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The Crapo Act and the Target Rate

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The o/n fed funds (FF) rate is at risk of a spike this quarter-end or year-end, and these spikes will continue and may get bigger in the foreseeable future.

Futures are not priced for that…

The growth of the sponsored repo market and the passage of the Crapo Act have established an arbitrage-relationship between the o/n FF and repo rates, and this relationship is the primary driver of the potential quarter-end spikes.

The sponsored repo market has seen tremendous growth since 2017 – it has grown from zero to $50 billion. Sponsored repo isn't for everyone. It's the exclusive domain of custodian banks – Bank of New York and State Street.

Sponsored repo enables the two custodian banks to run matched repo books without those books hurting their leverage ratios (SLR). Sponsored repo is thus a totally balance sheet neutral activity for custodians – a rarity under Basel III.

Unlike matched repo books, repo loans opportunistically funded in the o/n FF market are not balance sheet neutral, but the Crapo Act's exemption of reserves from the calculation of the leverage ratios of the two custodian banks makes such trades effectively balance sheet neutral too for the time being.

Unlike other repo dealers, custodian banks can borrow in the o/n FF market on scale, and have an incentive to do so when the o/n FF rate trades below the o/n tri-party repo rate – the usual o/n funding rate of matched repo books.

Unfortunately, the Federal Home Loan banks that are the main lenders in the o/n FF market do the opposite: they lend more in the o/n tri-party repo market precisely when the o/n FF rate trades well below the o/n tri-party repo rate.

A push and a pull on the o/n FF rate at the same time cannot be good…

…and pushes and pulls will intensify as we're tumbling down the rabbit hole of the world of excess collateral. As repo rates drift higher, the FF rate will follow.

In an environment where collateral supply is swelling, the Crapo Act complicates things for the Fed: Senator Crapo's law is influencing monetary conditions and "Governor Crapo" is the most important FOMC member you've never heard of.

That's not a problem. It's just a sign of the times that we live in. Times when lawmakers and regulators can influence rates just as much as central bankers.

In this issue of Global Money Notes, we continue our deep dive into the mysteries of overnight funding markets. Our focus is on the growing sponsored repo market and how it is changing the way overnight (o/n) markets trade intra-quarter and on quarter-ends.

Our aim is to highlight the risk of a spike in the o/n fed funds (FF) rate this quarter-end, and that these spikes will continue and may get bigger in the foreseeable future.

Futures are not priced for that…

Sponsored repo is an important milestone in the evolution of money markets post-Basel III, as it establishes a firm bond between the o/n tri-party repo rate and the o/n FF rate.

This issue of Global Money Notes has four parts to it.

Part one describes the dynamics of the o/n repo market since the introduction of Basel III. Part two describes how sponsored repo is changing the dynamics of the o/n repo market. Part three describes how sponsored repo impacts price action in the o/n FF market, and how it can lead to spikes in the o/n FF rate going forward. Finally, part four concludes.

Part I – Repo Under Basel III

Repo dealers' balance sheet is a marketplace where cash lenders and cash borrowers come together: in a typical o/n matched-book transaction, a repo dealer borrows in the tri-party repo market and lends in the interdealer GC repo market or the bilateral, customer-to-dealer repo market. Thus, from the perspective of a typical repo dealer, the tri-party repo rate is a borrowing rate, and the GC and bilateral repo rates are lending rates.

Figure 1 shows these rates on a repo dealer's balance sheet.

Figure 2 shows the same rates expressed as spreads. Thus, the o/n tri-party repo rate trades as a spread to the Fed's o/n RRP rate; the o/n GC repo rate trades as a spread to the o/n tri-party repo rate; and the o/n bilateral repo rate trades as a spread to the o/n GC repo rate. Expressing repo rates as spreads shows the hierarchical nature of repo.

Figure 3 shows the o/n tri-party and GC repo rates over time, excluding quarter-ends.[1]

Figure 4 shows that corresponding to the hierarchy of repo rates, there is a hierarchy of market participants. Thus, money funds and other cash lenders with tri-party repo access are at the bottom of the hierarchy – they earn the lowest of all repo rates. On the flipside, repo dealers with access to tri-party repos borrow at the lowest of all repo rates. Typically, only primary dealers have access to tri-party repos. Non-primary dealers only have access to the GC repo market and so they have to pay a spread to primary dealers for funding. The buyside has access to bilateral repos only and has to pay a spread over GC repos.

The hierarchy of repo market participants does not stop here – there is also a hierarchy to primary dealers (see Figure 5). Primary dealers reside either in broker-dealer or bank legal entities. Both ultimately lend in either in the GC or the bilateral repo market, but for a repo dealer that resides in a broker-dealer legal entity, the only marginal funding point is tri-party repo, whereas for a dealer that resides in a bank legal entity, marginal funds can come from o/n tri-party repos or o/n FF, depending on which of the two rates is cheaper.

French and Canadian dealers are the most prominent examples of dealers that reside in bank legal entities (branches). All other repo dealers reside in broker-dealer legal entities.

[1] The GCF® repo rate is the representative volume-weighted average rate on a subset of interdealer GC repo trades. The tri-party repo rate is a volume-weighted median rate. Data on bilateral ("GC + a spread") rates are not available.

Market making in repo markets is dominated by foreign-owned primary dealers and most foreign-owned dealers are subject to quarter-end balance sheet reporting requirements. In turn, quarter-end reporting means that repo books need to shrink on quarter-ends.

Balance sheets can shrink two ways: by turning off repo market making completely, or by changing the funding leg of market making activities so that some trades can be netted. Balance sheets shrink mostly through netting, not through a complete shutdown of books.

In the U.S., repo is nettable only if both sides of a matched book are executed with the same counterparty. Only centrally cleared trades meet this requirement and, in the U.S., the only central repo counterparty is the Fixed Income Clearing Corporation (or FICC). In the figures above, only o/n GC repo transactions are FICC-cleared, but as we've noted, o/n GC repo transactions are funded mostly via tri-party repos which aren't FICC cleared.

To make o/n GC repo loans nettable, dealers need to replace o/n tri-party funding with o/n GC funding on quarter-ends. The associated surge in dealers' need for GC funding is met by banks that lend reserves from their HQLA portfolios, for which they charge a hefty premium – see the massive spikes in the o/n GC repo rate on quarter-ends in Figure 6.

Banks' lending via GC repo on quarter-ends introduces yet another level in the hierarchy, which we can highlight through who wins and who loses on quarter-ends (see Figure 7).

Money funds lose as they are forced to trade down: because dealers don't take their cash on quarter-ends, money funds are forced to invest with the Fed at the o/n RRP rate.

Primary dealers lose too as they are forced to pay up: because they have to net, they have to temporarily fund at the higher o/n GC rate, not the lower o/n tri-party rate.

Banks win as they go from earning the IOR rate to earning a hefty spread over IOR. Banks always earn a spread – their precondition to lend via GC repos is a spread to IOR.

Only 25 banks can lend in the GC repo market globally (see Figure 8 and footnote 2), and the flexibility of these 25 banks to switch between reserves and o/n GC repos in their HQLA portfolios determines how much money can flow into o/n GC repo on the margin.[2]

It takes a minnow to catch a barracuda, a barracuda to catch a shark…

Not all quarter-ends are created equal: some quarter-ends are fairly calm; some can be quite a bit stormy. Quarter-ends that are calm can be backstopped by a handful a banks – typically foreign banks that have reserves well in excess of their dollar HQLA needs and so are ready to lend into o/n GC repo even for a spread of a basis point or two over IOR.

These are the minnows of the o/n GC repo market.

