

Global Money Notes #15

Monetary Policy with Excess Collateral

The agenda of this year's Jackson Hole Economic Policy Symposium will be "[Changing Market Structure and Implications for Monetary Policy](#)".

The topic couldn't be more timely.

In the previous issue of Global Money Notes, we discussed one important change in market structure: the changing demand for and supply of safe assets and why Treasury's current bill issuance strategy is uncomfortable for the Fed.

Bill supply has *pushed* the floor under o/n rates higher and with it their trading range relative to the top of the Fed's target range for the federal funds rate. But relative to each other, private o/n rates continue to trade fairly range-bound.

Coupon issuance will soon complicate this picture. More change is coming...

Funded buyers are expected to be an important source of bid for coupons, and their bid is expected to *pull* o/n GCF and GC rates away from other o/n rates – initially. But o/n fed funds and tri-party repo rates will follow soon after, and as they do, the Fed will have a hard time enforcing that o/n fed funds stays within the target band. A rethink of the Fed's operating regime will be necessary.

We are transitioning from an environment where reserves are excess to an environment where collateral is excess. The Fed's monetary toolkit has to adapt.

The floor system doesn't need to be replaced with a corridor system, in our view, but could be appended with a fixed price full allotment o/n repo (RP) facility – which is the symmetrical counterpart to the o/n reverse repo (RRP) facility.

The o/n RRP facility was relevant while the system had too many reserves relative to balance sheet capacity and reserves needed to be mopped up.

The o/n RP facility will be relevant when there will be too much collateral relative to balance sheet and collateral will have to be turned into reserves.

In an environment where the sovereign is flexing some serious fiscal muscle – the source of excess collateral – the launch of the o/n RP facility may be nigh.

But as one astute market participant put it, "the political, educational and operational cost of introducing a new facility is such that the Fed won't launch until alternatives have been exhausted and benefits are clear". And if reserves are hard to add, they'll have to be preserved by prematurely ending taper...

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Part 1 – From a Leaky Floor to an Escalator...

The net supply of bills is expected to increase by \$150 billion by September, with more to come during the last two months of the year. The safe asset glut is about to get worse.

Bill yields will likely trade 5-10 basis points (bps) higher on the back of this supply and higher bill yields would soon push the o/n rates complex outside the Fed's target range.

Bill yields were the reason why the o/n RRP rate was called a "leaky floor" in the past. Figure 1 shows that other than the weeks before FOMC rate hikes, one month bill yields typically traded below the administered floor – the o/n RRP rate. But with the recent surge in net bill supply, this pattern has changed. One month bill yields went from trading below the o/n RRP rate to trading well above it, and with that shift, one month bill yields became the effective floor under all private o/n interest rates replacing the o/n RRP rate.

The leaky floor became an escalator...

Figure 2 is a more dynamic representation of the shifting floors idea. The thick blue line plots the effective floor – as opposed to the administered floor – under o/n interest rates. The effective floor is the o/n RRP rate in periods when the o/n RRP rate is higher than the one month bill yield and it is the one month bill yield in periods when the one month bill yield is higher than the o/n RRP rate. The chart clearly shows that by April, the effective floor under o/n rates shifted higher – the o/n RRP rate is currently not binding.

Government money funds are the biggest investors in o/n RRP's and one month bills, and their preference for one month bills if they yield more than o/n RRP's is understandable. Both instruments are a direct claim on the sovereign and are considered liquid assets for regulatory purposes, but bills give access to intraday liquidity whereas o/n RRP's do not.¹ If money funds buy bills for intraday liquidity purposes even when their yield is below the o/n RRP rate, they'll definitely buy them when their yield is higher than the o/n RRP rate.

Figure 3 shows that as one month bill yields traded above the o/n RRP rate, the usage of the o/n RRP facility fell to zero – this is the quantitative proof to the observation that the administered o/n RRP rate currently does not serve as the floor under o/n interest rates.

Government money funds' third investment option next to o/n RRP's and one month bills are o/n tri-party (TRP) repos with primary dealers and foreign banks' New York branches.

Figure 4 shows the one month bill yield and the o/n TRP and o/n RRP rates over time. Money funds' first choice is always bills to cover intraday liquidity needs, followed by o/n TRP repos which offer a spread over o/n RRP's, followed by o/n RRP's as a last resort.

Figure 5 shows the o/n TRP repo rate within the administered band and its spread to the o/n RRP rate. This spread has been around 5 bps in the post-Basel III era. But in April, it quintupled to about 25 bps – a gigantic spread move by the standards of o/n markets. Figure 6 shows, however, that when expressed as a spread to one month bill yields, the o/n TRP repo rate still trades at its typical spread levels – relative to the effective floor.

Now that we've established that the recent bout of *bill supply* pushed the effective floor under o/n TRP rates higher, we can broaden the conversation to other o/n interest rates: the o/n GCF repo rate, the o/n discount note rate and the o/n fed funds (FF) rate.

Figure 7 shows o/n GCF rates relative to o/n TRP rates. Primary dealers' matched repo books typically involve lending to other dealers at the o/n GCF rate or to the buy-side at the o/n GCF rate plus a spread, both of which are funded in the o/n TRP repo market.

¹ Maturing bills return cash early in the morning. Proceeds from the sale of bills return cash by 3:00 PM the latest. But maturing o/n RRP's return cash only at 3:30 PM, which makes o/n RRP's the least liquid of all o/n instruments!

Matched book intermediation must involve a positive spread so if the funding leg of the matched book shifts higher, the lending leg must shift higher too. Indeed, the spread between o/n GCF and TRP rates has been mostly unchanged this year.² The only reason why o/n GCF rates have been trading structurally above IOR is that the effective floor to the funding leg of o/n matched books has shifted higher – again, due to *bill supply*.

Figure 8 shows the yield on o/n discount notes relative to the o/n RRP rate. Like bills, o/n discount notes command a liquidity premium relative to o/n RRP. Discount notes return cash by noon and so they also provide intraday liquidity for money funds, like bills.

In a way, o/n discount notes are even better than bills as they are true o/n instruments in the sense that they have zero price risk while one and three month bills have some. When you sell a bill for intraday liquidity needs, you do not precisely know the price at which you'll sell, but when o/n discount notes mature, you know how much you'll get at noon.

The only problem with o/n discount notes is that there aren't enough of them: Figure 9 shows that their supply is only \$20 billion, which is a drop in the ocean of funding markets. The frequent dips in the yield of o/n discount notes even outside of quarter-ends are a reflection of their superior liquidity coupled with their unpredictable and razor-thin supply.

The liquidity premium of bills and o/n discount notes tend to move in tandem which makes sense given that the two instruments are substitutes. That the liquidity premium of o/n discount notes disappeared in recent months is – once again – due to *bill supply*.

FHLBs issue o/n discount notes to fund arbitrage. Yes, FHLBs are arbitrageurs too...

In a typical arbitrage trade, FHLBs issue o/n discount notes and lend the proceeds in whichever o/n market yields the most. FHLBs conduct these arbitrage activities in order to reduce the periodic negative carry of their liquidity portfolios. Their liquidity portfolios periodically earn a negative carry because, on the asset side, FHLBs are captive lenders in the o/n FF market due to early cash return requirements, but on the funding side, their regulator requires them to fund their liquid assets with three month discount notes.

Figure 10 shows that FHLBs' liquidity portfolios typically bleed money in the run-up to FOMC hikes – that's obviously because o/n markets react to hikes only after the fact, but term funding markets anticipate such hikes in advance. FHLBs' o/n arbitrage trades on any given day serve the purpose of offsetting the negative carry that periodically arises in the run-up to rate hikes. Importantly, whereas in the past, FHLBs' liquidity portfolios went back to earning a positive carry after hikes, in recent months, their liquidity portfolios have been earning a negative carry even after hikes – due to the pressure on FHLBs' three month funding costs from *bill supply*. The \$10 billion increase in daily average o/n discount notes outstanding since late last year – see Figure 9 above – has to do with FHLBs trying to reduce the earnings impact from what once was only a periodic hit to what has become a structural hit to the spreads earned on mandatory liquidity portfolios.

Figure 11 shows what o/n arbitrage options FHLBs have to reduce this earnings hit. Unlike their liquidity portfolios, where cash must go to o/n FF due to early return needs, FHLBs do not care about the timing of cash return from o/n arbitrage trades so they are flexible between o/n FF and o/n repo trades – they'll lend where yields are the highest. In the past, when o/n FF was the highest-yielding arbitrage trade, FHLBs put both their liquidity and arbitrage into o/n FF, which boosted volumes and kept the o/n FF rate steady. But in recent months, volumes declined as arb flowed to repos and o/n FF drifted higher and as in the examples above, the reason for the updrift in the o/n FF rate was *bill supply*.

² The increase in the spread between o/n GCF and o/n TRP repo rates during the year-end turn was partly due to strong demand for collateral upgrade swaps (equities for Treasuries) from some foreign banks' [equity futures desks](#).

Figure 12 shows that the increase in o/n FF volumes during the fourth quarter of last year was driven by the massive widening of the o/n FF – o/n discount note spread. Wider spreads incentivized FHLBs to ramp up arbitrage and o/n discount note issuance.

Figures 13 and 14 show that as one month bill yields pushed o/n discount note yields higher, the o/n FF – o/n discount note spread collapsed and o/n FF volumes fell as FHLBs pulled arbitrage trades from o/n FF and put them in better-yielding repos instead.

Thus the recent decline in o/n FF volumes has to do with FHLBs shifting arbitrage flows away from o/n FF to o/n TRP and o/n GC repos instead. To argue that traded volumes in the o/n FF market will fall from here now that repo rates trade above FF is a stretch.

FHLBs liquidity portfolios are a function of their advance books...

...their liquidity portfolios must be liquid before dawn...

...and only o/n FF trades return cash before dawn.

That was the case. That is the case. And that will be the case for the foreseeable future. Structurally, FHLBs will continue to lend at least \$60 billion in the o/n FF market, but volumes in excess of \$60 billion will depend on where FHLBs direct o/n arbitrage flows.

If the o/n FF rate trades above o/n TRP and GC repo rates, traded o/n FF volumes will increase and the o/n FF rate will go down within the Fed's target band given unchanged demand for o/n FF from banks. But if the o/n FF rate falls below o/n repo rates, the opposite will happen: traded o/n FF volumes will fall and the o/n FF rate will drift higher within the Fed's target band given unchanged demand for o/n FF from banks.³

The ebb and flow impact of FHLBs arbitrage activities on volumes in the o/n FF market is not a part of the market's understanding of how the o/n FF rate trades but it should be. Periodic "high tides" in traded o/n FF volumes can push the FF rate down within the band and periodic "low tides" in traded o/n FF volumes can push the FF rate up within the band.

