CREDIT SUISSE

10 June 2016
Global
Economic Research

Global Money Notes #6

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QE, Basel III and the Fed's New Target Rate

QE and Basel III have forever changed the way money markets trade.

Changes are so fundamental that one's knowledge of markets pre-crisis may be a hindrance to successfully trading money markets today. And judging from the Fed's narrative on money markets after liftoff, policymakers too are still in the early stages of making sense of the numbers they see on their screens.

Forget everything you know, and start from a blank page. Everything's in play…

There was a time when banks deployed massive amounts of balance sheet to arbitrage. The typical day of a money market trader involved borrowing and lending within and across various money markets segments both onshore and offshore: arbitraging small differences between fed funds and eurodollar rates and between various unsecured and secured (repo) rates were the norm.

Banks' aim was to conduct arbitrage until spreads became so narrow and the relationship across the entire spectrum of money market rates so tight that arbitrage was no longer possible. Policing these money market relationships – ensuring that spreads remained tight at all times – was the name of the game.

Policing the tightness of spreads required "endless" amounts of balance sheet. One can either control prices or quantities, but not both. Under the old regime, the focus was on prices and tightness. Quantities (balance sheet) were endless and an afterthought, and the volume of matched money market books that accumulated through banks' money dealing activities – borrowing in one segment of the money market in order to lend in another – were massive indeed.

Matched money market books also meant that for the largest of global banks – the main arbitrageurs in the system – liquidity buffers were interbank loans.

Liquidity was stored inside the system.

The Great Financial Crisis taught bankers and regulators alike that "inside" liquidity is the least reliable when most needed. The system needed a reboot.

Basel III tore up the old model and forced banks to hold liquidity buffers with the sovereign instead of banks. *Liquidity is now being stored outside the system.*

Money is now less "inside" and more "outside".

Understanding the implications of this regime shift must be at the center of evaluating the performance of money markets after liftoff. Analyses that don't do that lack in perspective and confuse rather than illuminate at a time of change.

No change is more important than the choice of an alternative reference rate and the related choice of the Fed's new target rate. While at the moment the OBFR is the *only* possible candidate, a recent speech by President Dudley hints that the Fed may be laying ground for a repo rate as the *preferred* alternative.

QE and Basel III have euthanized interbank money markets.[1]

There isn't much happening in interbank money markets in general in a banking system awash with massive amounts of reserves that banks are required to hoard in order to comply with new rules designed to ensure they can survive a 30-day liquidity storm.

Compared to the past, when banks traded scarce reserves frantically to settle interbank payments, banks today have abundant pools of reserves and settle payments leisurely.

There are no better tell-tale signs of this than the facts that interbank settlements occur much earlier in the day and intraday credit extended by the Fed is nil today (see here). This is in sharp contrast to the pre-crisis era, when banks had incentives to delay interbank payments until late in the day and drew massive volumes of intraday credit from the Fed.

Intraday credit (daylight overdrafts) meant an increase in liabilities for the deficit banks (those making the payments) and an increase in excess reserves for the surplus banks (those receiving the payments) and the Fed intermediating between them – *during the day*.

Intraday credit had to be repaid by the end of the day (before sundown) and the shifting of intraday credit and corresponding excess reserves from the Fed's balance sheet onto banks' balance sheet happened in the overnight fed funds market – *during the night*.

Fed funds are thus overnight credit not daylight credit, and interbank credit not Fed credit…

…or at least they *were* until QE and Basel III changed everything.

Historically, the overnight interbank fed funds market was where the Fed set its policy rate, but with QE and Basel III taking the life out of what once was a vibrant market, the Fed will have no choice but to switch to a new target rate and OIS markets to a new reference rate.

This issue of Global Money Notes explores the ways in which QE and Basel III have influenced the hierarchy and trading pattern of various money market interest rates and how they impact the search for an alternative reference rate and the Fed's new policy rate.

