the day, at a time when the RRP facility has already closed (the facility is open only for 30 minutes between 12:45 and 1:15 EST) and the alternative for FHLBs is to earn zero interest in their account at the Fed. During the first quarter of 2015, the volume of such trades was about \$5 billion (according to FR2420 data (see [here](#)), about \$2.5 billion printing 3 bps below EFFR and another \$2.5 printing more than 3 bps below EFFR).

Thus, in a nutshell, over 80% of lending in the fed funds market is done by the FHLBs, and on the borrowing side of the market, the split between U.S. and foreign banks is ~ 40:60.

In terms of the number of players involved, the market has a distinct “family atmosphere”.

Of the 11 FHLBs (their number fell from 12 when FHLB Seattle was merged into FHLB Des Moines on May 31st, 2015), only 10 are active lenders in the fed funds market. On the borrowing side, volumes are dominated by 10 foreign banks and 10 U.S. banks – so few because FHLBs can only lend in volume on an unsecured basis (the fed funds market is unsecured) to counterparties that are rated one of the top four investment grades. And as it turns out, there are not so many highly rated banks left to begin with globally.

Exhibit 6 provides the list of eligible candidates for FHLBs to lend to, and Exhibit 7 (note the overlap with the names in Exhibit 6) lists the top 10 foreign and U.S. borrowers in the fed funds market at present. The combined borrowing of these 20 banks absorbs about 70% of the lending done by the FHLBs. In essence then, at present, the bulk of trading in the fed funds market occurs between 10 FHLBs and 20 banks – small enough numbers to get a sense of the character of the market by talking to the main participants, which we did.

Exhibit 6: Who are the FHLBs Willing to Face?

Banks by ratings and FHLBs' corresponding maximum capital exposure limit (in percent)

Foreign banks

	Name	Fitch	Limit	Name	Moody's	Limit	Name	S&P	Limit
1	Royal Bank of Canada	AA	9	Toronto-Dominion Bank	Aa1	14	Svenska Handelsbanken AB	AA-	3
2	Svenska Handelsbanken AB	AA-	3	Svenska Handelsbanken AB	Aa2	9	Royal Bank of Canada	AA-	3
3	HSBC Holdings Plc	AA-	3	Bank of Nova Scotia	Aa2	9	Toronto-Dominion Bank	AA-	3
4	Toronto-Dominion Bank	AA-	3	National Australia Bank Limited	Aa2	9	Nordea Bank AB	AA-	3
5	Bank of Nova Scotia	AA-	3	Australia and New Zealand Banking Gro	Aa2	9	National Australia Bank Limited	AA-	3
6	Nordea Bank AB	AA-	3	Westpac Banking Corporation	Aa2	9	Australia and New Zealand Ba	AA-	3
7	Bank of Montreal	AA-	3	Commonwealth Bank of Australia	Aa2	9	Westpac Banking Corporation	AA-	3
8	Canadian Imperial Bank of Com	AA-	3	Skandinaviska Enskilda Banken AB	Aa3	3	Commonwealth Bank of Austr	AA-	3
9	National Australia Bank Limited	AA-	3	Swedbank AB	Aa3	3	Skandinaviska Enskilda Banke	A+	3
10	Standard Chartered Plc	AA-	3	Royal Bank of Canada	Aa3	3	BNP Paribas SA	A+	3
11	Australia and New Zealand Bani	AA-	3	Nordea Bank AB	Aa3	3	Swedbank AB	A+	3
12	Westpac Banking Corporation	AA-	3	Bank of Montreal	Aa3	3	Bank of Nova Scotia	A+	1
13	Commonwealth Bank of Australi	AA-	3	Canadian Imperial Bank of Commerce	Aa3	3	Bank of Montreal	A+	1
14	Skandinaviska Enskilda Banken	A+	1	National Bank of Canada	Aa3	3			
15	BNP Paribas SA	A+	1	Standard Chartered Plc	Aa3	3			
16	Swedbank AB	A+	1	HSBC Holdings Plc	A1	1			
17	National Bank of Canada	A+	1	BNP Paribas SA	A1	1			

U.S. banks

	Name	Fitch	Limit	Name	Moody's	Limit	Name	S&P	Limit
1	Wells Fargo Bank	AA+	14	Wells Fargo Bank	Aa1	14	1 Wells Fargo Bank	AA-	3
2	U.S. Bank	AA	9	U.S. Bank	Aa1	14	1 U.S. Bank	AA-	3
3	JPMorgan Chase Bank	AA	9	BB&T Bank	Aa1	14	2 JPMorgan Chase Bank	A+	1
4	BB&T Bank	AA	3	JPMorgan Chase Bank	Aa2	9	3 BB&T Bank	A	1
5	PNC Bank	AA	3	PNC Bank	Aa2	9	3 PNC Bank	A	1
6	Bank of America	AA-	3	Bank of America	A1	1	3 Bank of America	A	1
7	SunTrust Bank	A-	1	SunTrust Bank	A1	1	4 SunTrust Bank	A-	1

Source: SNL Financial, company reports, Credit Suisse

Talking to fed funds traders at FHLBs further reinforces the notion of a family atmosphere.

Traders refer to borrowers as the “usual names” – the “scandies,” the “ozzies,” the “Canadians,” and a few of the “bigger U.S. guys” – and indicate that most of their lending gets done early in the day Eastern Time (this applies regardless of which time zone an FHLB is based) and well before the window when the RRP facility is open.

Exhibit 7: Who Borrows in the Fed Funds Market?

\$ billions, 2015Q1

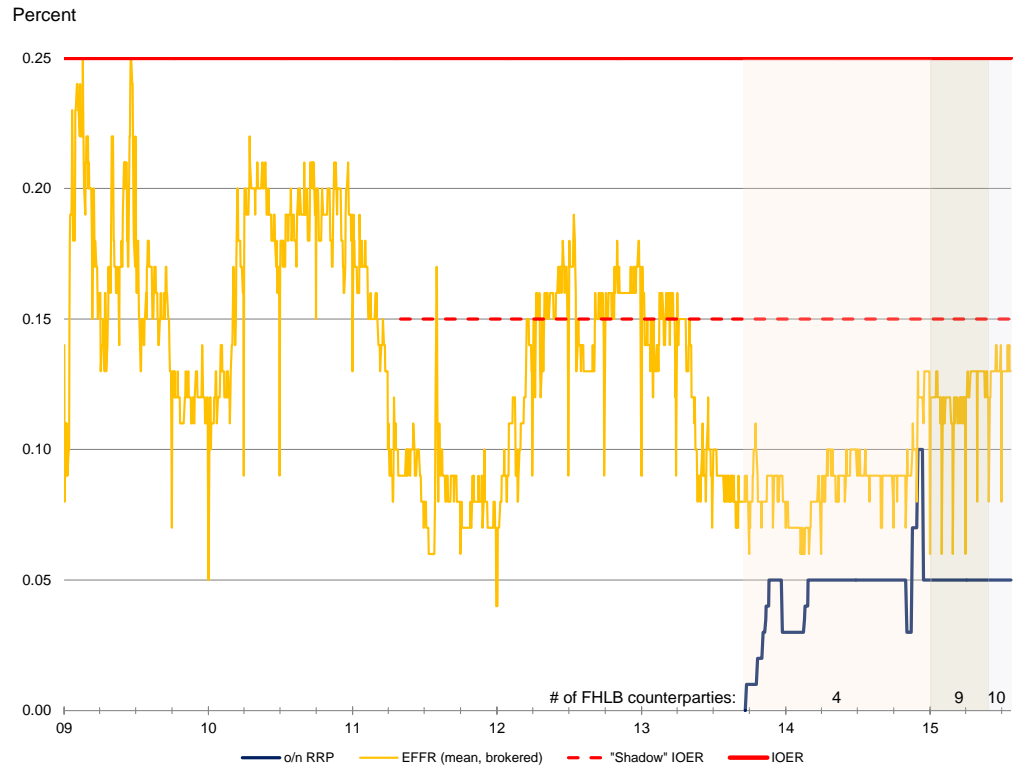
U.S. banks		Foreign banks	
1 Wells Fargo	6.2	1 Bank of Nova Scotia	5.7
2 Suntrust	1.3	2 DnB NOR Bank ASA	3.5
3 Deutsche	1.3	3 Mizuho Corporate Bank	2.6
4 JPMorgan	1.2	4 Swedbank AB	2.0
5 BoNY	1.2	5 BNP Paribas	1.1
6 USBC	0.9	6 Skandinaviska Enskilda Banken	1.0
7 BB&T	0.7	7 Bank of Tokyo	0.5
8 Citi	0.2	8 Sumitomo Mitusi Banking Co	0.2
9 BoA	0.1	9 Standard Chartered Bank	0.1
10 PNC	0.0	10 Svenska Handelsbanken	0.1
Total	13.1	Total	16.9
Other U.S. banks...	12.6	Other foreign banks (residual)	7.4
...of which non-IOER arb ("high tail") trades	8.0		