Figure 15 shows the three most recent episodes of low tides in the o/n FF market and Figure 16 shows that the greater the low tide, the greater the move in the o/n FF rate. When between March 1st and April 24th traded o/n, FF volumes fell by over \$50 billion, the o/n FF rate drifted 4 bps higher within the band, and between June 1st and June 19th when traded o/n FF volumes fell by over \$30 billion, the o/n FF rate drifted 2 bps higher. Furthermore, during low tides the 75th percentile of o/n FF trades tends to "zigzag" more.

This feature of the o/n FF market is useful to know for both banks and hedge funds.

For foreign banks it can give an edge to more effectively fund o/n arbitrage trades between o/n FF and o/n GCF repos and FX forwards and parts of their HQLA portfolios.

For hedge funds, it can give an edge to more effectively forecast the path of o/n FF within the Fed's target band and have a more precise view of the fair value of term OIS.

Figure 17 summarizes our discussion of o/n markets. It clearly shows that relative to each other private o/n rates trade like they did before the surge in *bill supply*. That spreads between private o/n rates are broadly unchanged tells us that interbank and interdealer liquidity is currently *not* tight. Reserves aren't scarce and dollars aren't scarce either.

It also shows that the only thing that changed is that the constellation of o/n rates shifted higher relative to the administered target band, but as we've explained the sole reason for that was the surge in *bill supply*. And the solution to a glut of bills is to undo *bill supply*...

How?

³ Demand for o/n FF is of course changing and is increasing at the moment. But that's a discussion for another day.

Part 2 – How to Shut Down the Escalator?

First, the Debt Management Office of the Treasury could change its issuance strategy. For example, shifting future issuance from bills to notes is one option. Buying back bills and reissuing them as notes is technically also possible but practically it is very unlikely.

Second, the Fed could announce a reverse twist, where they sell coupons from their portfolio and buy bills instead. Doing so would be reserves neutral – a reverse twist is just an asset swap. Doing a reverse twist would pressure bill yields below the o/n RRP rate and help drag the o/n rates complex back down within the target band. The yield curve would steepen, but that's a price worth paying for improving one's control over o/n rates.

Third, the Fed could cut the rate on the foreign RRP facility.⁴ Foreign official and supranational accounts currently keep \$250 billion in the foreign RRP facility, a takeup that has been steady for the past two years (see Figure 18). As we've discussed [before](#), the foreign RRP facility pays around the o/n GC repo rate and so is one of the priciest liabilities of the Fed – recently it may even have paid in excess of IOR (see Figure 19)!

The Fed uncapped this facility sometime during the last months of 2015 to ease what it rightly expected to be a potential shortage of bills triggered by U.S. G-SIBs pushing non-operating deposits off their balance sheet after the global adoption of Basel III, and prime money fund reform pushing trillions of funds from prime to government-only funds. Uncapping the facility was the right response to deal with the anticipated shortage of bills.

But that was then. The world is different today.

Today, the issue is not a shortage of bills but a glut of bills – a large foreign RRP facility is no longer optimal. Clearly, it is bad business for the government as a whole for the Fed to pay a rate on an o/n liability that is meaningfully above the one month bill yield: that makes the effective cost of funding a part of the federal deficit the bill yield and then some.

By cutting the rate it pays on the o/n foreign RRP facility, the Fed could incentivize foreign central banks to go back into the bill market and mop up excess bills that way.

The Fed is in absolute control of the price of its liabilities and in the foreign RRP rate, it has the single most effective lever in dealing with the pressure on o/n interest rates.

It is important to appreciate that both a reverse twist and cutting the foreign RRP rate can happen in conjunction with taper. The reverse twist is just an [asset swap](#) and cutting the foreign RRP rate ultimately amounts to a [liability swap](#) – it would reduce the usage of the foreign RRP facility and increase reserves in the system as reserves get [unsterilized](#). Swapping assets and liabilities does not interfere with shrinking the balance sheet.

But there is a difference between what should happen and what will happen...

The Fed's response to the shift up in the effective floor under o/n rates hasn't been to push the floor back down but instead to lower the ceiling by cutting the IOR rate by 5 bps.

If you had to explain the problem to a three year old, you'd say that the obvious solution to a floor shifting higher is not to lower the ceiling, but to push the floor back down. But lowering the ceiling can work too if it forces market participants to dig a hole in the floor...

...the [effective](#) floor!

That is what the Fed *appears* to be trying to do by cutting the IOR rate.

⁴ Other than cutting the rate on the foreign RRP facility, the Fed could introduce binding counterparty caps like it does with the o/n RRP facility for money funds and other qualified institutional investors that have access to the facility.

Part 3 – A Jackhammer to the Effective Floor

Cutting the IOR rate raises to raise the opportunity cost for banks with lots of reserves. Presumably it aims to make some banks think deep about how many reserves they need – what's true excess in their portfolios and what's not – and trade true excess for bills.

In other words, instead of cleaning up money markets either by buying up excess bills itself or by forcing foreign central banks to buy bills by re-pricing the foreign RRP facility, the Fed's preferred way to mop up excess bills is by incentivizing banks to buy them by re-pricing another Fed liability – reserves – by cutting the rate it pays on them by 5 bps.

In a way, the Fed's experiment is about trying to figure out whether reserves or bills are more excess. If reserves are excess, banks will swap them for bills and the experiment works. If reserves aren't excess – and we've been arguing that they aren't (see [here](#)) – banks won't play ball and the Fed will learn something about the demand for reserves.

Cutting the IOR rate won't push bill yields – and o/n rates – lower for three reasons.

First, by forcing reserves-rich banks to trade reserves for bills, an implicit aim of the Fed is to flatten the distribution of reserves in the banking system such that those with lots of reserves have somewhat less and those with few reserves have somewhat more. That's an interesting idea but as we've shown with our analysis of o/n rates, the issue is not the distribution of reserves within the system but *bill supply* pushing up the effective floor.

Second, cutting IOR is a blunt instrument for the issue at hand. By cutting IOR, the Fed has no control over what point along the Treasury curve banks will buy, if they buy at all. The pressure on o/n rates stems from the one month point of the bill curve and the Fed would have to cut IOR by at least 25 bps to make one month bills attractive to banks.⁵

Indeed, according to the Fed's H.8 [release](#), 5 bps did *not* do the trick. Since the rate cut, banks only bought \$15 billion in Treasuries, and, judging from prices, those weren't bills.

Why?

Figure 20 shows the HQLA frontier for banks and aims to make the point that far from being the center of the universe, the bills-IOR spread is just a point on a broad canvas! Repos and FX swaps have always been much better alternatives to reserves than bills and cuts to IOR will incentivize banks to lend more via repos and FX swaps than buying bills.

Cutting the rate on the foreign RRP facility would be a much more effective tool – a syringe rather than a jackhammer. The Fed could cut its rate so that foreign central banks bid for one month bills until one month bill yields go back down below the o/n RRP rate.

Third, regular readers of Global Money Notes know that J.P. Morgan is by far the most reserves-rich bank in the system, and with its reserves portfolio, it serves as the lender of next-to-last resort in global dollar funding markets (see [here](#)). Their \$350 billion in reserves at the Fed are not behaviorally excess – they are the bedrock of J.P. Morgan's HQLA portfolio (see [here](#)). Pushing J.P. Morgan into giving up reserves for bills will take a lot of cuts in IOR, as the main reason they have so many reserves is to be able to harvest the option value of cash in a post-Basel III world order – to be able to step in and lend into dislocations in funding markets as they arise intra-quarter and on quarter-ends.

⁵ For example, if J.P. Morgan holds reserves intra-quarter so that they can earn an extra 20 bps over IOR by lending in the o/n GC repo market or an extra 100 bps over IOR by lending in the FX swap market on quarter-ends, then, all else equal, bill yields would have to get relatively that high to IOR to make bills attractive to this specific institution

Chances are that if J.P. Morgan gives up reserves for bills, whichever bank gets those reserves won't be as plugged into o/n GCF or FX swap markets as J.P. Morgan and so quarter-end dislocations may worsen if the distribution of reserves is flatter across banks.

Furthermore, J.P. Morgan's reserves-heavy HQLA portfolio is paired with a very large credit portfolio. Indeed, its credit portfolio is [one of the largest](#) in the U.S. banking system. Figure 21 shows the bank's credit barbell, and Figure 22 shows its size over time.

Again, if J.P. Morgan's ends up holding more Treasury bills or, more likely, notes, that will come at the expense of the size of its credit portfolio – if you swap zero duration assets for assets with some duration risk, you are running more risk and if you bump up against your risk limits, you cut your discretionary credit book and not your mandatory HQLA book.

Thus, the flipside of forcing banks to swap reserves for bills are worse quarter-ends and wider credit spreads. Far from being an innocent tweak, cuts to IOR can pressure markets.

In the end, the Fed is the master of its fate and the captain of its balance sheet...

...it'll just have to live with the consequences of its actions. And it seems to us that there are more effective and less disruptive ways of dealing with the glut of bills than cutting IOR.

Cutting IOR is too radical a step to deal with the issues that currently beset o/n markets, in our view. At the current juncture, gradualism would be more effective than radicalism.

Cutting IOR has also opened up a can of worms about the evolution of the Fed's operating regime – the whole floor versus corridor debate. Cutting the rate the Fed pays on the foreign RRP facility does not eliminate the need for that conversation, but it buys more time to think deep about it. And thinking needs to be very deep about it indeed for it will be the single most important decision the next Head of Markets will have to take.

According to one view that's gaining traction with market participants, cutting IOR was just a first step in ultimately converging the IOR and o/n RRP rates and returning to the old corridor system. But if we are going to go “back to the future”, the market should be cognizant of the fact that in the past, the Fed did both reverse repos and repos to implement the corridor system. Thus, the idea that we will return to a corridor system implies the re-activation of the Fed's o/n repo facility. The discount window won't cut it as the facility to police the top-end of the corridor, for at 50 bps above the upper-end of the Fed's target range for the o/n FF rate, it is priced too wide to effectively control the range within which o/n rates are supposed to trade, not to mention the stigma of using it.

Thus, if the Fed will indeed converge the IOR rate with the o/n RRP rate and restore the corridor system, it will have to dust off and re-activate the o/n repo (RP) facility – as a fixed price, full allotment facility, just as it currently administers the o/n RRP facility.

In conversations with clients, we've been arguing that the Fed's [small value exercises](#) with o/n RPs serve the purpose of re-building muscle memory when it comes to using o/n RPs and to ensure that all systems are go if and when the Fed has to step in to cap o/n rates as the cumulative impact of taper and the surge in *coupon issuance* start to pressure rates.