Quarter-ends that are stormy need more flows from more banks. Once the liquidity "cups" of the minnows are empty, flows get kicked higher up in the hierarchy to bigger banks. These bigger banks have the extra reserves the system needs, but they may not be as flexible to lend these reserves in the o/n GC market because their liquidity is less excess. Because their dollar liquidity is less excess, they will only lend for a wider spread over IOR.

These are the barracudas of the o/n GC repo market.

Quarter-ends that are rough kick the flows all the way up to large U.S. banks (G-SIBs). U.S. G-SIBs control the most amount of reserves, but their balance sheets are the most expensive so they lend at wider spreads to IOR than foreign minnows and barracudas. U.S. G-SIBs – the sharks – top the hierarchy of private repo intermediaries (see Figure 9).

How does sponsored repo change this hierarchy?

[2] See the FICC's GSD member directory here. Look for GCF lenders with the word "bank" or "branch" in their names.

Part II – Sponsored Repo

Sponsored repo flattens the hierarchy of intermediaries.

Sponsored repo enables "well capitalized bank-members" of the FICC to sponsor in both cash lenders and cash borrowers to become FICC netting members. Cash lenders include money funds and cash borrowers include all stripes of fixed income and hedge funds.

FICC has lots of members, but most of those members are broker-dealers, not banks, and only bank-members can sponsor in new counterparties, not dealers. Bank-members often correspond to foreign bank's New York branches, not capitalized bank subsidiaries, and so like broker-dealers, foreign banks cannot sponsor in new counterparties either. That leaves the large U.S. banks, but most of these suffer from high G-SIB surcharges and sponsoring in new counterparties would only increase their G-SIB surcharges further.

G-SIB surcharges are an issue for all U.S. banks except for the Bank of New York and State Street – the two custodians that are the champions of the sponsored repo concept.[3]

Sponsored repo means that at the end of the day, custodian banks can novate to FICC both tri-party trades with sponsored lenders and bilateral trades with sponsored borrowers such that matched repo books – o/n GC - tri-party or o/n bilateral - tri-party – do not hit custodian banks' enhanced supplementary leverage ratios (or eSLR; more on this below). To emphasize, sponsored repo books do not hit custodian banks' eSLR – sponsored repo is a totally balance sheet neutral activity. In a system subject to Basel III that is a rarity.[4]

As we speak, most money funds are sponsored cash lenders, and the fixed income funds of all major asset managers are sponsored cash borrowers as are some hedge funds.[5]

Cash lenders and cash borrowers benefit from sponsored repo primarily through counterparty diversification, and the sponsoring banks – the two major custodian banks – benefit from taking their repo market share from zero to about $50 billion (see Figure 10). That's a lot – it's as if some French or Canadian repo dealers doubled their books. Indeed, the takeoff of sponsored repo corresponds to the period during the second half of 2017, when several clients noted a surprising increase in the availability of balance sheet for repo.

Sponsored repo may have been the genesis of that…

Beyond adding two additional repo market makers, and hence capacity to repo markets, sponsored repo disrupts some established price-patterns in o/n markets. To explain how, we first compare the balance sheet aspects of custodian's banks sponsored repo books to the balance sheet aspects of primary dealers' "ordinary" repo books (see Figure 11).

Thus, primary dealers' repo books and custodian banks' sponsored repo books both have the o/n tri-party rate on the borrowing side and the o/n GC and o/n bilateral rates on the lending side. Correspondingly, both primary dealers and custodians banks intermediate between the same groups of entities: large money funds on the lending side and non-primary dealers, large asset managers and hedge funds on the borrowing side.

Primary dealers' matched GC - tri-party books are unconstrained intra-quarter, but are leverage constrained on quarter-ends. As discussed above, primary dealers deal with

[3] See the FSB's G-SIB list here. J.P Morgan's G-SIB surcharge is 2.5%. Citibank's and Bank if America's is 2.0%. The G-SIB surcharges of custodian banks – Bank of New York and State Street – are much lower at a mere 1.0%.

[4] To be very precise repos with GCF netting members funding via GC repos are also balance sheet neutral, but those are GC - GC trades earning a bid-ask spread. GC - tri-party trades are SLR neutral only in a sponsored repo setting.

[5] See the FICC sponsored member listing here.

these constraints through netting, where they swap tri-party repos for nettable GC repos, which banks provide for a hefty spread over IOR, while money funds are left in the dust.

Custodian banks matched GC - tri-party books are never subject to leverage constrains. Not intra-quarter and not on quarter-ends. Never, period. Because tri-party borrowings are novated to FICC, custodian banks' o/n GC - tri-party books are always nettable as both sides of the matched book are with the same counterparty – the FICC.

Sponsored repo flattens the hierarchy of intermediaries because the old dynamics of "money funds trade down" (from tri-party repos with dealers to o/n RRPs with the Fed) and "banks trade up" (earning IOR on reserves to earning IOR plus a spread on GC repos) are changed by the fact that custodian banks as sponsored repo dealers do not turn o/n tri-party cash away from money funds on quarter-ends, but continue to take it and lend it on via o/n GC repos to foreign dealers so that foreign dealers can net their books.

Foreign primary dealers are netting like they did before, but the enablers of netting aren't banks at a spread over IOR, but rather custodians at a spread over the o/n tri-party rate; the books that enable netting aren't HQLA books but custodians' sponsored repo books!

Money funds win, because on quarter-ends they don't trade down from tri-party repos to o/n RRPs with the Fed like in the past, but continue to earn a spread over the RRP rate.

Banks lose, because they are no longer the only intermediaries that can enable dealers to net down their repo books on quarter-ends – custodians took market share from them. Specifically, custodians gained market share in the GC repo market because they enable netting for primary dealers at lower rates than banks, as the rates at which they lend via o/n GC repo isn't a spread over the IOR rate, but a spread over the lower o/n tri-party rate.

Figure 12 shows the place of sponsored repo books in the hierarchy.

Figure 13 shows that since the growth of sponsored repo took off, quarter-end spikes started to show up in the o/n tri-party rate. This means that some of the netting pressures that drove the by-now-familiar quarter-end spikes in the o/n GC rate are shifting over to the o/n tri-party rate. In turn, this means that banks' position as o/n GC lenders on quarter-ends is weakening, and custodians' position as o/n GC lenders is strengthening. Going forward, we expect smaller GC spikes and bigger tri-party spikes on quarter-ends.

Sponsored repo is a game changer in the bilateral market as well (see Figure 11 again).

Primary dealers can only net GC - tri-party matched books on quarter-ends, but not bilateral - tri-party books. They cannot, because bilateral repos with the buyside are not centrally cleared, so switching from o/n tri-party funding to o/n GC funding doesn't help.

Custodian banks can net bilateral - tri-party books as well! This naturally follows from the fact that trades with sponsored borrowers and sponsored lenders are both novated to FICC and are nettable such that sponsored bilateral - tri-party books don't hit one's eSLR. Only custodian banks' sponsored repo books can do that; "ordinary" repo books cannot. If you're a hedge fund that can't get balance sheet on quarter-ends, you should consider joining the ranks of sponsored repo borrowers. Otherwise you are missing out…

Since the netting benefits of sponsored repo are present not only in GC - tri-party books but also in bilateral - tri-party books, it is reasonable to expect the quarter-end spikes in o/n tri-party repo rates to increase as more hedge funds sign up as sponsored borrowers.

Of course, even if sponsored repo books get around the eSLR, sponsored bilateral repos do add to risk-weighted assets (RWA) and so hit custodian banks' RWA-based ratios. Thus, unlike boosting their GC market share, there are capital limits to how much custodians can boost their bilateral market share. But boost they can, and that will lead to more balance sheet for repo and growing spikes in the o/n tri-party rate on quarter-ends.