Source: FDIC, Call Reports (FFIEC031, FFIEC002), Credit Suisse

Most trades involve the rolling of existing trades with the “usual names.” Competition is tight. If bids from an existing borrower are not received promptly (or aren’t good enough), FHLBs will move their cash over to one of the 19 other banks quickly.

Importantly, since the beginning of 2015, the bargaining position of FHLBs has improved markedly, which explains the updrift of the EFR over this period (see Exhibit 8).

Exhibit 8: FHLBs' Bargaining Power on the Rise



Source: Federal Reserve, Haver Analytics ©, Credit Suisse

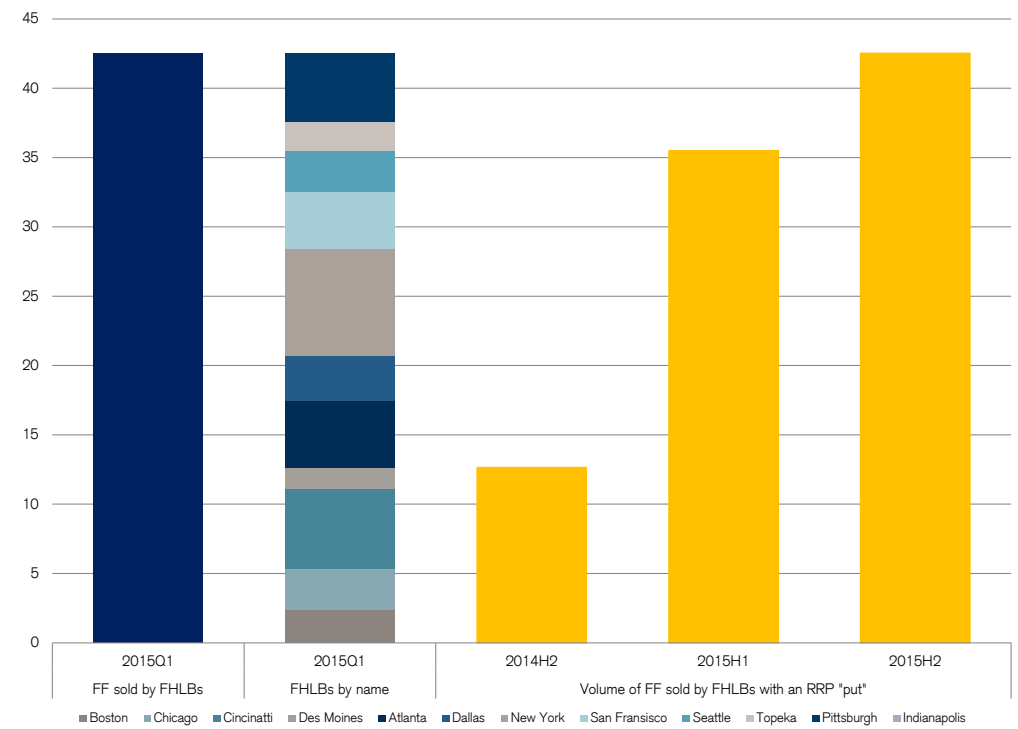
During most of 2014, the EFFR traded only about 2-3 bps above the o/n RRP rate, but since 2015, this spread widened to about 8 bps and recently to as much as 10 bps. What's behind this updrift is that the number of FHLBs with access to the RRP facility was only four during 2014, but expanded to nine on January 16th, 2015 and ten on August 3rd, 2015 (see [here](#), [here](#)). With more and more FHLBs having the option of investing at the o/n RRP rate, borrowers came under pressure to pay higher rates, pushing EFFR higher and higher.¹

In volume terms, Exhibit 9 shows the total volume of reserves lent by each of the FHLBs during the first quarter of 2015 and how the volume of reserves with a "put" to the RRP facility increased over time. At the moment, **all** FHLBs can invest at the o/n RRP rate except FHLB Indianapolis, which is not an active lender of federal funds presently (according to its financial reports, it has not lent a penny since the second quarter of 2014).

¹ This improvement in FHLBs' bargaining position could also explain why EFFR did not decline when the o/n RRP rate was first raised from 5 to 10 bps and then lowered back down to 5 bps in late 2014 – increasing the number of FHLBs as counterparties coincided with the testing of EFFR's responsiveness to the RRP rate.

Exhibit 9: FHLB Cash Balances with an RRP “Put”