Figure 23 shows what a reinstated corridor system could look like.

But there is a flipside to the corridor view, which is that instead of ending the floor system, the Fed should keep it and build on it – it could activate the o/n RP facility and keep the RRP facility. If the o/n RRP facility is a basement to the floor (IOR), the o/n RP facility is an attic – and basements and attics are both integral parts of a house (see Figure 24).

Basements and attics have well defined uses. Basements are cold and damp and are good for storing pickles and wine. Attics are hot and dusty and are good for storing books and hand-me-downs. Similarly, both o/n repos and reverse repos have well defined uses...

Conclusions – The End of Taper

O/n RRP's are useful when collateral is scarce and reserves need to be mopped up. The facility was useful when repo volumes were constrained while large, global banks transitioned to a world under Basel III. But these constraints have since lifted (see [here](#)) and the recent surge in *bill supply* eliminated the need for the facility – for the time being.

But times can change. Crises can revive demand for RRP's instantaneously and in size and in President Dudley's sage [words](#) "broad-based, open-ended lender-of-last-resort facilities are more difficult to accommodate in a corridor system because of the need to drain any reserve additions to keep the federal funds rate close to the FOMC's target". President Dudley saw this as an important shortcoming of the pre-crisis corridor regime that "does not get sufficient attention". Those in charge of designing the Fed's future operating regime should take President Dudley's parting remarks to heart, in our view. Converging the IOR rate with the o/n RRP now, only to insert a spread between them at some future point – and there surely will be crises in the future – is kind of pointless.

O/n RPs are useful when collateral is in excess supply and reserves need to be added. The facility will be useful at some point as balance sheet taper and *coupon issuance* gradually pull o/n interest outside the band. While balance sheet for repo feels abundant at the moment, leverage (eSLR) and risk-based capital (RWA) constraints still remain. These constraints, coupled with growing collateral supply from taper and *coupon issuance* will soon force the Fed to make one of two choices – activate o/n RPs or stop taper...

When?

Probably before the end of this year. As we've been arguing, reserves aren't excess – see [What Excess Reserves?](#) – and there isn't a lot of room to shrink the balance sheet. With half the o/n rates complex already printing outside the Fed's target range, this view is starting to prove spot on. Yes, it is true that the current pressure on o/n rates is due to *bill supply* and not taper, but the flipside of bills is \$400 billion in the Treasury's TGA account which is basically \$400 billion in reserves that've been [sterilized](#).

The fact that the usage of the o/n RRP facility is zero at the moment further underscores our point that reserves are not excess. Conceptually, o/n RRP take-up has always been the unbiased barometer of how much excess reserves there are in the system: o/n RRP's are the least liquid o/n instrument and lenders use it only if they have uninvested cash – uninvested in the sense that there was no private bid for it during the business day. No foreign bank to arb o/n FF versus IOR, o/n GCF repo or t/n FX forwards, no dealer to arb o/n TRP versus o/n GCF or GC repo and not the Treasury to boost TGA balances.

That's not the case any longer.

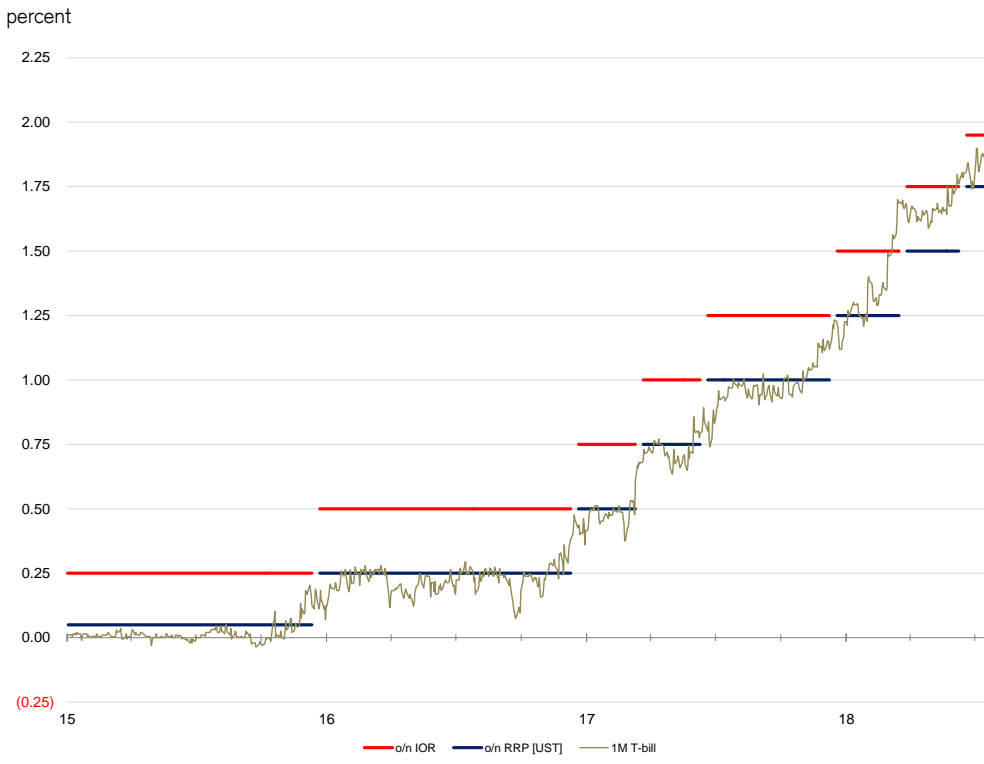
The fact that the usage of the o/n RRP facility is zero tells us that every penny of reserves is bid and that balance sheet taper from here will cut right into the system's liquidity bone.

One thing is for sure.

Anyone can buy a bill, but only banks can police how high o/n GCF repo trades – and as we've seen, where o/n GCF repo trades impacts where the o/n FF target rate trades. By cutting IOR, the Fed is forcing banks to use ammo to mop up bill supply when that ammo would be much better used to police how high o/n GCF repo trades as taper and coupon issuance accelerate. Cutting IOR only brings forward the launch date of o/n RPs!

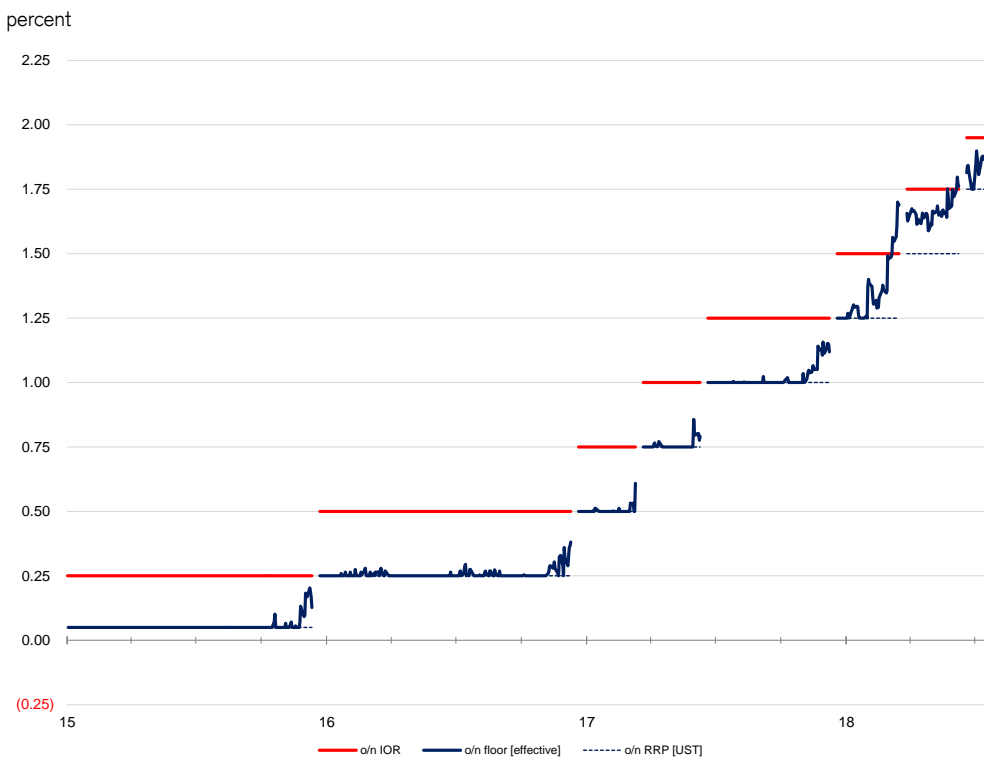
And as one astute market participant put it, "the political, educational and operational cost of introducing a new facility is such that the Fed won't launch until all alternatives have been exhausted and benefits are clear." And, in our view, if reserves are hard to add, they'll have to be preserved by ending taper sooner than many market participants expect...

Figure 1: From a Leaky Floor...



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

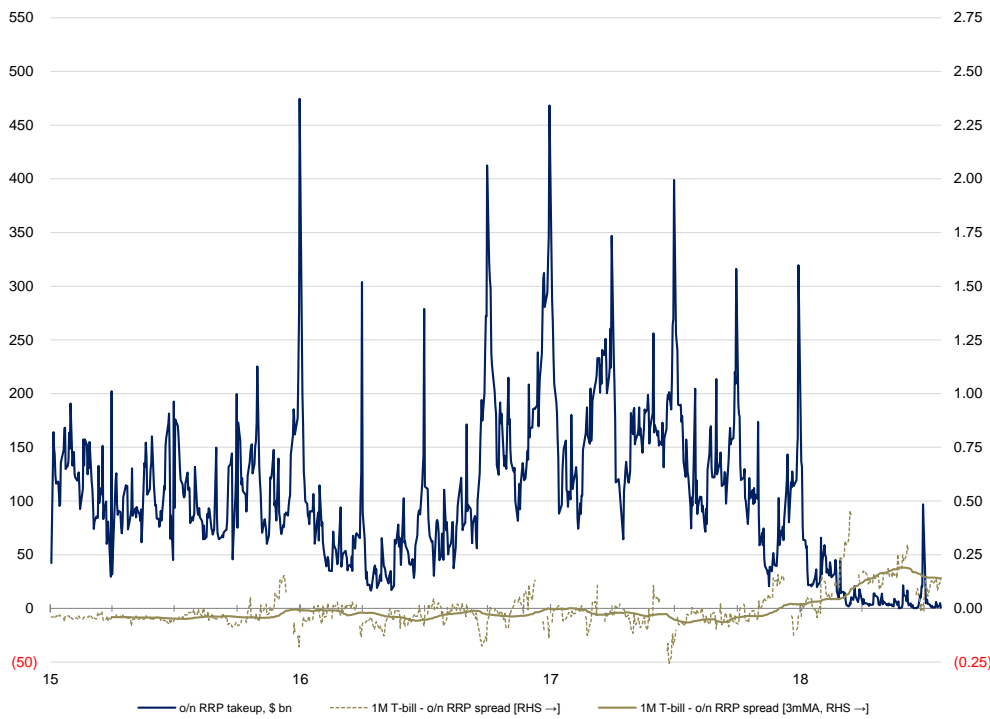
Figure 2: ...to an Escalator



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 3: The o/n RRP Facility Does Not Currently Function as the Effective Floor