Part III – Sponsored Repo and Fed Funds

Custodian banks' sponsored repo books thus flatten the hierarchy of repo in the sense that bank HQLA portfolios are less powerful in the GC repo market than they used to be.

Custodians' sponsored repo books also expand the variety of repo dealers. In part one of our analysis, we noted that repo dealers either reside in broker-dealer or bank legal entities. We can now distinguish between two distinct types of bank legal entities that can be hosts to repo books: these are foreign banks' New York branches and custodian banks.

Repo dealers that reside in a broker-dealer legal entity can only tap the o/n tri-party repo market for funding. Dealers that reside in a bank legal entity can tap the o/n tri-party repo market or the o/n FF market, depending on which one is cheaper. Thus, bank-based dealers have funding options not available to dealer-based dealers. But branch-based dealers' access to o/n FF is not as deep as custodian-based dealers' (see Figure 14).

Our regular readers know that at present, the Federal Home Loan Banks (FHLBs) are the only lenders in the FF market and that the FHLBs face strict ratings (AA or A-rated) and country-based lending limits when it comes to unsecured o/n and term FF lending.

As a rule of thumb, an FHLB can lend as much as 15% of its capital to AA-rated banks in an o/n or term FF trade, but only a much smaller 5% of its capital to A-rated banks.

As a rule of thumb, an FHLB also has strict limits that precisely stipulate how much banks from a certain country can borrow in the aggregate. Such limits don't apply to U.S. banks.

Currently, foreign banks' New York branches are the biggest borrowers in the FF market.

Swedish, Australian and German banks' branches account for roughly one half of the borrowing in the o/n FF market, and none of these banks actively play in the repo market. For them, borrowing in the o/n FF market is about arbitraging the o/n FF and IOR rates.

On the other hand, foreign banks from Canada, France, Norway, the Netherlands and Japan do dabble in the repo market and can toggle between o/n tri-party repo and o/n FF as their marginal sources of funding for o/n GC and o/n bilateral trades – but not a lot.

Some of the constraints on how much foreign branch-based dealers can shift between o/n tri-party repos and o/n FF stems from the country-limits in FHLBs' unsecured books.

For example, if the New York branches of four banks from say the Republic of France borrow in the o/n FF market – three to arbitrage o/n FF - IOR and the fourth to fund its repo book in the o/n FF market because o/n FF is cheaper than o/n tri-party repos – given the country limits FHLBs are subject to, the repo-motivated borrower's capacity to borrow in the o/n FF market is limited by the o/n FF borrowings of the other three banks.

Thus, because of country limits, foreign bank-based repo dealers are not in a position to freely toggle – based purely on price – between o/n tri-party and FF funding on scale, and so their repo books cannot exert a particularly strong pull-force on the o/n FF rate during periods when the o/n tri-party repo rate trades measurably above the o/n FF rate.

That's not the case with custodian banks' sponsored repo books…

Country limits do not apply to o/n FF trades with U.S. banks and that's one reason why custodians' sponsored repo books are a game changer for how the o/n FF market trades.

Ratings-based counterparty exposure limits still apply, but given that from the perspective of the FHLB system, the two custodian banks are the only two AA-rated U.S. banks, the entire system of FHLBs can lend a significant, 15% of their capital base to custodians through o/n FF trades, which, in our rough estimate, can amount to as much as $40 billion.

$40 billion in the context of the size of the o/n FF market is a lot. Quite a lot…

By parsing the quarterly financial reports issued by the FHLB system's Office of Finance, we know the ratings of all U.S. and foreign banks that borrow in the o/n FF market (see Figure 15). As such, we can track how much AA-rated U.S. banks borrowed in the o/n FF market over time, and cross-reference these numbers with the amounts that the two custodians banks disclose in their call reports about how much they have borrowed.

Figure 16 shows the results.

Since volumes in the sponsored repo market took off in the third quarter of 2017, the Bank of New York's presence in the o/n FF market skyrocketed. Bank of New York is now the single largest borrower in the o/n FF market among all major U.S. banks.

Unlike GC - tri-party books or bilateral - tri-party books, GC - FF and bilateral - FF books aren't nettable, as only the sponsored GC and bilateral legs clear with FICC, not the FF leg.

As such, repos funded in the o/n FF market use balance sheet, which could limit the extent to which the custodian would lean on o/n FF if it was cheaper than tri-party repos.

Here is where the significance of the Crapo Act comes in.

The passage of the Crapo Act on May 22nd changed the way custodian banks calculate their eSLR by excluding reserves from the numerator of the ratio. For the two custodians, this freed up a combined $60 billion in balance sheet for repo trades effective May 23rd, and so the Crapo Act removed all obstacles for the moment for the custodian banks to freely toggle – based purely on price – between o/n tri-party and o/n FF funding on scale.

The Crapo Act relieved the custodians from eSLR constraints for the foreseeable future and with that, the Act established a strong bond between o/n tri-party and o/n FF rates that's enforced by the custodian banks: custodians can now run repo books funded in the o/n tri-party repo market without an impact on their eSLR, and, similarly, they can also run repo books funded in the o/n FF market without impacting their eSLR. Thus, for as long as custodians are far from their eSLR limits, they will always prefer to fund their o/n GC and o/n bilateral repo loans via o/n FF every time o/n tri-party repo rates trade above the o/n FF rate, and, given the relatively large volumes they can borrow in the FF market, this arbitrage will exert a considerable pull-force on o/n FF for the foreseeable future.

Like the bond of a happy marriage, o/n tri-party and FF rates are now inextricably linked.

Figure 17 shows the price action in o/n FF since 2015. The noteworthy developments are that the o/n FF rate drifted higher relative to IOR and that the month-end dips disappeared. The first development is due to the fact that more foreign banks are using o/n FF borrowings to improve their LCR. The second development is due to the fact that U.S. banks are starting to use o/n FF borrowings for the same, but mostly on quarter-ends.

Thus, o/n FF trades are no longer just about arbitrage, but about banks upping their LCR. For that, banks are willing to pay a slight premium over the volume-weighted median rate.

We can add a third driver to these dynamics – custodians' arbitrage of repo funding costs.

Figure 18 shows the o/n FF rate alongside the o/n tri-party repo rate since 2015. Up until March 20th, 2018, the o/n tri-party repo rate traded well below the o/n FF rate, so it did not occur to anyone to fund GC or bilateral repos with anything but tri-party repo.

But now that we are in an environment of a safe asset glut where collateral is becoming increasingly excess, o/n tri-party repo rates occasionally drift above the o/n FF rate, and shifting between the two rates depending on which one is cheaper is now relevant.

When o/n tri-party repo first traded above o/n FF on March 15th, the o/n FF rate drifted 2 bps higher. Then again, through the March 31st quarter-end turn, as o/n tri-party repo continued to trade above o/n FF, the o/n FF rate drifted another 3 bps higher. Finally,

as we approached the June 30th quarter-end turn, o/n FF drifted another 2 bps higher, just days ahead of the largest quarter-end spike in the o/n tri-party repo rate to date.

Figure 19 shows that days before that turn, the 75th percentile of o/n FF trades printed at 1.94%, just a bp below IOR. Anecdotally, it was custodians that pushed o/n FF that high.

Now you know why…

…presumably to hoard some reserves to get in position to lend into the quarter-end spike in o/n GC rates. Opportunistically funding these in the o/n FF market yields a better spread than being a matched-book dealer funding at the tri-party rate that's also spiking.[6]

Finally, to link up this analysis with an earlier issue of Global Money Notes (see here), the difference between the o/n FF rate and the o/n tri-party rate matters not only due to custodian banks' preference to borrow at the cheaper of the two rates on the margin, but FHLBs' preference to lend at the richer of the two rates on the margin. In English, this practically means that the FHLBs will lend less in the o/n FF market every time the o/n tri-party rate is above the o/n FF rate, which happens precisely when the custodians want to borrow more in the o/n FF market to cheapen the funding of their repo books.