\$ billions, 2015Q1



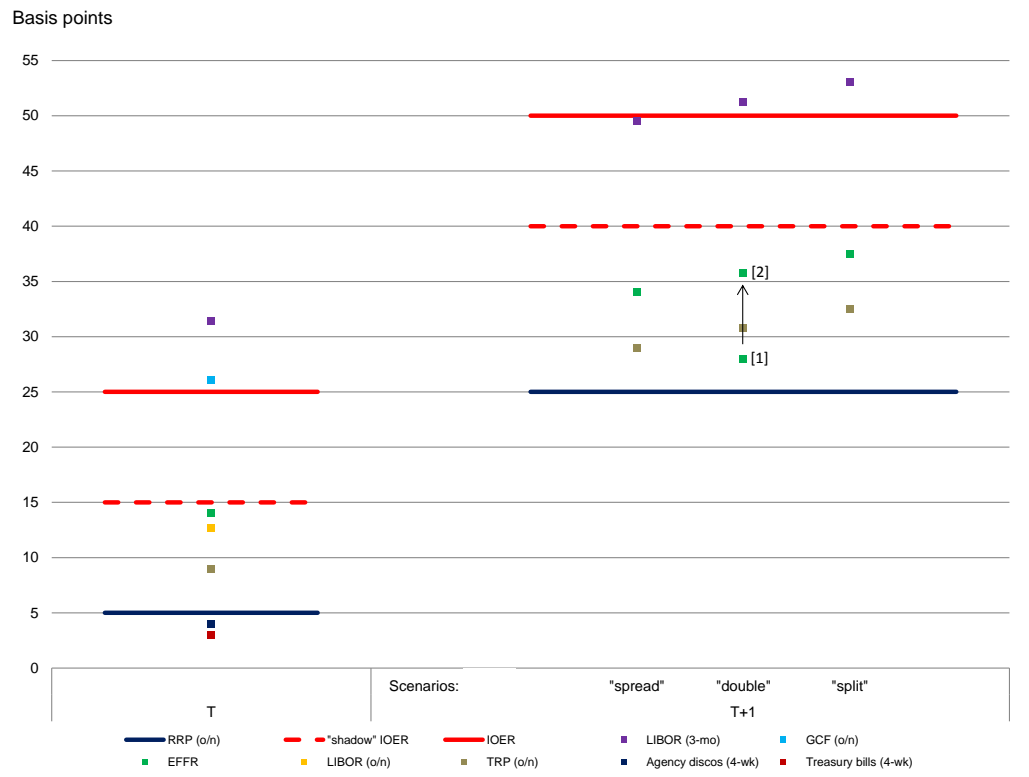
Source: Haver Analytics®, the BLOOMBER PROFESSIONAL™ service, Federal Reserve Bank of New York, Credit Suisse

This is the lay of the land. What does it imply for where EFFR will trade T+1?

Exhibit 10 shows how short-term interest rates stack up at present. The lines on the left-hand side show the key policy rates: the o/n RRP rate at 5 bps and IOER at 25 bps. The dashed line shows the “shadow” IOER, the effective rate U.S. banks subject to a 10 bps FDIC assessment fee earn on excess reserves (since it was introduced in April, 2011 the FDIC assessment fee has actually declined for all U.S. banks somewhat; what we know is that at present, these fees range from 7 to 15 bps. But figuring out how much U.S. banks pay on average is impossible as the assessment fees individual banks pay and the risk category they fall into for purposes of determining their assessment fee are both classified).

At the moment, 4-week U.S. Treasury bills and Agency discount notes both trade below the o/n RRP rate, at 3 and 4 bps, respectively. Overnight Treasury repos (tri-party) between primary dealers and money funds trade around 9 basis points. Overnight fed funds between FHLBs and banks trade around 15 bps. Overnight GCF repos between primary and non-primary dealers trade around 26 bps. 3-month LIBOR trades near 32 bps.

Exhibit 10: Plotting the Future



Source: Haver Analytics ©, Credit Suisse

The day after liftoff, the o/n RRP rate will be at 25 bps and the IOER and “shadow” IOER rates at 50 and 40 bps, respectively (see the lines on the right-hand side of Exhibit 8).

For where EFFR will print, consider three scenarios: spread, double and split.

Under the “spread” scenario, the tri-party repo rate trades at a similar spread over the o/n RRP rate as at present, and EFFR settles above tri-party repo also at a spread similar to where it is trading at present. This would put tri-party repo at 29 bps and EFFR around **34 bps** T+1. Assuming we get a full allotment RRP facility, there shouldn’t be a reason why tri-party repo rates should settle at a narrower spread over (let alone below) the o/n RRP rate. Should primary dealers offer to borrow at rates below the o/n RRP rate, money funds would quickly switch to funding the Fed’s balance sheet instead (see test results [here](#)).

Under the “double” scenario, imagine a trader at a bank (a borrower of fed funds) telling a trader at an FHLB (a lender of fed funds) the following: “At the moment you are earning 14 bps on fed funds. Why don’t I double that for you and pay 28 bps?” Were this trade to get done, the bank would also double the spread it makes arbing EFFR and IOER. At the moment, banks pay 14 bps and invest at 25 bps, for a profit of 11 bps. Were banks to pay 28 bps and invest at 50 bps, their profit would increase to 22 bps. Still, some FHLBs may not get particularly excited about where they are positioned within the o/n RRP – IOER band in terms of the rate that they earn. At 28 bps, FHLBs would earn close to the bottom of the range, compared to the middle of the range at present. The trader at the FHLB could ask for **35 bps** instead. Were this trade to get done, FHLBs would earn 2.5 times as much as at present and banks 50% more. Tri-party repo would drift higher accordingly.

Under the “split” scenario, imagine a trader at a bank telling a trader at an FHLB: “At the moment you and I are splitting the spread between RRP and IOER. Let’s just keep doing that.” Were this trade to get done, EFFR would print at around **37.5 bps**. Tri-party repo rates (Treasury collateral) would set marginally higher compared to the “double” scenario.

It is hard to imagine a scenario where FHLBs would ask for rates higher than 37.5 bps.

Doing so would be counterproductive. This is because above 37.5, trades would not be profitable for U.S. banks (they only earn the “shadow” IOER rate) and were U.S. banks stop borrowing, an already limited number of highly rated counterparties that FHLBs can trade with would halve and be limited to foreign banks only. Were this to happen, foreign banks would gain an upper hand and push rates offered back down. FHLBs would actually end up earning less on their fed funds trades, not more.

It is clear from these examples that when borrowers are few, it is hard to drive a tough bargain, and this also applies on the flipside with having the RRP facility to lend to.

Taking an average of these scenarios, EFFR should print somewhere around **35 bps** T+1.

Seven questions are typically raised in response to this forecast:

First, could EFFR drift higher than forecast if smaller banks enter the market as borrowers of fed funds in order to arbitrage the difference between EFFR and IOER?

The answer is no. FHLBs would not lend to smaller banks because they are not rated highly enough, and banks would not lend fed funds to other banks below IOER.

Second, could EFFR drift higher than forecast if the FHLBs were to leave the fed funds market altogether (like Fannie and Freddie did) and lend their cash at higher rates elsewhere (for example, in GCF repos)? In such a scenario, all fed funds transactions would be “high tail” trades, which would pull EFFR higher, possibly above IOER.

The answer is no. By regulation, FHLBs need to maintain enough liquidity to meet the needs of their members under the following two scenarios: “inability to access debt markets for 5 days and all advances are renewed except those for very large, highly rated members” and “inability to access debt markets for 15 days and no advances are renewed.” These requirements will keep the size of the market at least where it is today.

Third, could EFFR shoot through IOER if the RRP is full allotment? How close EFFR trades to IOER is a function of how much the Fed drains, and a full allotment RRP facility means the Fed will drain a lot. EFFR would then surely trade close to or above IOER.

The answer is yes, but with qualifiers. The Fed can’t just drain reserves on its own; the ecosystem has to cooperate. If RRP is full allotment and if uptake is not large, the Fed can’t drain a lot. While we think the RRP facility will get very big, this will play out over time and won’t necessarily be a T+1 event (more on this in the section below).