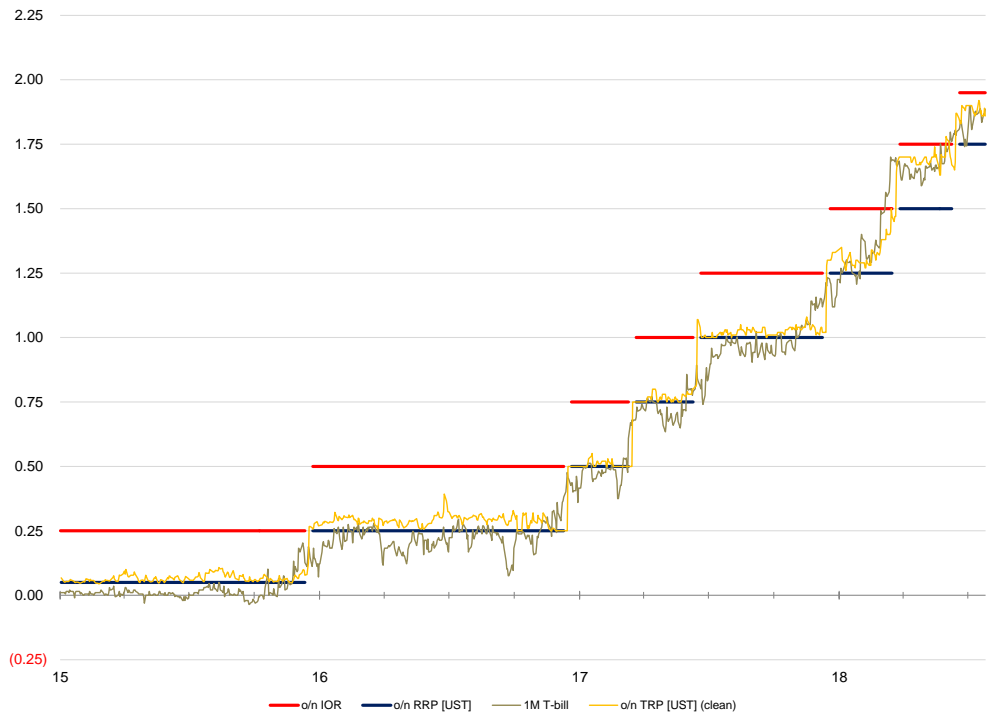
percent (RHS), \$ billions (LHS)



Source: the BLOOMBERG PROFESSIONAL™ service, Federal Reserve, Credit Suisse

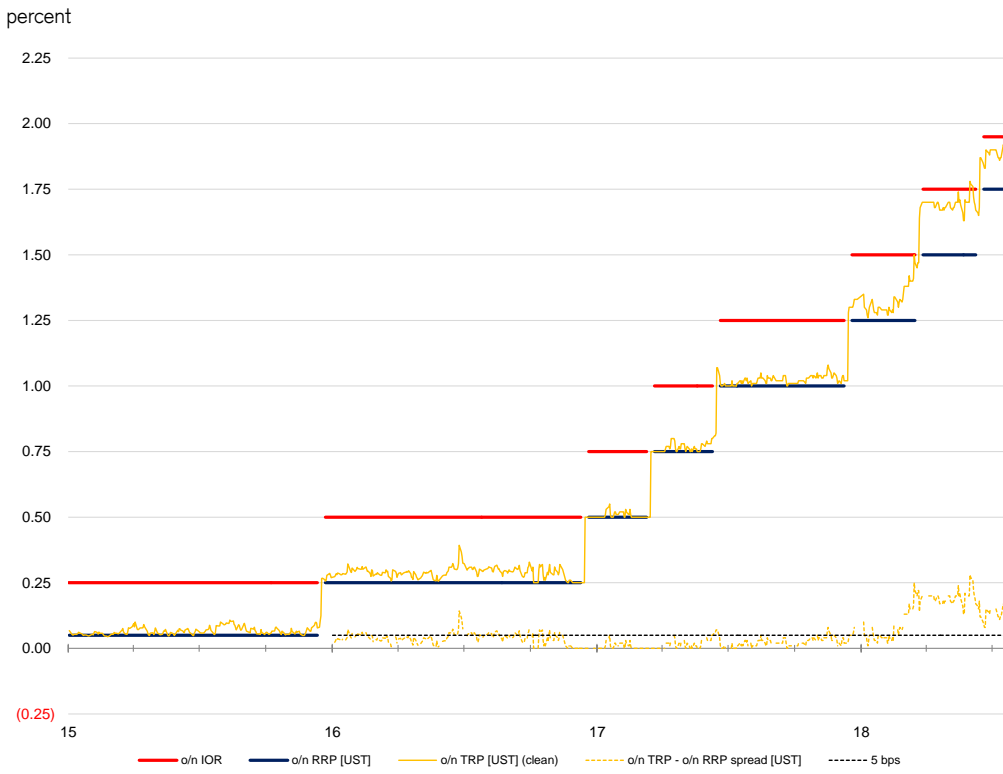
Figure 4: Government Money Funds' Liquidity Options

percent



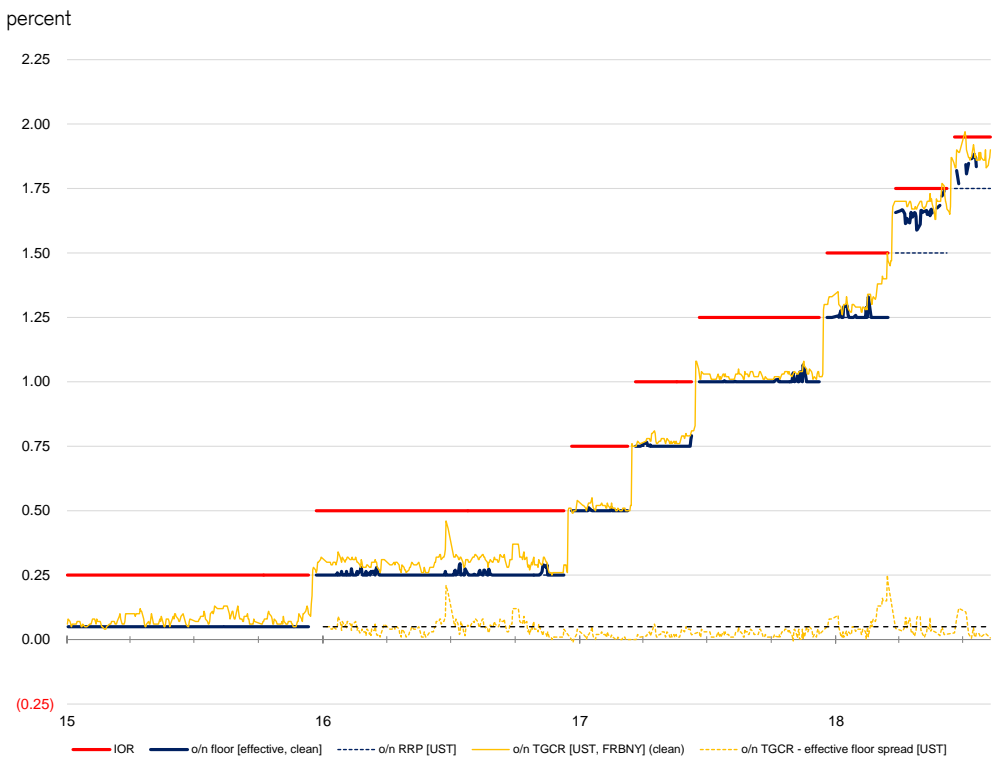
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 5: Wide Spreads Relative to the Administered Floor



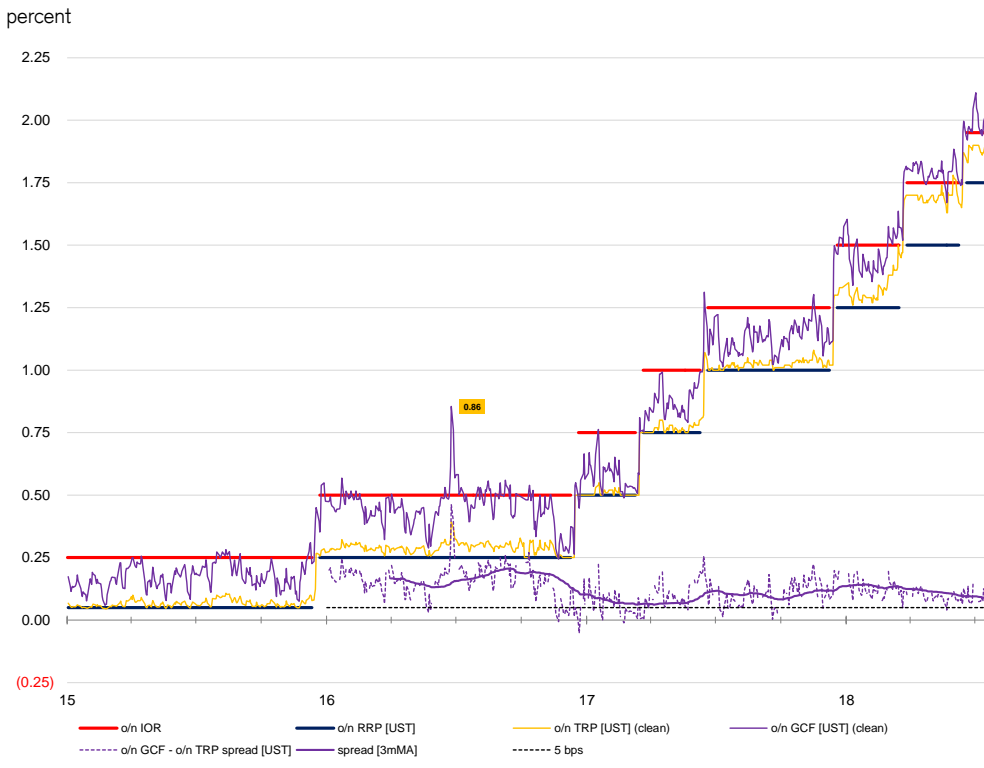
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 6: Normal Spreads Relative to the Effective Floor