A push and a pull on the o/n FF rate at the same time cannot be good…

…and pushes and pulls will only intensify as we're tumbling down the rabbit hole of the world of excess collateral. As collateral supply increases and o/n GC - tri-party spreads widen, tri-party repo rates will get pulled away from the o/n FF rate and then o/n FF will play catch up. This will be one reason why o/n rates will soon drift outside the target band.

Conclusions

Sponsored repo is one thing; the Crapo Act codifying a strong arbitrage-relationship between repo rates and the Fed's target rate is another. In an environment where collateral supply is bound to increase, the Crapo Act makes monetary policy a lot trickier.

Senator Crapo's Act is influencing monetary conditions, and "Governor Crapo" may be the most important FOMC member you've never heard of…

Sponsored repo has added repo capacity to the system, but is not a systemic solution to what will soon be a problem of excess collateral. From the perspective of cash lenders, custodians are just another counterparty, not a be-all-end-all counterparty. This will be the ultimate limit to how much custodian banks' sponsored repo books will be able to grow.

Sponsored repo's impact on the o/n fed funds rate is the key takeaway from our analysis.

The o/n FF rate used to dip on month-ends. That was when banks used to borrow o/n FF to fund reserves at the Fed as part of their discretionary arbitrage portfolios.

The o/n FF rate now prints flat on month-ends. That means that banks want to hold on to the reserves funded via o/n FF to meet their LCR. Unlike arbitrage, LCRs are mandatory.

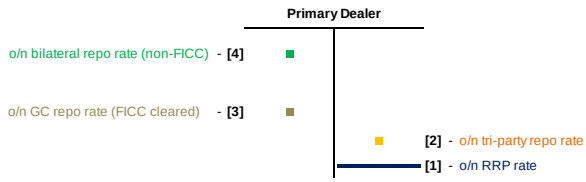
The o/n FF rate will next spike on month-ends. Some banks will scramble for reserves, maybe as the custodians opportunistically fund o/n GC trades as others boost their LCR.

Dip, flat, spike…

It's just a matter of time. It's not rocket science. Yet futures don't price for any of this. You should take the other side of that and receive the spikes before they hit the market.

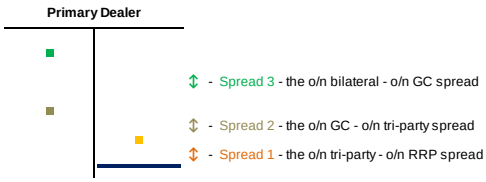
[6] A polite inquiry from your regulator as to "why you're bidding so aggressively for o/n FF" can halt these opportunistic trades. That said, such polite inquiries may succeed at halting trades at small spreads, but perhaps not big spreads.

Figure 1: The Basic o/n Repo Rates



Source: Credit Suisse

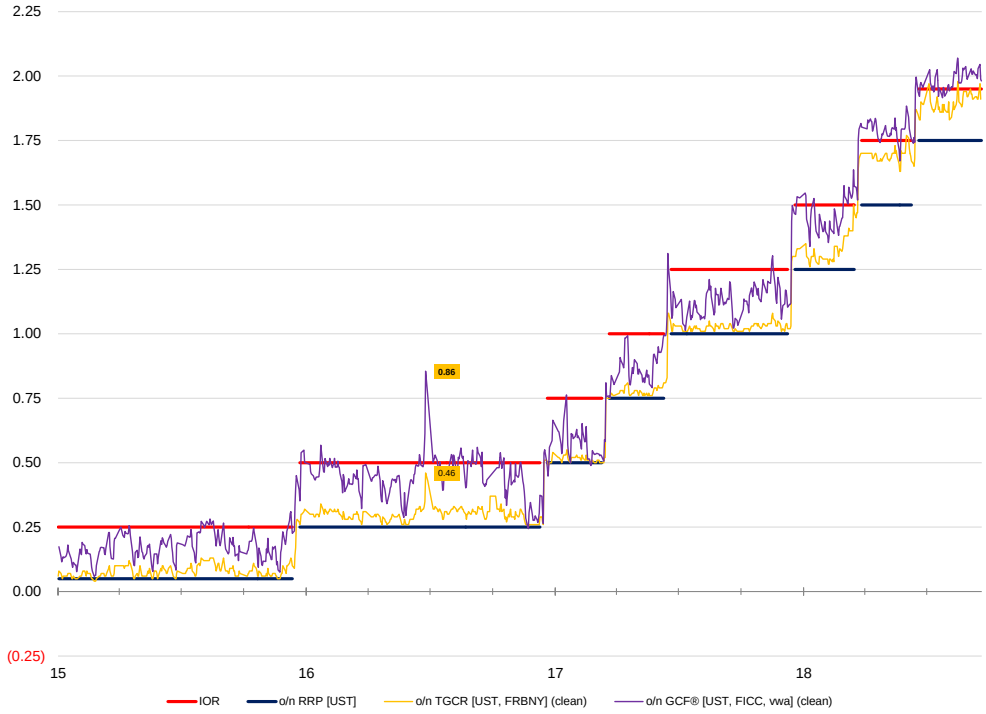
Figure 2: The Hierarchy of Repo Rates



Source: Credit Suisse

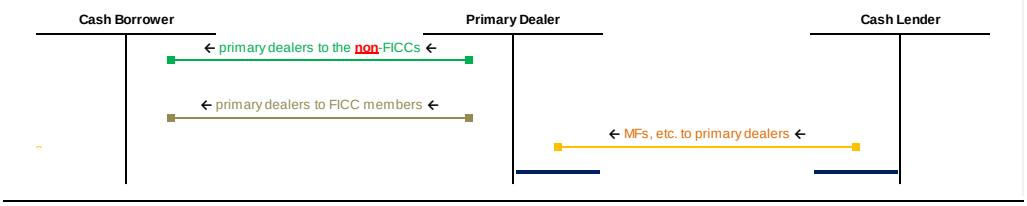
Figure 3: Repo Rates Under Basel III

percent



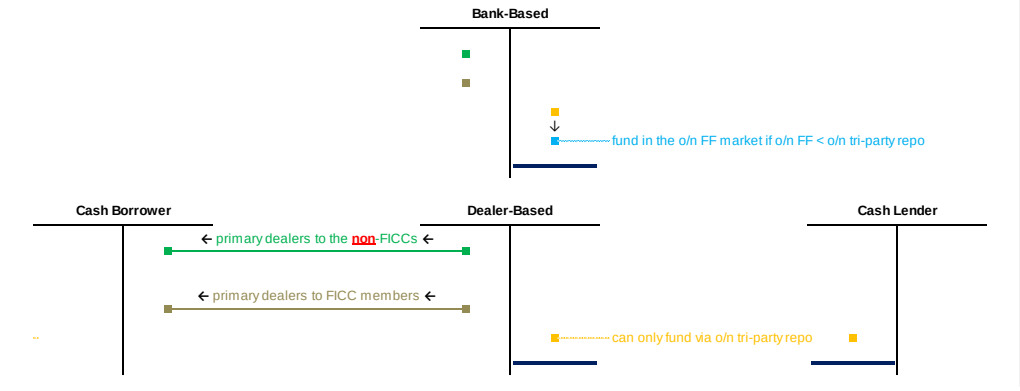
Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 4: The Hierarchy of Repo Market Participants