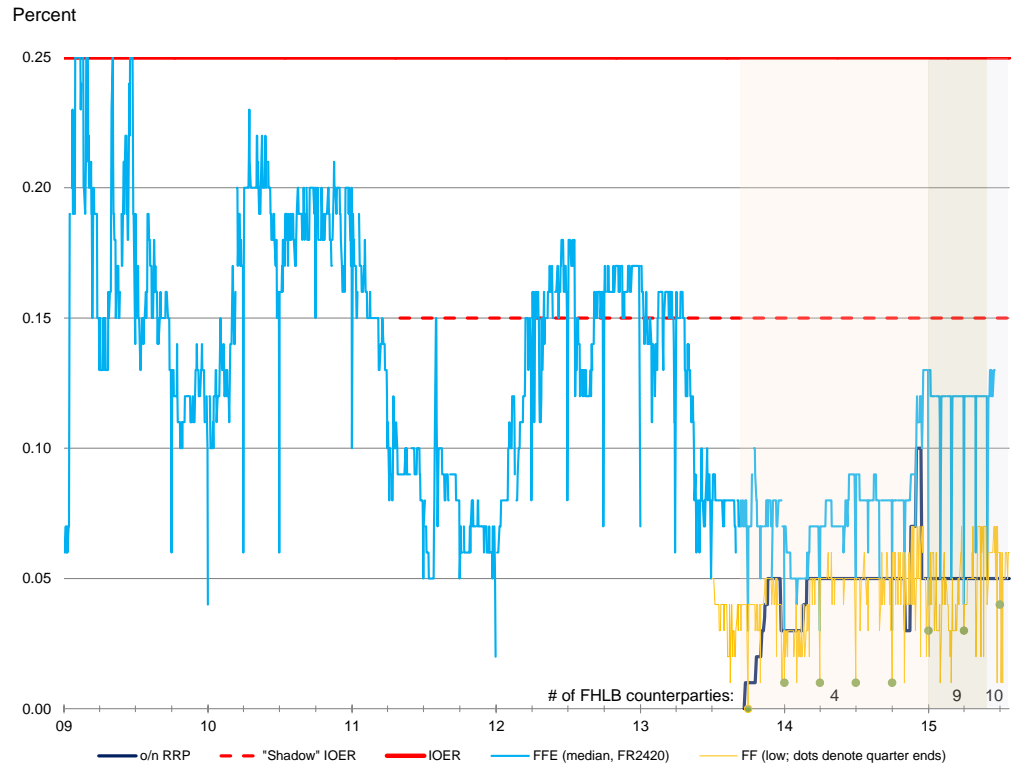
Fourth, could EFFR drift *lower* than forecast if the banks were to stop borrowing in the fed funds market and opt for cheaper venues such as the tri-party repo market?

The answer is no. Banks do not borrow in the tri-party repo market; primary dealers do. In recent months, banks accounted for only about 5% of borrowing in the tri-party repo market against U.S. Treasury collateral. Because Basel III requires banks to hold HQLA on an unencumbered basis, repos (because they encumber HQLAs) are simply not an attractive source of funding for depository institutions in the ordinary course of business. Post Basel III, repos are no longer a primary, but rather next-to-last resort source of funding for banks. The idea behind holding more HQLA is to have enough safe assets on hand as collateral to raise liquidity in the repo market in case outflows accelerate unexpectedly, and not to encumber them because repo is a cheaper source of funding.

Fifth, could EFFR drift lower than forecast if late in the day trades get “low-balled” at 1 bp?

The answer is no. The “low tail” of fed funds trades is only about \$5 billion, a volume that is unlikely to move EFFR by much. In addition, the lowest rates on fed funds transactions typically print +/- 1 bp above the o/n RRP rate. They only drop deep below the o/n RRP rate on quarter-ends. The lowest fed funds trades will likely print around +/- 1 bps around the o/n RRP rate (see Exhibit 11). If below, FHLBs would opt for holding U.S. Treasury bills instead – 3 and 6-month bills auctioned at rates near 12 and 22 bps, respectively.

Exhibit 11: Deep Dives Limited to Quarter-Ends...



Source: Haver Analytics®, Federal Reserve Bank of New York (FR2420), Credit Suisse

Sixth, could EFFR drift lower than forecast if FHLB Indianapolis (which is not an o/n RRP counterparty at present) started to lend in the fed funds market suddenly again?

The answer is no. During the quarters before Indianapolis stopped lending, it lent about \$1.5 billion on average, a volume unlikely to move EFFR by much if it came back online.

Seventh, could EFFR drift lower than forecast once the Fed switches its methodology to calculate EFFR?

Yes, but only about 1 bp and provided the Fed hikes this year, this will not be a T+1, but an early 2016 event – when the switch is scheduled to occur. The switch from reporting EFFR as a volume weighted mean to a volume weighted median will cause a slight downward drift. This is because the volume of trades that print well above EFFR is greater than the volume of trades that print well below EFFR (see [here](#)). The removal of these tails pulls the median EFFR slightly below the average (about 1 bp lower). The median has been trading closer to the o/n RRP rate than the average and on quarter-ends it **did** dip below it while the average has not. These preliminary findings (see [here](#)) are what may have prompted the Fed to start referring to the o/n RRP rate as a **soft** floor (versus a floor without qualifiers) in starting with the December 2014 FOMC meeting.

What does all this mean for 3-month LIBOR? The spread between 3-month LIBOR and EFFR has been stable around 15 bps since 2013, with a standard deviation of 2 bps.

Were this spread to hold at current levels, 3-month LIBOR would set around **49, 51 and 53 bps** under the spread, double and split scenarios, respectively, and at **52 bps** on average.

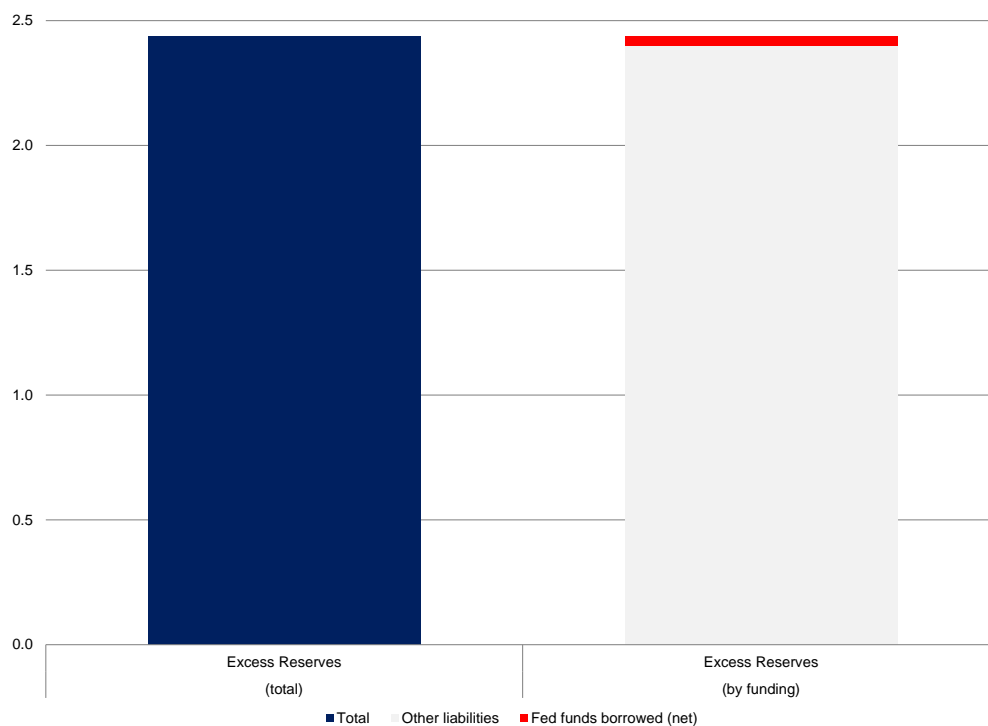
In practice, however, this spread will likely widen – not because bank credit risk will deteriorate, but because banks’ demand for term funding **may** increase were cash pools to stampede out of bank deposits and crowd into money funds en masse (see below).