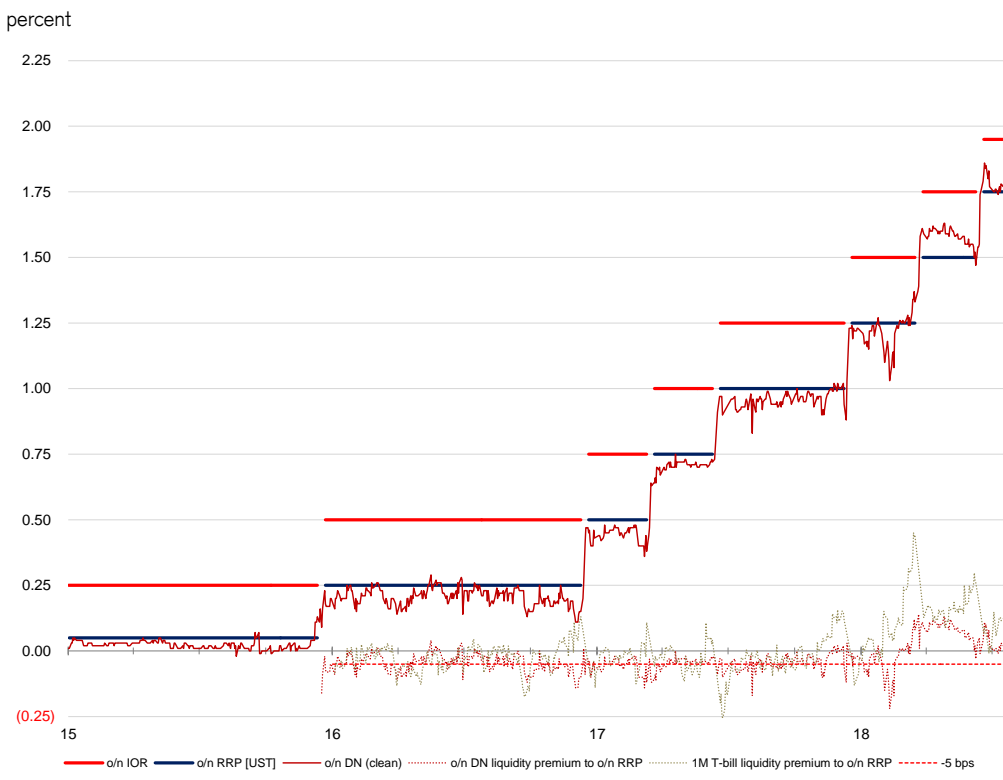
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 7: All Quiet on the Interdealer Front



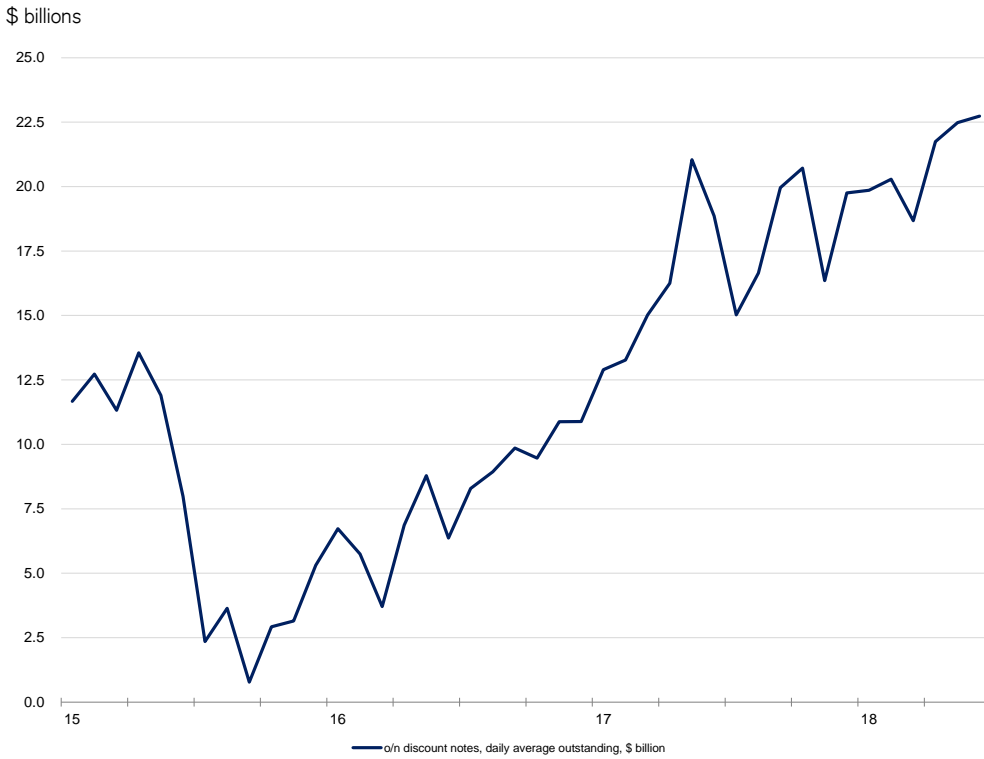
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 8: From a Liquidity Premium to a Collateral Glut



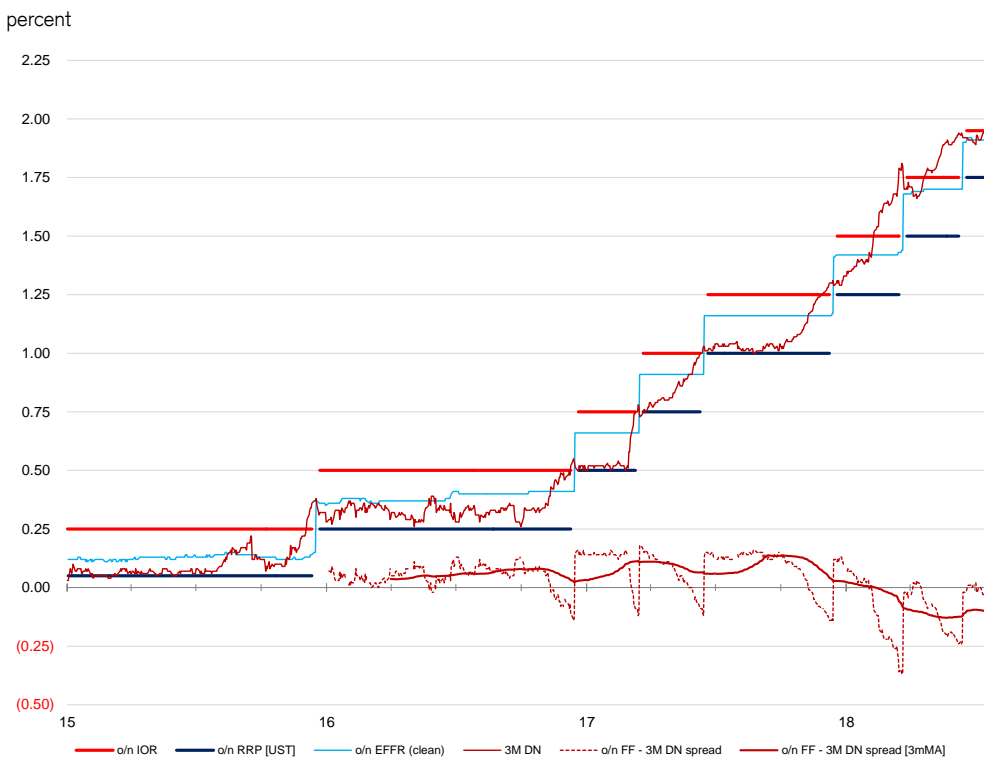
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 9: The Limited Supply of o/n Discount Notes



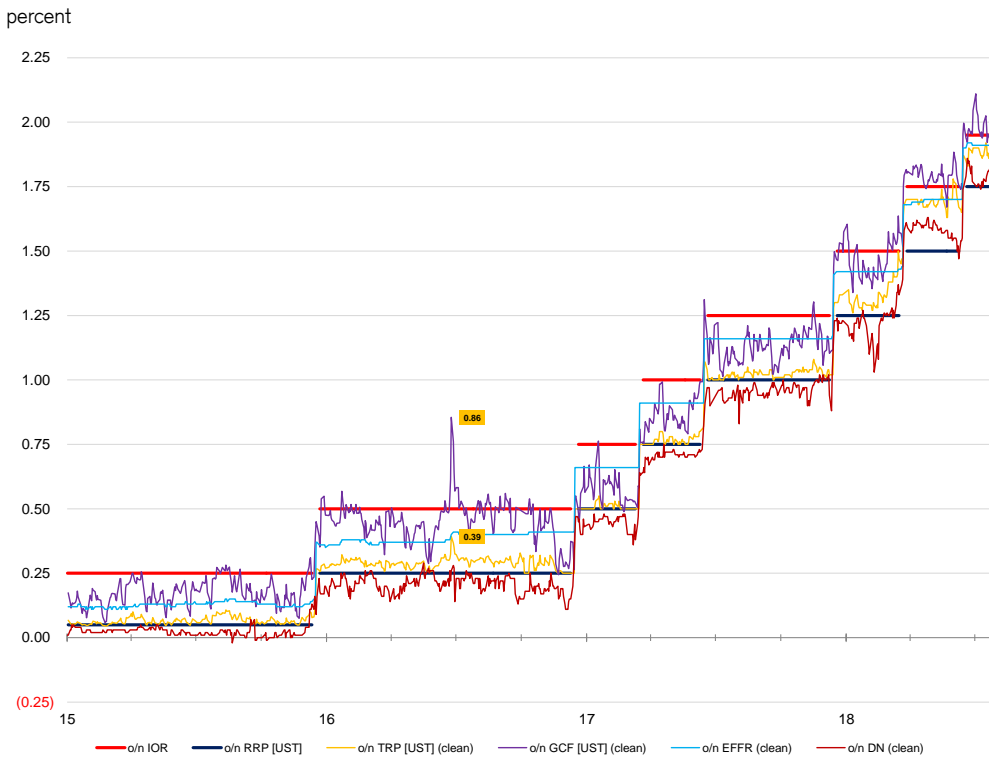
Source: Office of Finance, Credit Suisse