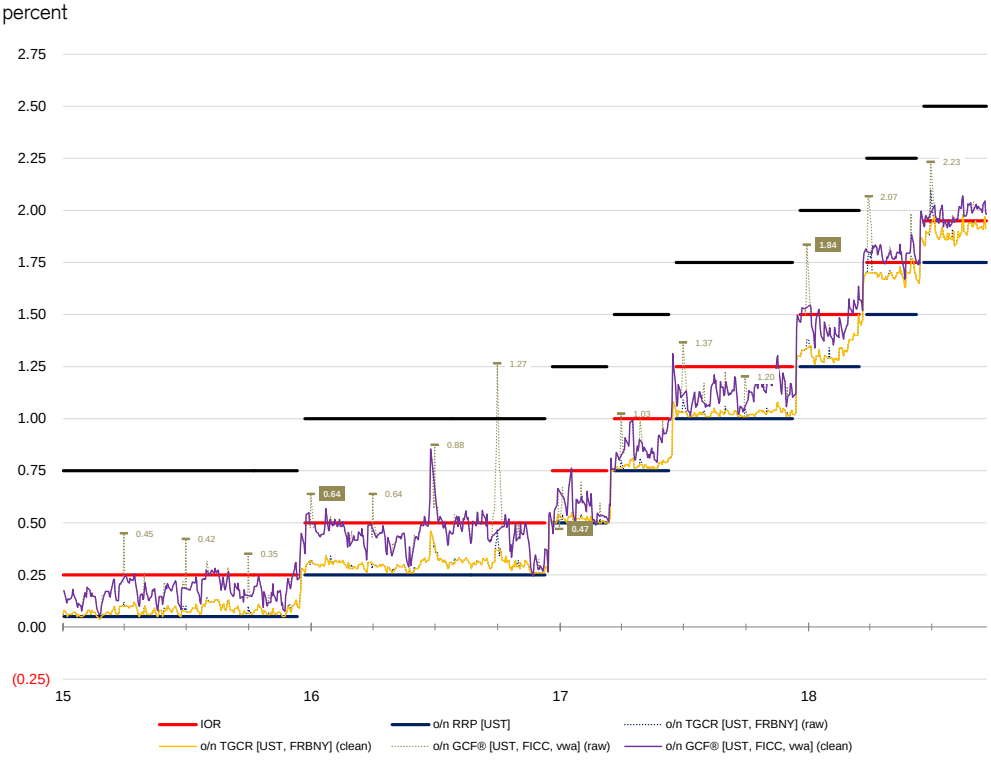
Source: Credit Suisse

Figure 5: The Hierarchy of Repo Dealers (1) – Funding Options



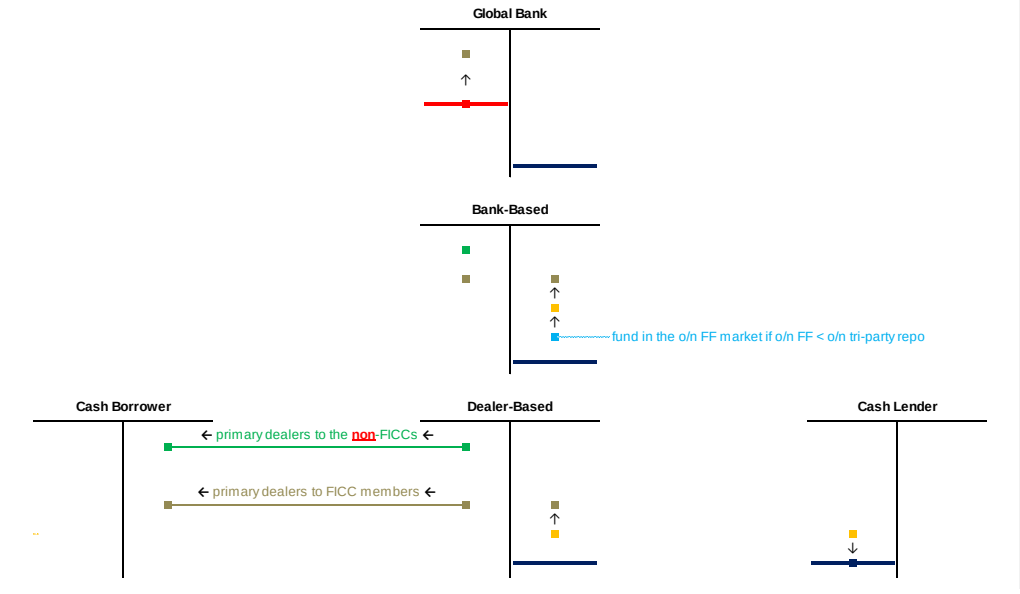
Source: Credit Suisse

Figure 6: o/n GC Repo Spikes Under Basel III



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

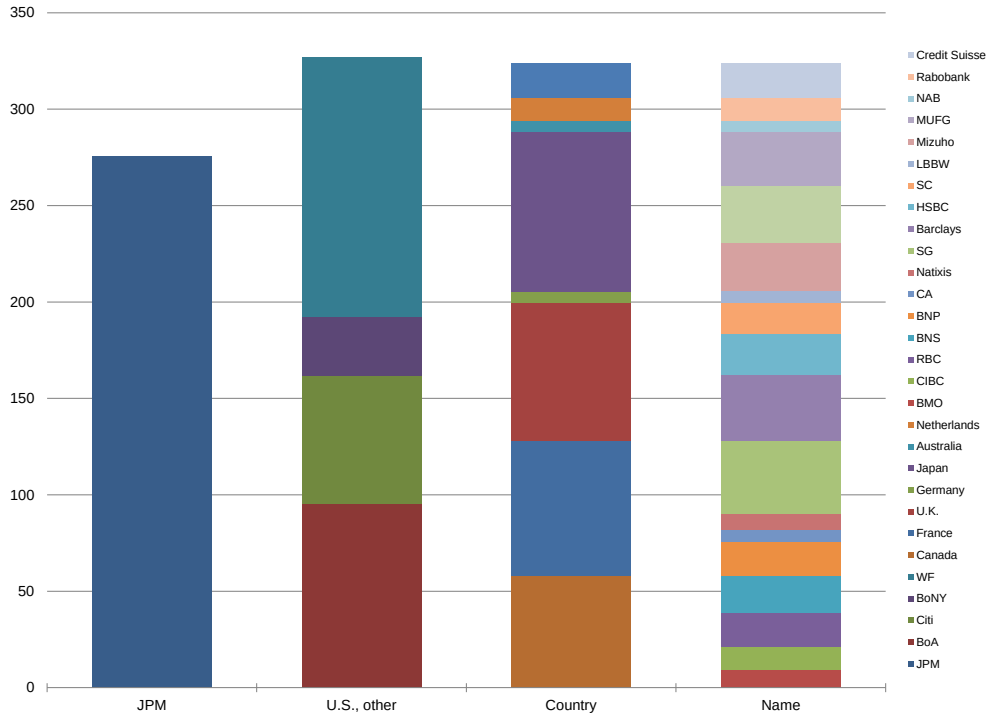
Figure 7: The Hierarchy of Repo Dealers (2) – Banks as Enablers of Netting