Liftoff and Bank Equities

No one seems to think about the fact that of the \$2.5 trillion of excess reserves in the banking system, only about \$50 billion are funded in the fed funds market through the EFFR - IOER arbitrage trade. That is less than 2% of excess reserves (see Exhibit 12).

Exhibit 12: The Tip of the Iceberg

\$ trillions, 2015Q1



Source: Federal Reserve (H.4.1), Federal Reserve Bank of New York (FR2420), Credit Suisse

What about the rest of the \$2.45 trillion of excess reserves in the system?

\$1.5 trillion of these are held by U.S. banks funded with institutional deposits. The rest are held by the New York branches of foreign banks and funded with yankee and Eurodollar CD and CP issued to prime money funds, as well as interoffice loans from headquarters also funded by Eurodollar deposits and Euro/U.S. dollar basis swaps (see Exhibit 13).

It is the pricing of these liabilities and the interest rate sensitivity of investors that hold them that will determine how large the RRP facility will get T+1 and in the following months.

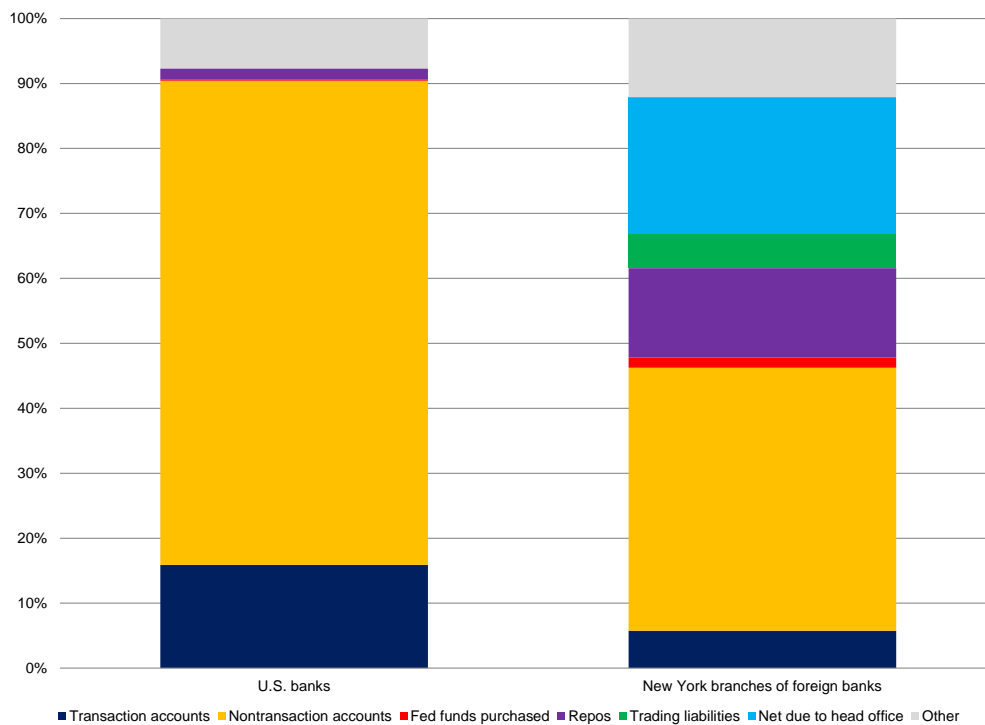
These flows are important, but completely ignored! The dynamics of the fed funds market get most of the airtime, but flows there are small, almost insignificant at the system level.

There will be two types of flows after liftoff: fast and slow.

Slow flows will involve cash pools trading out of institutional-class prime money funds and into government-only money funds. These flows will swell in anticipation of the October 2016 deadline for prime money funds to comply with SEC reforms to float their net asset values (NAV), **but only gradually**. Flows here will likely amount to roughly \$500 billion.

Exhibit 13: U.S. and Foreign Banks Fund Reserves Differently

Percent, 2015Q1



Source: FDIC, Credit Suisse

Fast flows will involve cash pools trading out of bank deposits and into government-only money funds. These flows may occur fast: either coincident with, or soon after liftoff. Flows here will likely amount to roughly \$500 billion as well.

Both fast and slow flows will ultimately net down to flows between banks and the Fed via money funds. The RRP facility will be the enabler of these flows (see Exhibit 14).

Slow flows – the institutional prime to government-only money fund flows – are unlikely to be disruptive. As money leaves, prime funds won't roll the yankee and Eurodollar CDs and CPs they bought from the foreign banks that used this funding to arbitrage the difference between IOER and money market rates on and offshore. The dynamics of these flows will be as simple as the example described on page 3: as foreign banks lose funding from prime funds and give up reserves, the Fed will swap reserves for RRP for government-only money funds so they can absorb outflows from prime money funds, closing the loop.

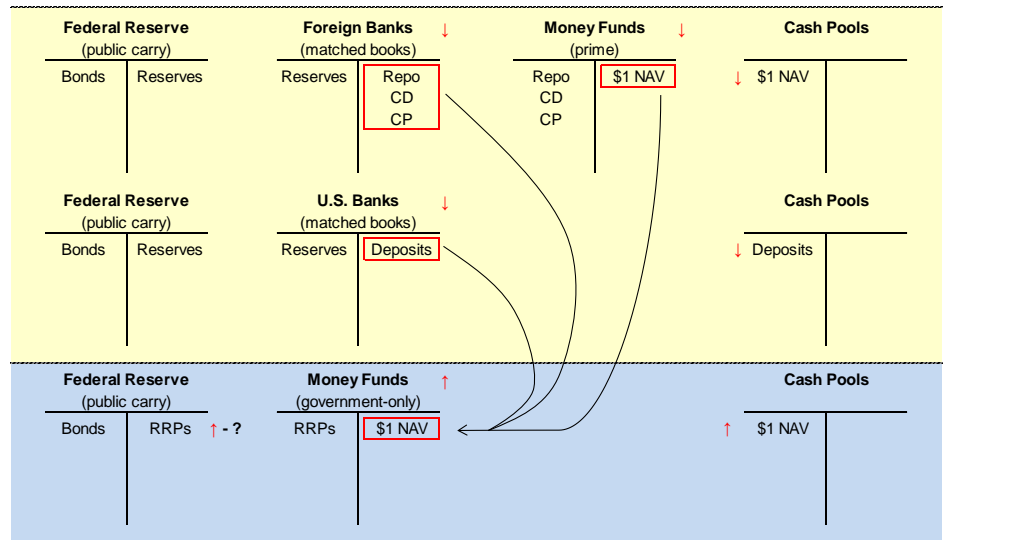
Fast flows – the deposits to government-only money fund flows – may lead to unforeseen dislocations, however. This is because the large U.S. banks that hold most of the hot money (in the form of non-operating institutional deposits) that could leave fast once interest rates move higher are positioned very differently for potential deposit outflows.

As it turns out, the largest U.S. banks hold similar amounts of non-operating deposits, but the HQLA portfolios backing them vary significantly from bank to bank (see Exhibit 15).

Someone won't get things right.