Figure 10: FHLBs' Liquidity Portfolios Are Hurting



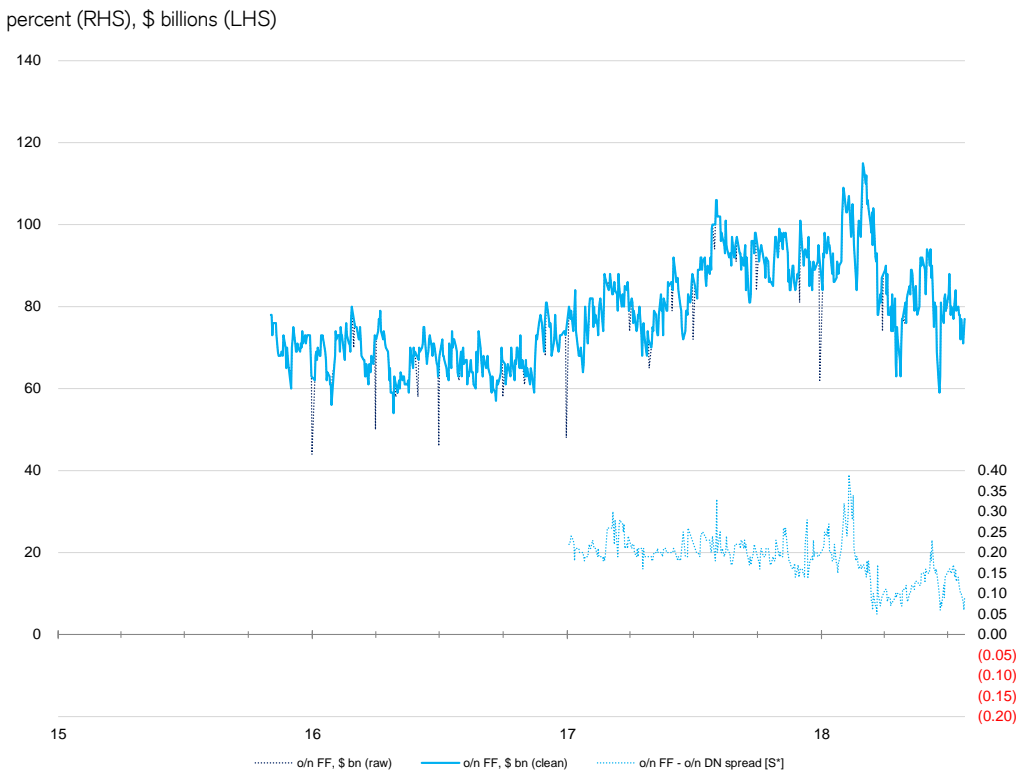
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 11: FHLBs' Overnight Arbitrage Options



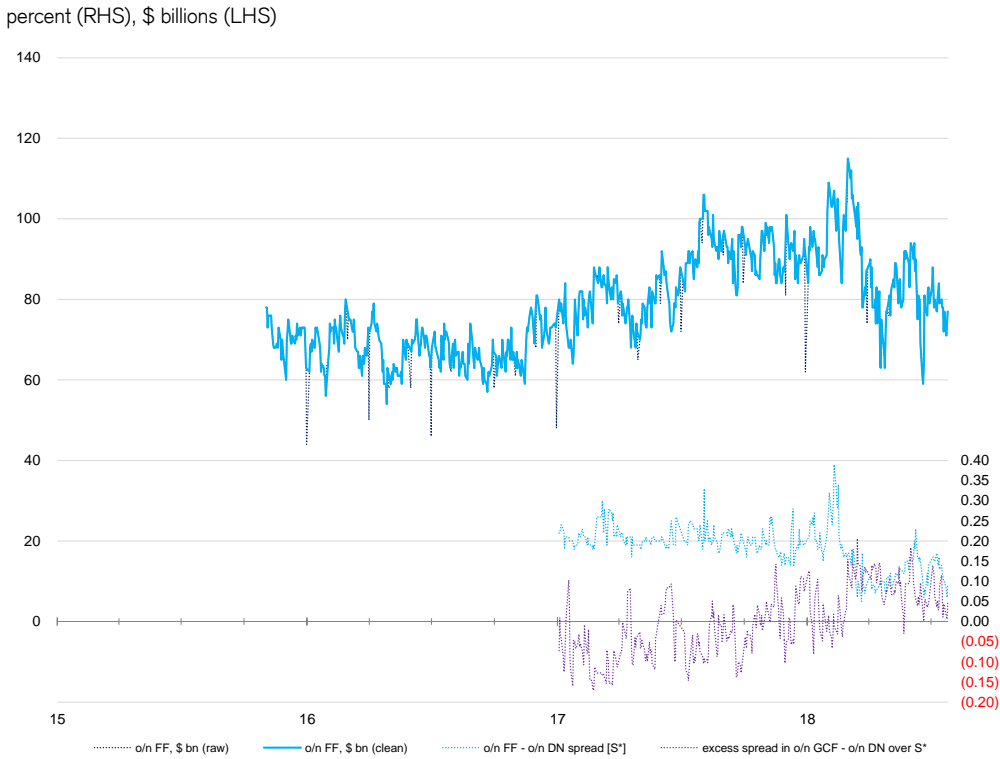
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 12: FHLB Arbitrage Drives o/n FF Volumes



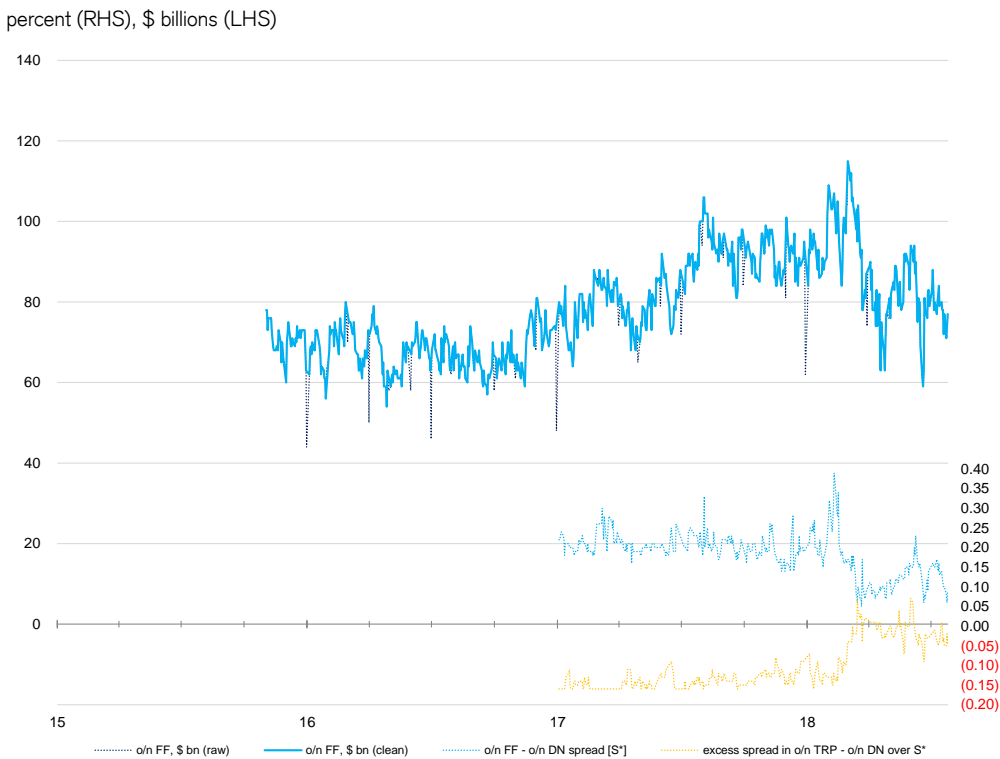
Source: the BLOOMBERG PROFESSIONAL™ service, Federal Reserve, Credit Suisse

Figure 13: o/n GC Repo Rates Pull Volume Away from o/n Fed Funds



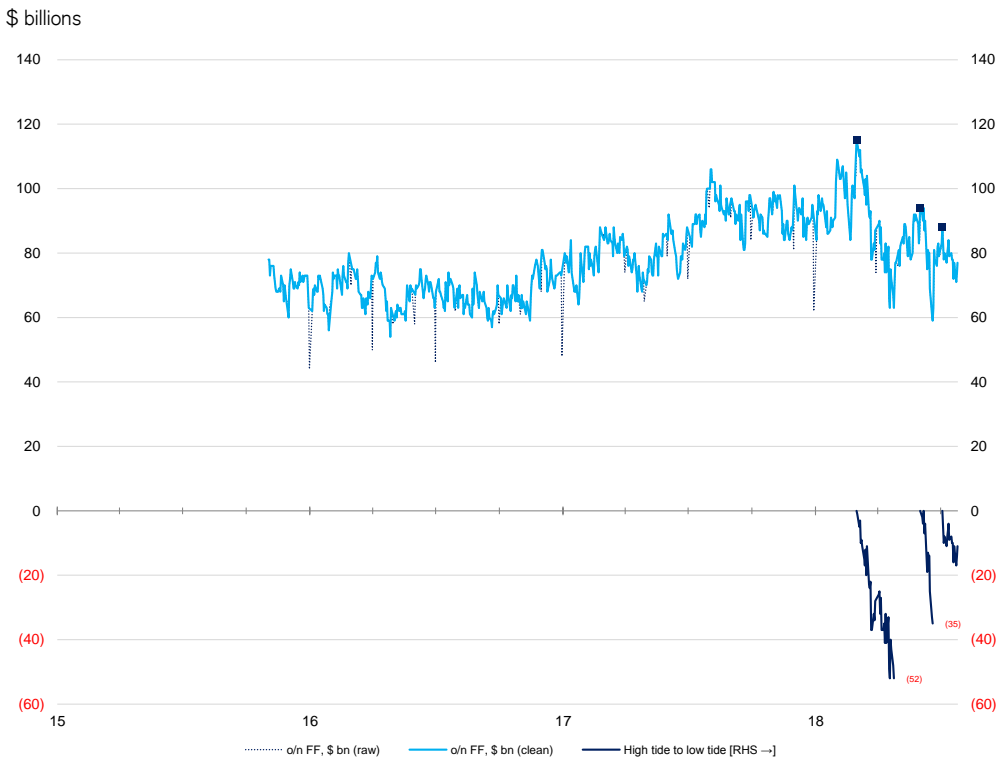
Source: the BLOOMBERG PROFESSIONAL™ service, Federal Reserve, Credit Suisse