Source: Credit Suisse

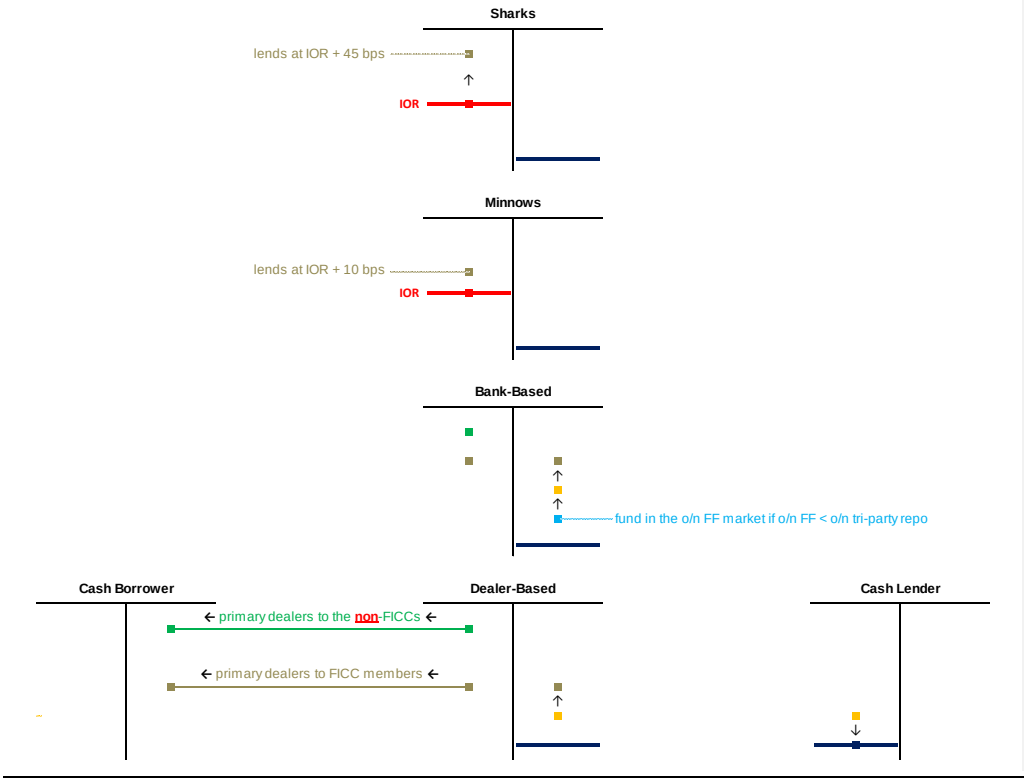
Figure 8: The Liquidity "Cups" that Lend in the o/n GC Repo Market

$ billion, as of 2018Q2



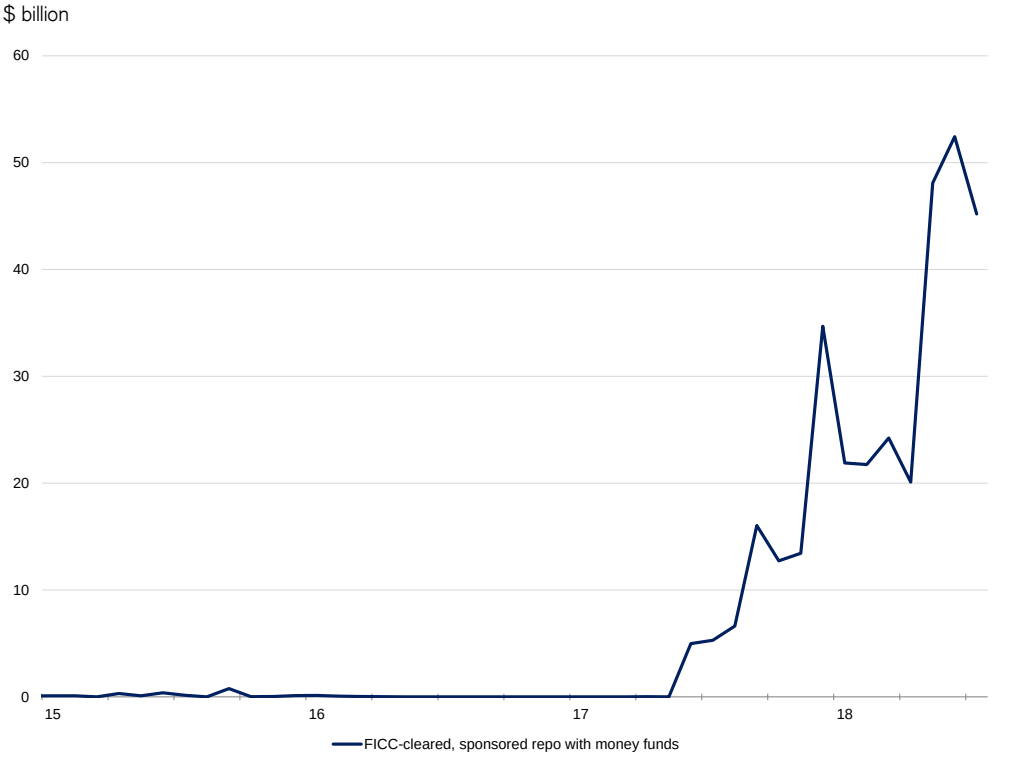
Source: FFIEC 031, FFIEC 002, Credit Suisse