Estimating the exact amount and interest rate sensitivity on non-operating institutional deposits is not an exact science. The concept of non-operating deposits itself is a new concept (a creation of Basel III) and banks are presently building their systems and models to estimate their exact volume and behavior. The potential for model risks abounds.

Exhibit 14: Fast and Slow Flows

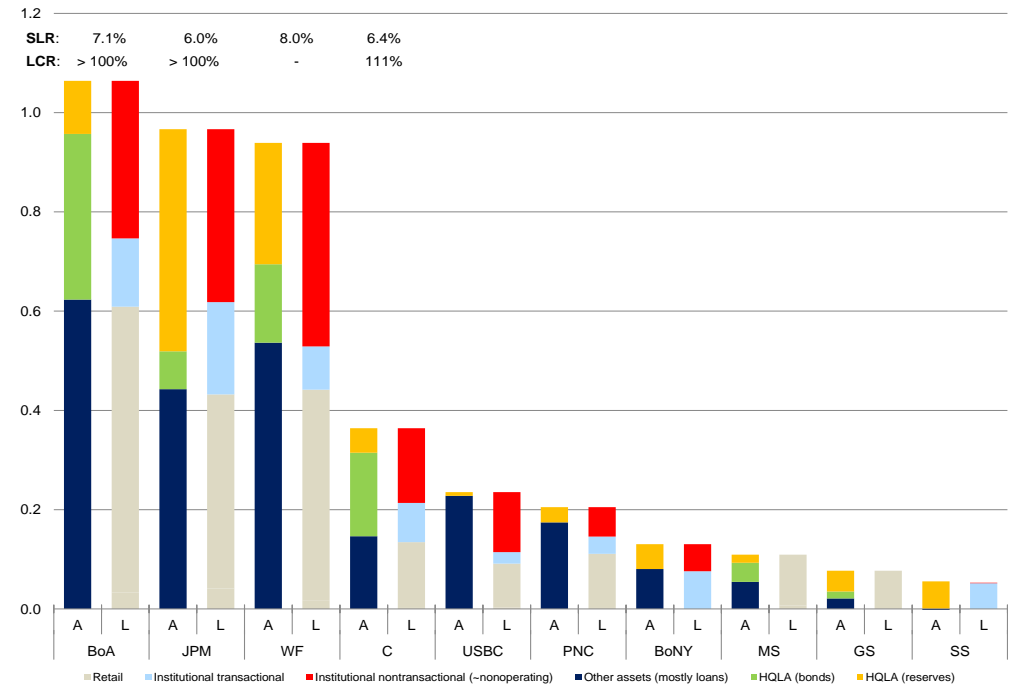


Source: Credit Suisse

Based on our impression listening to recent earnings calls, the executives and CFOs of big banks seem more confident about the **estimates** of how much non-operating deposits their institutions have and the interest rate sensitivity, stickiness and hence HQLA dimension of these deposits than the back-office modelers that generate these estimates.

Exhibit 15: Someone Won't Get Things Right

\$ trillions, 2015Q1



Source: FDIC, Call Reports (FFIEC031), company 10Qs, earnings presentations and fixed income investor presentations, Credit Suisse

Of particular interest is how much of non-operating deposits are those of financial institutions (such as asset managers, hedge funds, private equity funds and FX reserve managers) with a 100% HQLA requirement. Only one of the top four U.S. banks has disclosed that of the \$390 billion of deposits it had from financial institutions as of the first quarter of 2015, \$200 billion is non-operating (with a 100% HQLA requirement). Assuming a similar split at the other three top U.S. banks points to at least an additional \$450 billion of such deposits in the system. According to the U.S. Flow of Funds accounts, financial institutions hold \$1.1 trillion in deposits. If we are right, 60% of these are non-operating.

Losing these deposits will be a non-event for banks that have more reserves than non-operating deposits. As deposits leave for money funds, banks give up reserves, which the Fed will swap into RRP's and give to money funds. The only trade that occurs in the financial system is the Fed swapping reserves for RRP's – a non-event in markets.

As deposits leave, these banks will gain balance sheet relief and remain LCR compliant, freeing them up to do whatever they please with their surplus capital: buy back debt, buy back stock or compete retail deposits away from others – all positives for their equity price.

Life may not be so simple for banks that have fewer reserves than non-operating deposits, however. If deposits leave faster or in greater volume than assumed, these banks will have to choose between one of three options: (1) paying up for wholesale deposits in order to slow their outflow to a pace more in line with their HQLA profile (a first resort response); (2) repoing U.S. Treasuries from their HQLA portfolio to raise the liquidity to finance deposit outflows (as a next resort); or (3) sell U.S. Treasuries and other HQLA assets such as agency MBS right in the middle of a hiking cycle (as a last resort option).

Whichever one of these scenarios will dominate, one thing is for sure. These banks either won't gain balance sheet capacity as fast as those that are "over-reserved." Or if they do, the higher funding costs and trading losses incurred will weaken their ability to compete for (or much worse, retain) retail deposits – all potential negatives for their equity price.

A rising tide – rising interest rates – may not lift all boats as is typically the case during hiking cycles. The implication for bank equities is straightforward (see Exhibits 16).

Exhibit 16: Not All HQLA Portfolios Are Positioned for Balance Sheet Relief

\$ billions, 2015Q1

	Institutional Deposits		HQLA (by asset)			HQLA (by location)		
	Transactional ¹	Nontransactional ²	Reserves	US Treasuries	MBS	Bank	Dealer	Holdco
BoA	137	318	107	60	274			
JPM	186	348	447	11	65			
WF ³	87	410	244	81	76			
C	79	151	49	135	57	218	24	
MS	-	-	16	80	36	55	78	
GS	-	-	42	64	10	55	88	32

¹Some transactional deposits may be viewed by banks as "operating excess balances" and classified as nonoperating deposits instead.

²Proxy for nonoperating deposits.

³Unencumbered MBS only.

Source: Credit Suisse

Liftoff, Libor-OIS and the U.S. Treasury Market

It is far less obvious what the sum total of these flows will mean for the money and fixed income markets. Libor-OIS could certainly widen if banks that are under-reserved start paying more to slow the flow of non-operating deposits, or if they crowd into the repo market to “liquify” their HQLA. But when this widening will occur is not entirely obvious.

A lot will depend on how fast government-only money funds pass higher interest rates on to their investors. At the moment, money funds are “eating” the fees associated with their business – costs are not being passed on to investors. A key question is whether sponsors will keep the first hike to themselves or pass it on to investors promptly?

Our instinct says promptly – as soon as the first hike.

Were this to happen, Libor-OIS could widen as soon as T+1. What gives us confidence in this call is that from the banking system’s perspective, Basel III (and, in particular, the Liquidity Coverage Ratio (LCR)) has dramatically reduced the attractiveness of institutional deposits and dramatically increased the attractiveness of retail deposits for funding.

On the other end of the spectrum, the SEC’s money fund reform has dramatically reduced the attractiveness of institutional-class prime money funds and dramatically raised the attractiveness of institutional-class government only money funds. And the attractiveness of retail money funds (both prime and government-only) has been reduced somewhat.