Figure 14: o/n TRP Repo Rates Pull Volume Away from o/n Fed Funds



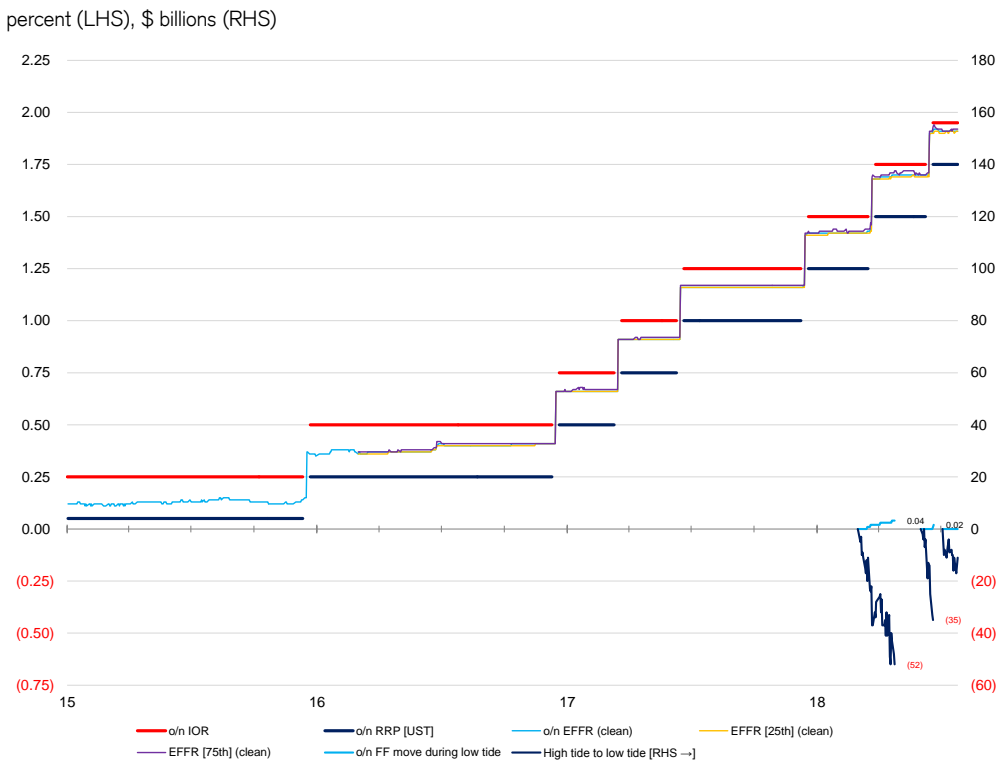
Source: the BLOOMBERG PROFESSIONAL™ service, Federal Reserve, Credit Suisse

Figure 15: Low Tides...



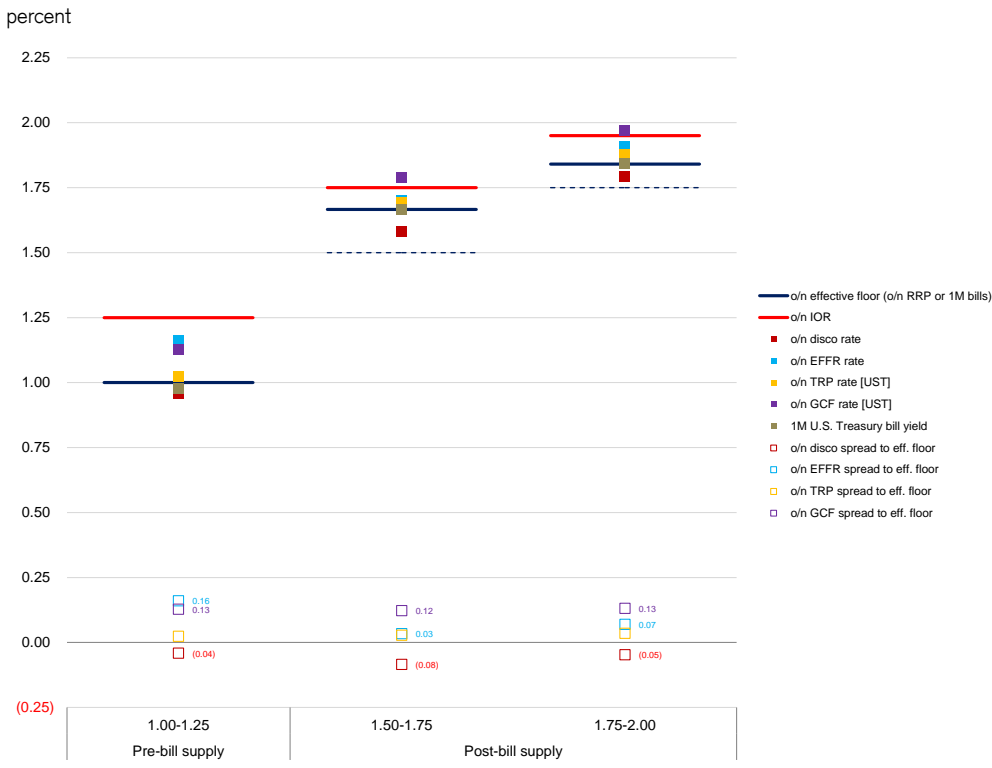
Source: the BLOOMBERG PROFESSIONAL™ service, Federal Reserve, Credit Suisse

Figure 16: ...High Prints



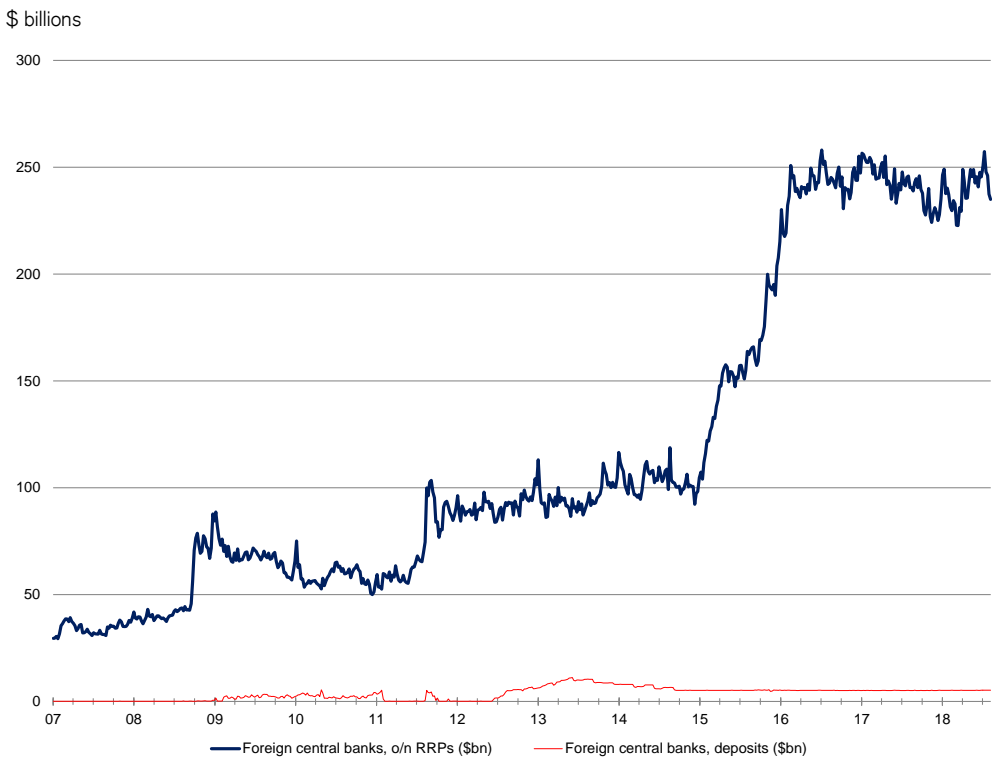
Source: the BLOOMBERG PROFESSIONAL™ service, Federal Reserve, Credit Suisse

Figure 17: Constellation Range-Bound



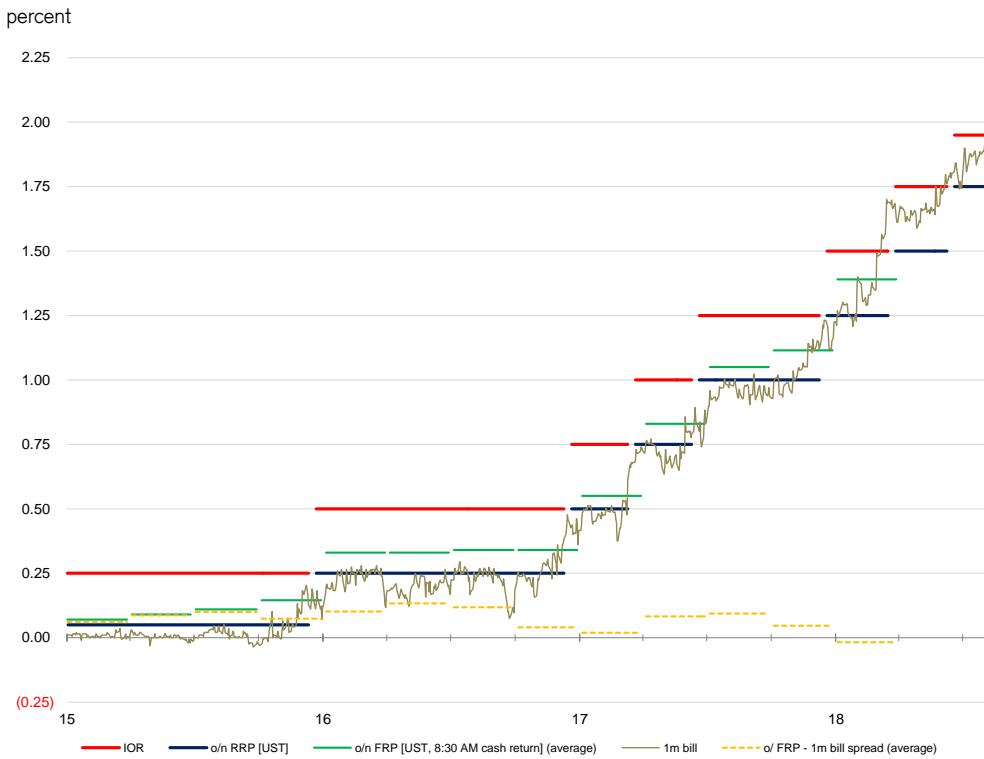
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 18: The Foreign RRP Facility