Figure 9: The Hierarchy of Repo Dealers (3) – Minnows, Barracudas and Sharks



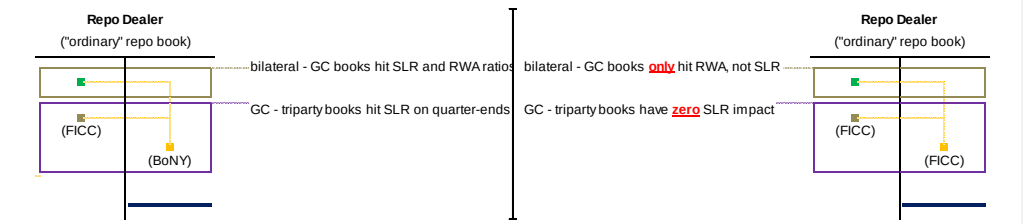
Source: Credit Suisse

Figure 10: Sponsored Repo



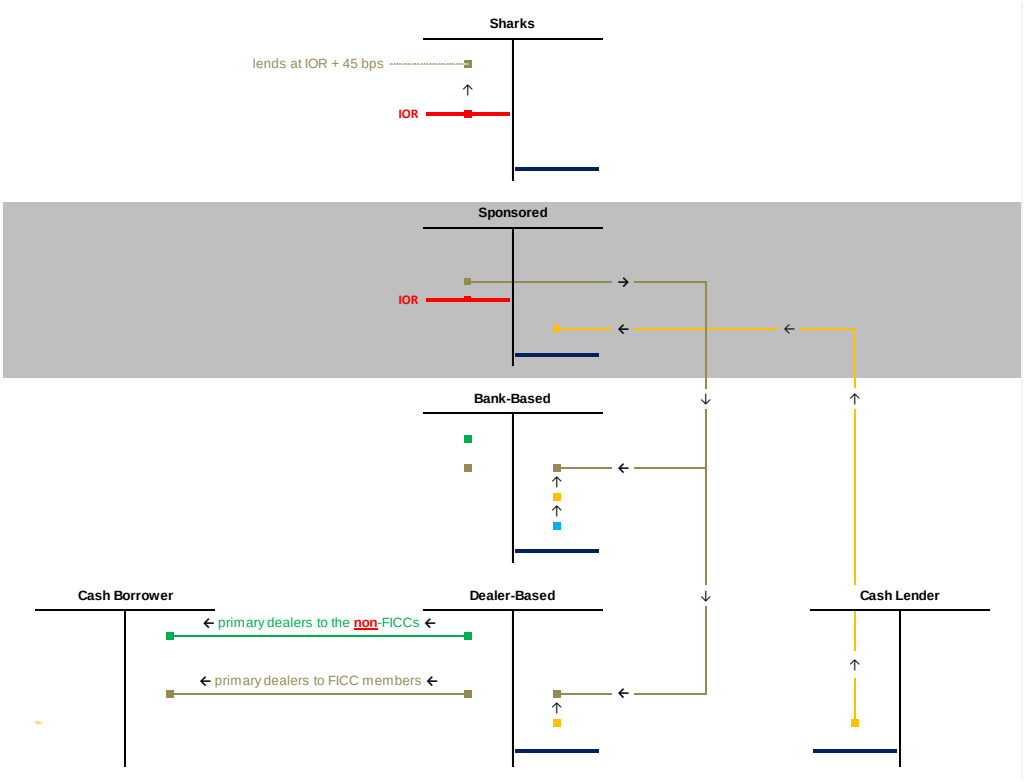
Source: OFR, SEC, Credit Suisse

Figure 11: Sponsored Repo's Balance Sheet Impact



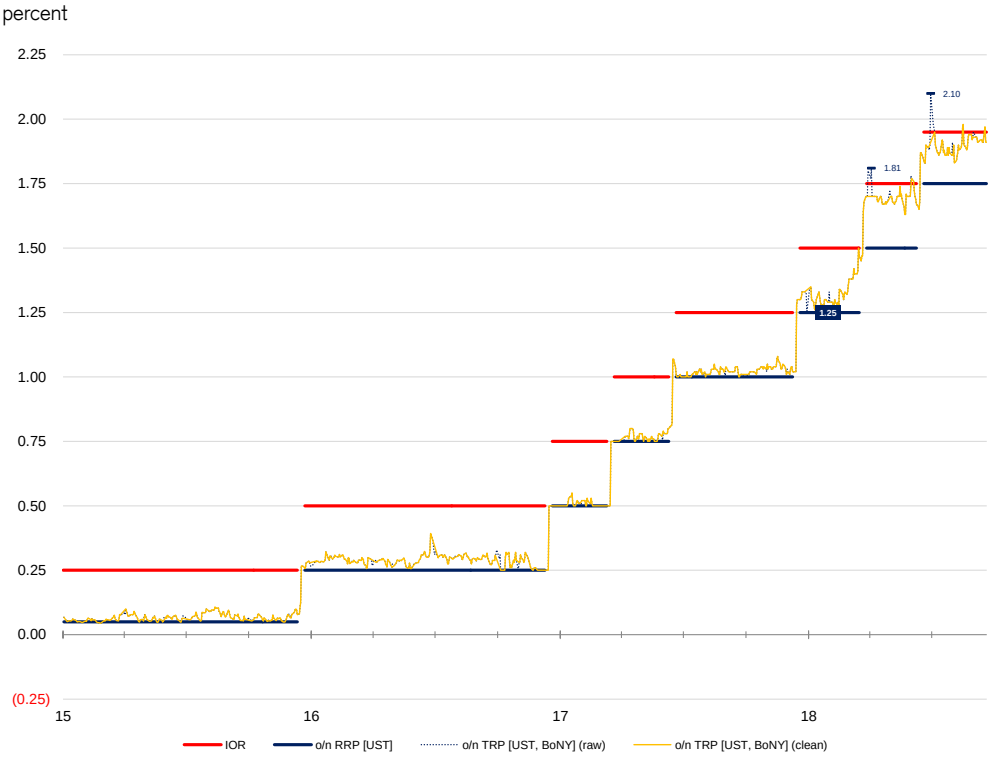
Source: Credit Suisse

Figure 12: The Hierarchy of Repo Dealers (4) – Sponsored Repo Dealers



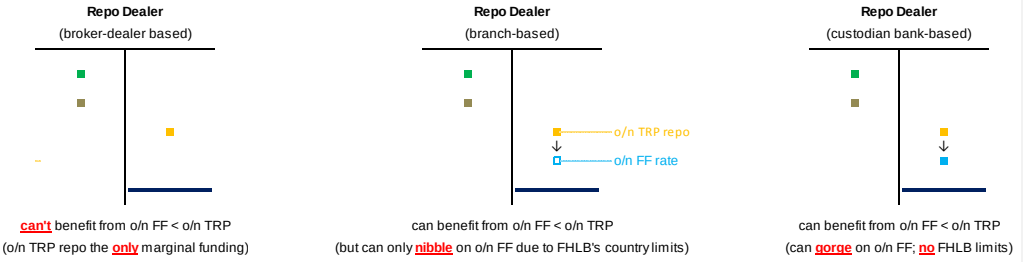
Source: Credit Suisse

Figure 13: o/n Tri-Party Repo Spikes Under Sponsored Repo



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 14: Three Repo Dealers, Three Funding Options



Source: Credit Suisse

Figure 15: FHLBs' o/n Fed Funds Exposure

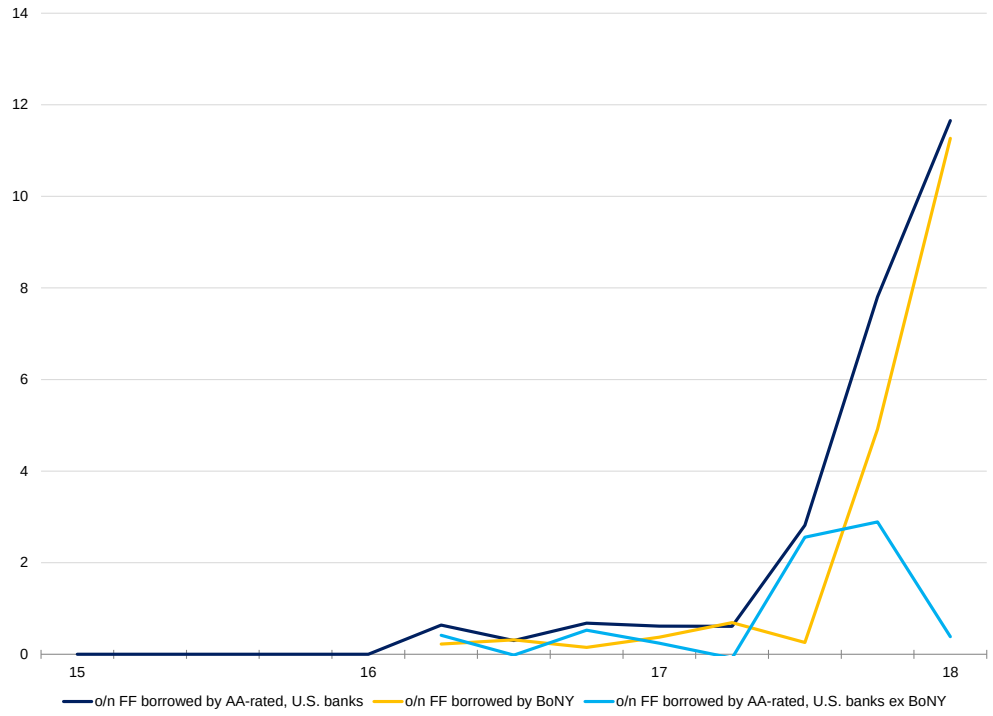
$ millions, as of 2018Q2

	Investment Grade				
Carrying Value(2)	Double-A	Single-A	Triple-B	Unrated	Total
Domestic	$ 7,290	$ 18,698	$ 1,414	$ 146	$ 27,548
U.S. subsidiaries of foreign commercial banks	500	300	—	—	800
Total domestic and U.S. subsidiaries of foreign commercial banks	7,790	18,998	1,414	146	28,348
U.S. branches and agency offices of foreign commercial banks					
Canada	950	18,243	—	—	19,193
Sweden	14,657	2,530	—	—	17,187
Australia	11,300	—	—	—	11,300
Netherlands	—	7,117	—	—	7,117
Germany	400	6,375	—	—	6,775
Norway	—	5,380	—	—	5,380
France	—	3,985	—	—	3,985
Austria	—	1,226	—	—	1,226
Singapore	1,200	—	—	—	1,200
Japan	—	965	—	—	965
Switzerland	—	535	—	—	535
Belgium	—	300	—	—	300
Chile	—	300	—	—	300
Total U.S. branches and agency offices of foreign commercial banks	28,507	46,956	—	—	75,463
Total unsecured investment credit exposure	$ 36,297	$ 65,954	$ 1,414	$ 146	$ 103,811