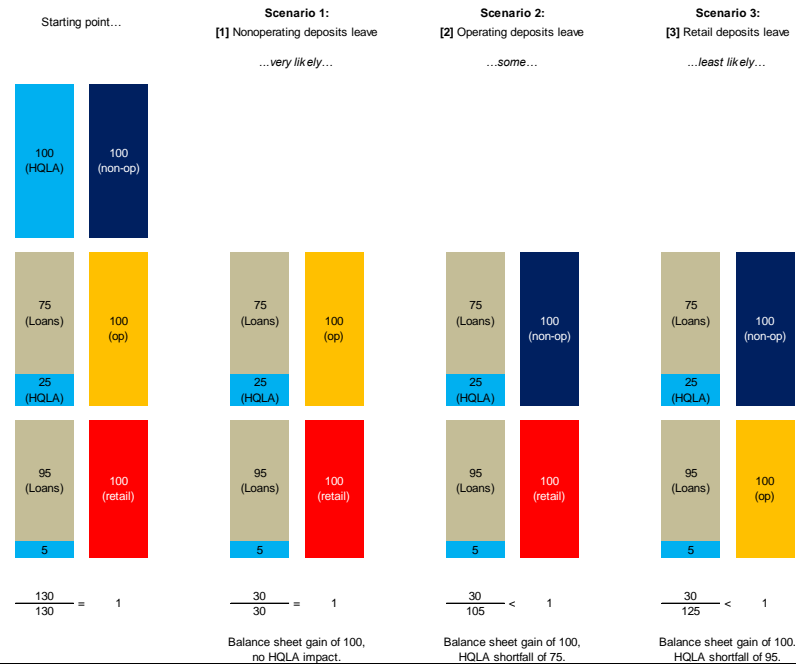
Under the LCR, banks only have to hold 3-5% of HQLA for each dollar of retail deposit. These numbers jump to 40% and 100% for non-operating institutional deposits depending on their type, with huge (essentially make-or-break) implications for banks’ net interest margins and return on equity. These rules make it abundantly clear that the fight for **retail** deposits – both between banks and money funds and between banks – will be fierce, unlike anything we have seen in past hiking cycles. And as banks concentrate their efforts to retain retail deposits, they will fight much less aggressively for institutional deposits.

Money funds will do the exact opposite.

They will compete fiercely among each other for the **institutional** deposits that banks do not want (one large asset manager recently announced a new business unit specifically to this end), and fight less for retail deposits. In addition to the higher deposit rates retail depositors are set to get from banks, deposit insurance limits are also much higher post-crisis (\$250,000, up from \$100,000 before the crisis), which would make competition for retail money harder and margins on retail funds narrower than on institutional-class funds.

Other fixed income themes all derive from scenarios for deposit outflows (see Exhibit 17).

Exhibit 17: Basel III Hardwires the Asset-Side Response to Deposit Outflows



Source: Credit Suisse

The examples discussed in the previous section all describe scenarios where non-operating deposits with a 100% HQLA requirement leave and some banks are under-reserved. In a worst case, banks may have to sell U.S. Treasuries from their HQLA portfolios. Such sales would pressure the year segment of the curve: our analysis of who holds U.S. Treasury debt (see [here](#)) suggests that banks have concentrated their recent purchases in that segment of the curve. But competition for retail deposits between banks could push in the opposite direction: as some banks lose **retail** deposits, they may face HQLA shortfalls and may have to buy U.S. Treasuries to make up for this shortfall (also see our mortgage market team’s comment on the potential for HQLA shortfalls [here](#)).

Which way the balance will tip is hard to say but rising volatility in the year segment of the U.S. Treasury curve is high and not something the market is currently pondering.

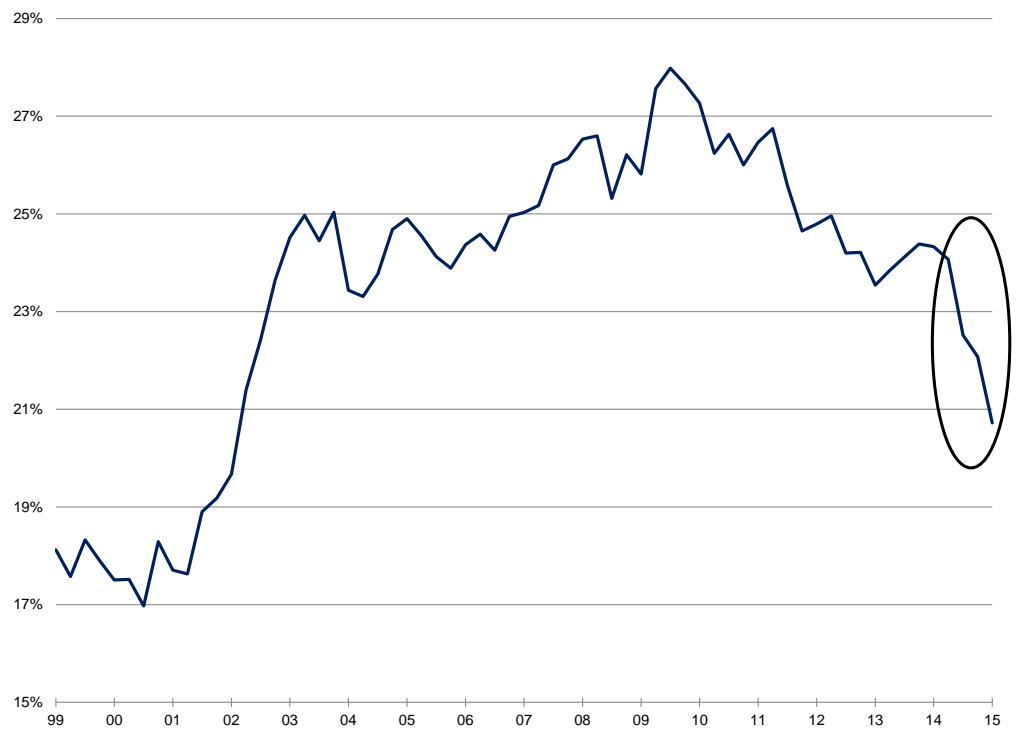
Liftoff and the Dollar

Finally, there is a currency dimension to the exit: the potential for a reallocation out of euros for U.S. dollars for reasons that lurk in the deepest berths of the global plumbing.

Since the ECB cut deposit rates below zero in June 2014, FX reserve managers have been reducing their EUR exposure. The euro’s share of global FX reserves fell from 25% to 20% by March, 2015 (see Exhibit 18). The U.S. dollar absorbed all of these flows.

Exhibit 18: Negative Rates Can be Painful

The euro's share of global reserves



Source: IMF, Credit Suisse

The entity that absorbed these U.S. dollar inflows was none other than the New York Fed, through an RRP facility – the foreign repo pool – it maintains for FX reserve managers (see Exhibit 19). This facility is separate from the one the Fed will rely on for liftoff.

Balances outstanding in the foreign repo pool averaged around \$100 billion during the first half of 2014 and then shot up to \$160 billion fast in the months after the ECB's move, indicating reserve managers' strong demand for safe, short-term, U.S. dollar instruments.

But the foreign repo pool is not full allotment. Its size is determined by the New York Fed.

Yield differentials matter, and quantities do too. At the moment, FX reserve managers face a shortage of short-term dollar-denominated sovereign instruments that could absorb their flows out of euros and into dollars. Deposits at U.S. banks are not an option for two reasons: most FX reserve managers are only allowed to hold claims on the sovereign (claims on banks are claims on the private sector) and banks themselves would turn such deposits away as they classify as non-operating deposits with a 100% HQLA requirement.