Source: Federal Reserve, Credit Suisse

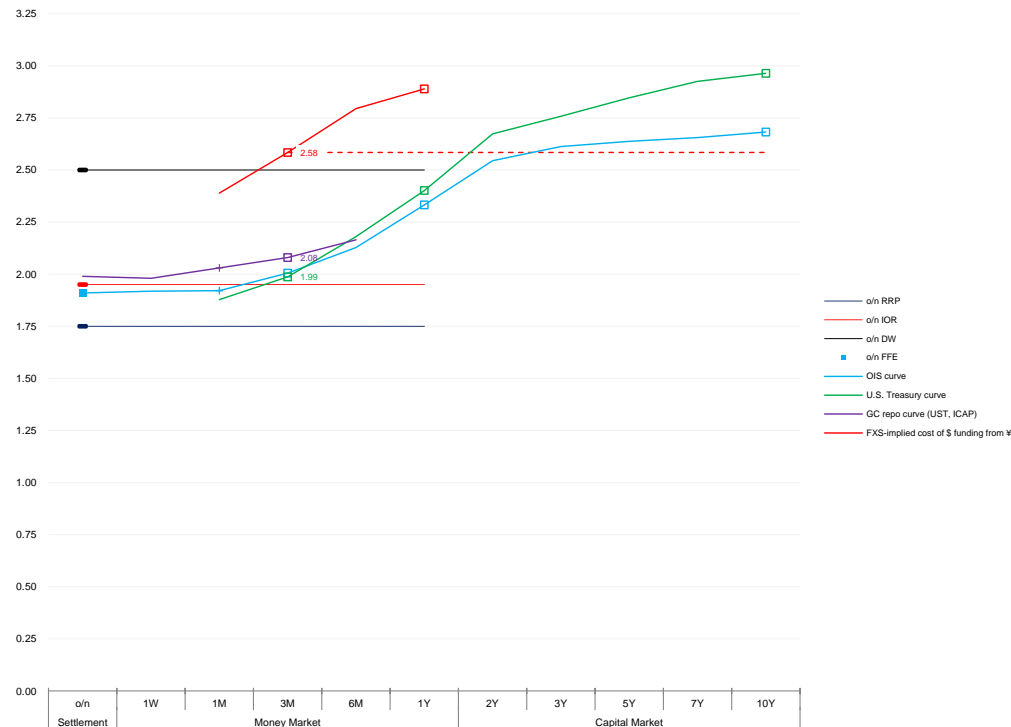
Figure 19: The Foreign RRP Rate Is Adding to the Government's Funding Cost



Source: the BLOOMBERG PROFESSIONAL™ service, Federal Reserve, Credit Suisse

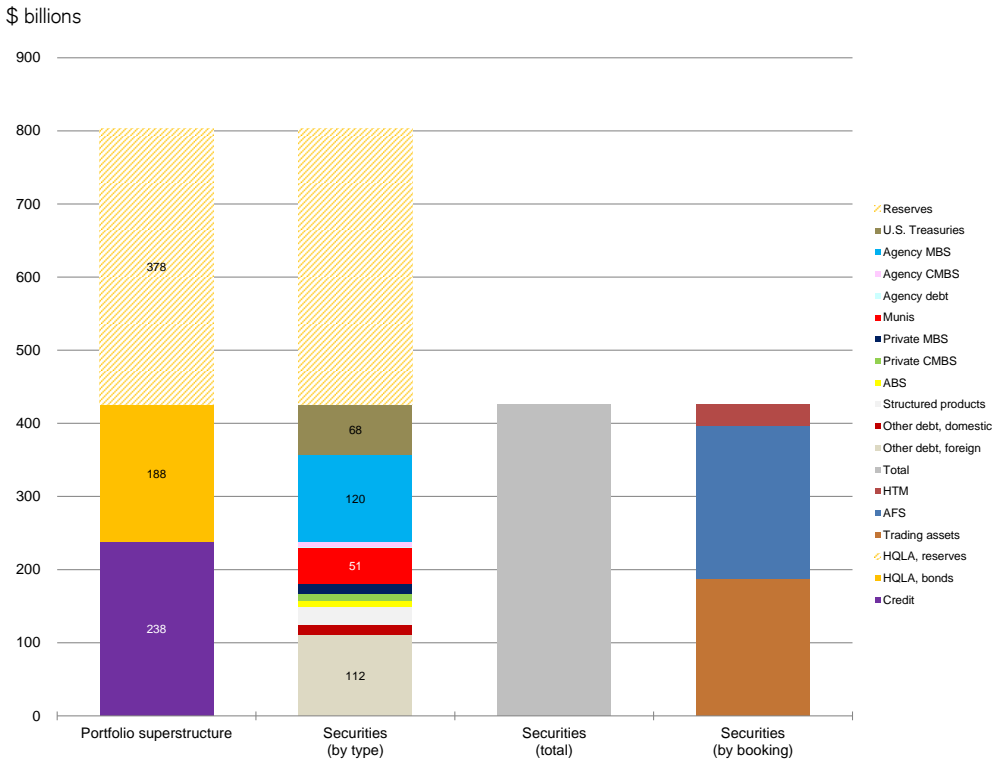
Figure 20: The Bills-OIS Spread is Just a Point on a Broad HQLA Canvas

percent, as of July 27th, 2018



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

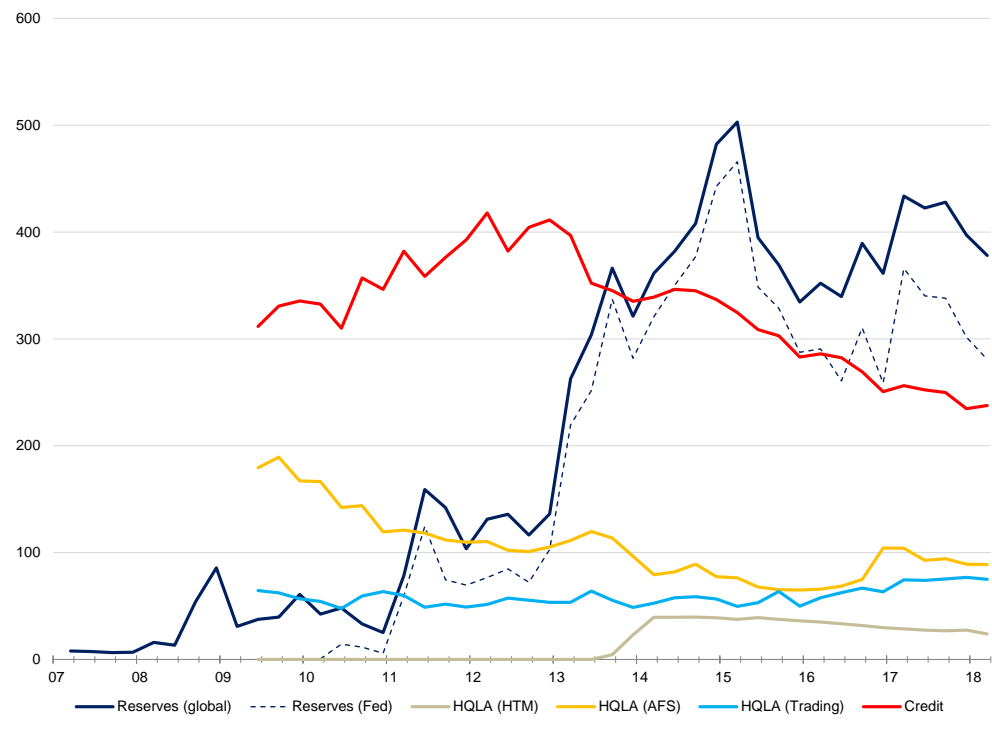
Figure 21: J.P. Morgan's Credit Barbell



Source: Call reports, Credit Suisse

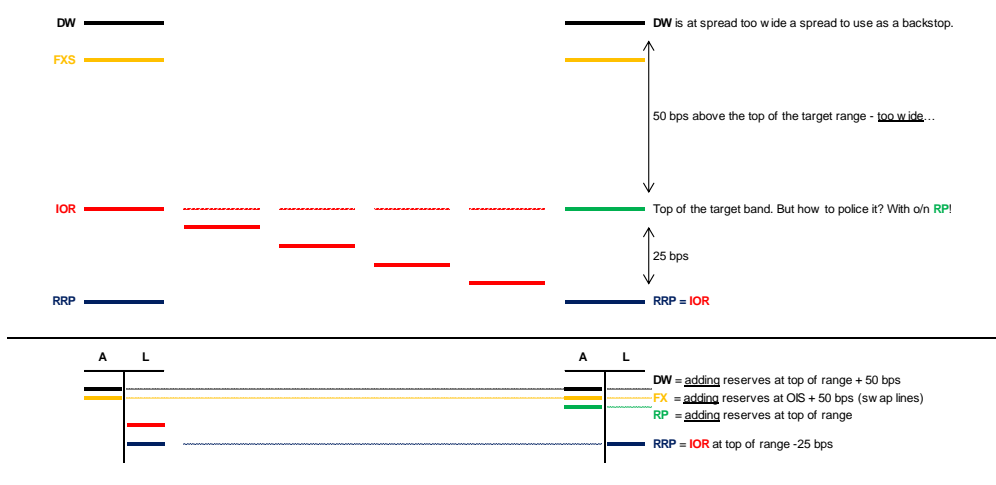
Figure 22: More Risk Means Less Credit

J.P. Morgan's HQLA and credit holdings, \$ billions



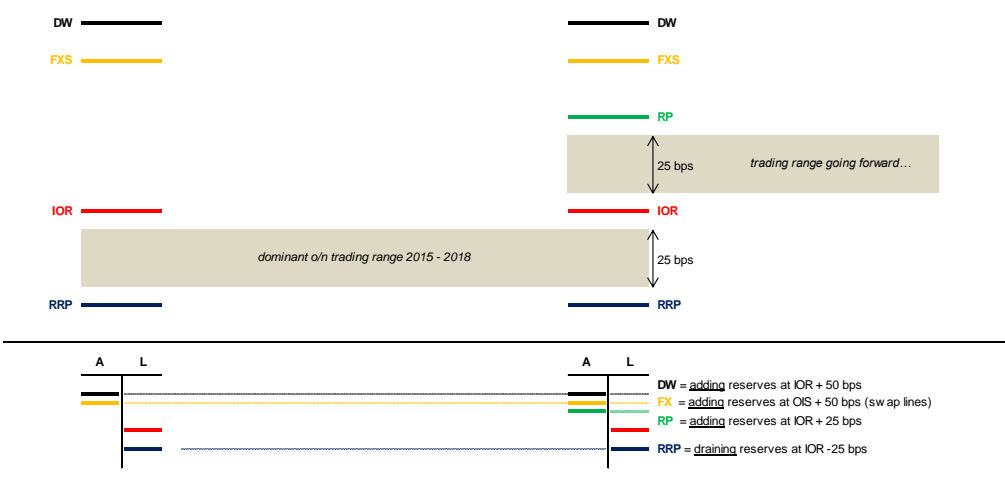
Source: Call reports, Credit Suisse

Figure 23: The New Corridor System



Source: Credit Suisse

Figure 24: The Enhanced Floor System



Source: Credit Suisse

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