Source: Office of Finance

Figure 16: Custodian Banks' Presence in the Fed Funds Market

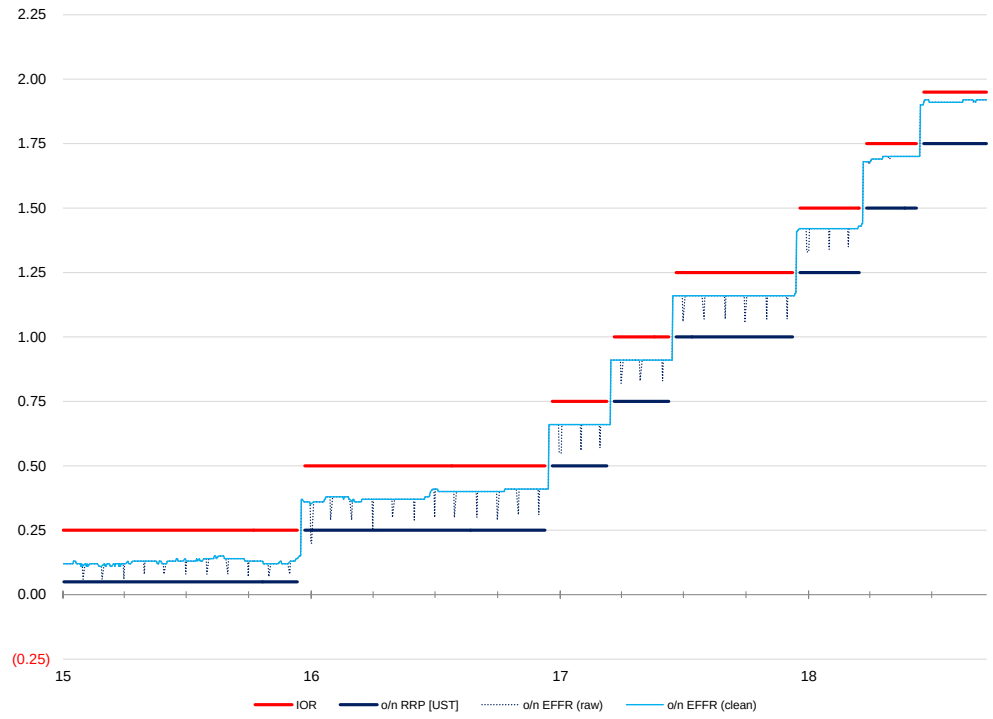
$ billions



Source: Office of Finance, FFIEC031, Credit Suisse

Figure 17: No More Dips

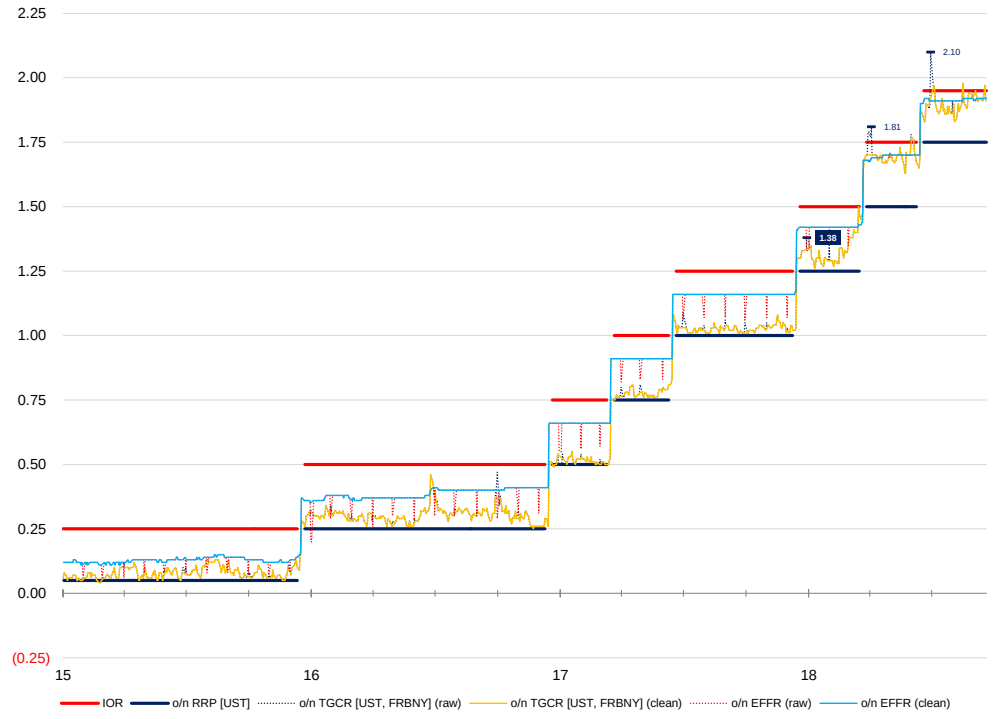
percent



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

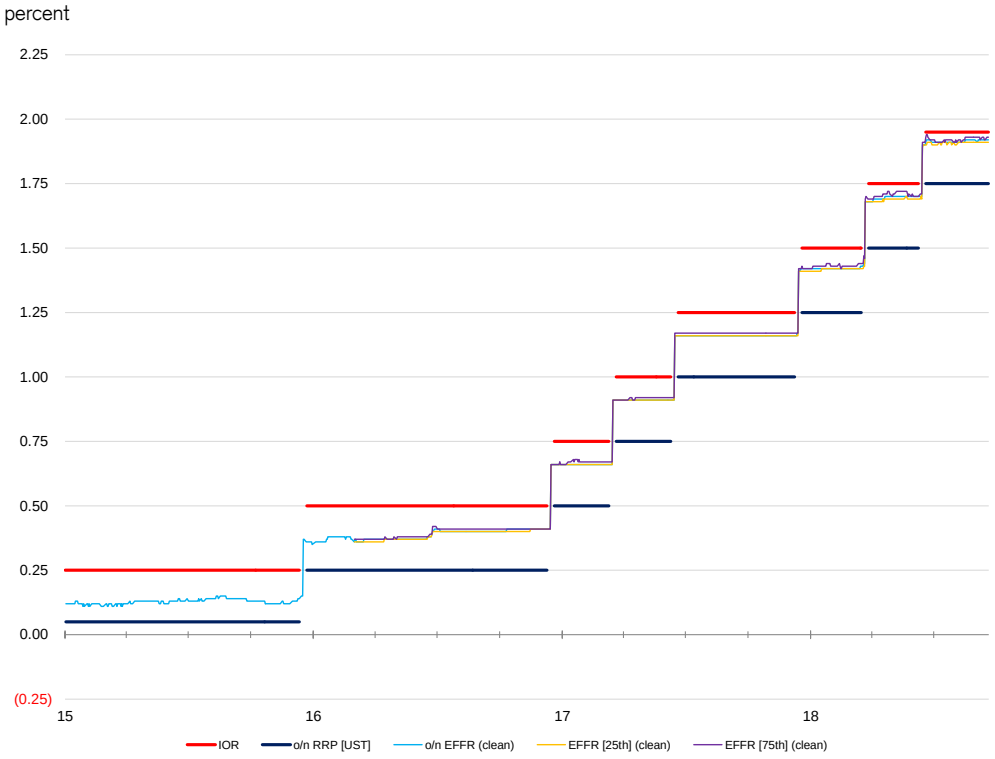
Figure 18: Spot the Bond

percent



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 19: Spot Custodians' Bid



Source: the BLOOMBERG PROFESSIONAL™ service, Credit Suisse

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