But these flows and corresponding pressures on the euro's value versus the U.S. dollar could grow further if the Fed delivers a full allotment RRP facility during liftoff. A full allotment facility could lead to money funds trading out of U.S. Treasury bills (money funds hold about \$250 of Treasury bills; see pp. 17 [here](#)), leaving more for FX reserve managers to invest in. This in turn could unlock flows that are constrained by quantities at present...

Exhibit 19: The “Other” RRP Facility - the New York Fed’s Foreign Repo Pool

RRPs' liabilities to foreign official accounts, \$ billions



Source: Federal Reserve (H.4.1), Credit Suisse

Conclusions

The Fed is between a rock and a hard place.

If it worries too much about the turbulence we highlight, that may follow from a full allotment RRP facility, it runs the risk of not being able to control short-term interest rates.

If it wants to demonstrate its ability to control short-term interest rates, it must live with turbulence during liftoff despite all its communication efforts to ensure the opposite.

In the end, mechanics will trump rhetoric. The side-effects of financial re-regulation will trump the good intentions of enhanced monetary policy transparency.

Get ready for a turbulent exit...

Appendix – The Politics of the Exit

Initially, the Fed's intention (or more precisely the New York Fed's intention, in agreement with then Chairman Ben Bernanke) was to turn RRP's into fixed rate, **full allotment** operations. However, this idea soon hit the wall of concerns raised by regional Fed presidents and differences between the New York Fed and the Federal Reserve Board.

Four concerns emerged in particular. The first three are entirely misplaced and the fourth could have been dealt with through more deft communication, but never was.

The first concern (voiced mostly by regional Fed hawks) was that a full allotment RRP facility would keep the size of the Fed's balance sheet large for a long time to come, which would bring with it "obvious" inflationary risks. This concern is misplaced. Inflation is nowhere to be seen, and the size of the Fed's balance sheet certainly does not drive it.

The second concern was that a full allotment RRP facility would "disintermediate" banks. This concern is also misplaced. If anything, banks view excess reserves more as a burden rather than a boon. When combined with the supplementary leverage ratio (SLR), excess reserves dilute banks' net interest margin and return on equity. It is true that at the moment banks hold hundreds of billions worth of excess reserves as HQLA, but they could hold other instruments at no haircut as well, namely U.S. Treasury securities. The liquidity coverage ratio (LCR) does not require banks to hold ultra short-term assets – such as reserves – but with the stock of excess reserves determined by the Fed, the banking system as a whole simply has no choice. **Some** swapping of reserves for RRP's may actually be neutral from an LCR perspective (see below), and if anything, banks would ideally prefer more, not less choice as to how they structure their HQLA portfolios.

The third concern was that a full allotment RRP facility would increase the size of money funds – entities not under the direct supervision of the Fed. This concern is misplaced as well. Money funds are far more transparent and easier to understand for regulators than banks, and with the SEC's recently concluded reforms of the sector, a safer set of vehicles to enable liftoff. While it is true that the Fed does not directly supervise money funds, it does have a powerful seat on the Financial Stability Oversight Council which in turn wields powers granted by Congress to require any financial entity to submit information, submit to Fed supervision and in extremis meet prudential standards set by the Fed.

The fourth concern was that a full allotment RRP facility would encourage runs during a crisis. This concern is also misplaced, but could easily have been dealt with by more deft communication. Those in favor of a full allotment RRP facility could have articulated the difference between the meaning of full allotment in "peace time" and "war time."

In "peace time," essentially now, the notion of full allotment is about how to calibrate the mix between reserves and RRP's given no change in the size of the Fed's balance sheet. Here, full allotment is about the Fed's **ability to control short-term interest rates**. The question is how high to build the wall of the Hoover Dam for normal times (see above).

In "war time," that is during systemic crises, the notion of full allotment is about the Fed increasing the size of its balance sheet when the pressure is on to issue the supply of safe assets. The question is how much to add to the height of the Hoover Dam when a tsunami is about to surge downstream. It relates to a deeper question of whether to follow the Bank of England down the path of Dealer of Last Resort that the Fed will have to spend some time thinking about, but the way officials have been talking about RRP's so far is one sided. Balance sheets never increase on one side only, and if during the next crisis the Fed were to increase the supply of RRP's on the liability side of its balance sheet, it would also have to do something else on the asset side. Whether that will be outright asset purchases from asset managers (via dealers), repos (TOMOs) with dealers **in size**, or discount window loans to banks won't matter. What will matter is that the collateral that comes in through either of these operations will be in exchange for central bank funding. In this context,

RRPs would **not** facilitate a run, but provide a safe asset in a new (not yet familiar) form – not in the form of currency or reserves but RRP. In this context, RRP is no different from a surging supply of U.S. Treasury bills (in the form of SFP bills) during the 2008 crisis.

To make up for everything a fixed rate, fixed allotment facility was not, two additional tools entered the debate – the term deposit facility (TDF) and segregated cash accounts (SCA) – both of which have more to do with internal Federal Reserve politics than substance.

RRPs, the TDF and SCAs all aim to achieve one thing, which is to reduce the amount of excess reserves in the banking system to a point where reserves are scarce again and there are more incentives for banks to trade them to meet regulatory requirements.

RRPs reduce the amount of excess reserves by swapping them into a liability that can be held by money funds. The idea of RRP originated at the New York Fed.

TDFs reduce the amount of excess reserves by swapping reserves into term deposits, which, unlike reserves, cannot be used to meet reserve requirements. The TDF was an idea of the Federal Reserve Board, to address discomfort with the New York Fed's plan to rely on money funds as the enablers of liftoff. Banks don't seem too excited about the TDF, however. They typically swap existing reserves for TDs, but do not borrow to get them.

SCAs reduce the amount of excess reserves by stapling reserves to deposits such that reserves de facto become the assets of deposit holders and cease to be the assets of banks, such that banks would no longer be able to use them to meet reserve requirements. SCAs were an idea of Jamie McAndrews, head of research at the New York Fed (see [here](#)). Like the TDF, SCAs were also conceived to address discomfort with money funds.

Importantly, however, it is only RRP that reduce excess reserves in a way that provides balance sheet relief for banks. The TDF and SCAs do not and both are subject to the same Basel III constraints and transmission bottlenecks as excess reserves that we described in Global Money Notes #1 (see section "Basel III Disrupts Arbitrage" [here](#)).

On the importance on achieving reserves scarcity with balance sheet relief, consider that the New York Fed in its flagship presentation on the exit (see [here](#)) places great emphasis on how RRP give banks balance sheet relief, while the TDF does not; how RRP reduce banks' balance sheet costs, while the TDF does not; and how RRP enhance welfare, while the TDF does not. That's three pages in a 30-page report devoted to praising the attractiveness of o/n RRP over the TDF, authored by someone who according to the attendance [log](#) of the March FOMC meeting was in the room helping the Manager of the System Open Market Account brief the FOMC on how to size the o/n RRP facility for liftoff.

On the important matter of pricing, also consider that both the TDF and SCAs cost more than RRP. The TDF is priced at a slight premium over IOER versus a deep discount for RRP, and SCAs would be priced at a slight (not a deep) discount to IOER (see [here](#)).

Pricing and balance sheet relief do matter, which is why the Fed has ultimately decided to put more muscle behind RRP than the TDF as the primary "crutch" under short-term interest rates during liftoff. SCAs seem to have faded as an idea altogether.

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Disclosure Appendix

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