Its centerpiece is an interactive slide deck (see here) that guides the reader through the new money market landscape one step at a time. The deck starts with a blank page (literally) and explains the hierarchy between and behavior of all relevant money market rates in the post-QE, post-Basel III world. We do so through a careful review of each market participant's balance sheet – who they lend to and who they borrow from and why.

It is not for the faint-hearted: it runs close to 100 pages.

The deck builds on earlier work: first came the mapping of the shadow banking system (see Pozsar et al, 2010); then came mapping the hierarchy of money (see Pozsar, 2014); now comes mapping the hierarchy of interest rates that comes with the hierarchy of money.

The deck's target audience is anyone who trades money markets on a daily basis, the central banking community and members of the Alternative Reference Rate Committee.

We recommend reading the slide deck one click at a time in electronic (not hard copy) form and on a computer screen (not a tablet device).

Reading the deck is not essential for everyone, but do know that putting it together helped us understand money markets to the core and reach the conclusions summarized below.

Money Markets after QE and Basel III

Basel III forced banks to replace eclectic interbank portfolios with high-quality liquid assets (HQLA) in the form of reserves held at the Fed or Treasuries (reversed in or held outright).

Simplicity replaced diversity.

Basel III simplified things on the funding side, too. For an asset to qualify as HQLA, it must be unencumbered, which means that it can never be funded secured, only unsecured.

[1] QE and Basel III euthanized unsecured interbank money markets, but not secured interdealer money markets. We will discuss trends in interdealer money markets on Page 6.

Figure 1 (overleaf) shows the resulting shift in the rate pairs that banks "play off" against each other: the relevant pairs are no longer within and across private money market segments but rather unsecured rates and IOER; unsecured rates and centrally cleared (GCF) repo rates; and unsecured rates and the intermediate points on the Treasury curve.

Matched book money dealing – money market funding of money market lending – is no longer private on both sides, but rather half private, half public. Banks don't fund each other anymore but rather the sovereign – the U.S. Treasury or its subsidiary, the Fed.

Figure 2 (overleaf) shows this shift in action through the matched money market books of the New York branches of foreign banks. The size of matched books did not change much since the crisis, but their asset side is entirely different: o/n and term loans to other banks (fed funds and deposits, respectively) and interoffice loans are out, and HQLA (reserves) are in. Reverses (or reverse repos, a source of HQLA) are less important but present still.

On the funding side too, interbank (fed funds) trades are gone and what remains are funding from headquarters and unsecured funding from non-bank customers.

Basel III drove a wider wedge between the new rate pairs than the spread between the old pairs used to be: the spread between o/n rates used to be razor thin (about a basis point or two), but the spread between IOER and the effective fed funds rate is 12.5 bps today.

Why? Because banks need every penny of reserves as HQLA against short-term liabilities (demand for which is driven by customer liquidity needs), and since HQLA is a low-margin use of balance sheet and balance sheet is no longer infinite but scarce, o/n spreads have settled *structurally* wider. Furthermore, Basel III limits leverage and by extension the amount of balance sheet available to compress spreads – which is practically nil.

And so, high-volume, low-margin private money dealing gave way to Basel III compliance through *public-private* money dealing at wider margins (see McCulley and Pozsar, 2014).

Basel III also interacts with QE.

Reserves – the quintessential byproduct of QE – are HQLA and reserves can only be held by banks. By extension, QE influences the composition of banks' HQLA portfolios.

During the initial rounds of QE, every penny of reserves added to the system were indeed excess – in excess of the amount banks needed to comply with reserve requirements.

But when Basel III – and in particular, the Liquidity Coverage Ratio – went live, all reserves became required: not to comply with reserve requirements but with the LCR (see here).

Banks have no incentive to either borrow or lend reserves these days.

Banks have no incentive to borrow reserves because they already hold more than what's needed to comply with reserve requirements, and they have no incentive to lend reserves either because if they do their HQLA portfolios would shrink and their LCR would worsen.

The reason why we still have a fed funds (FF) market is because Basel III does *not* apply to a small corner of the U.S. banking system – the Federal Home Loan Banks (FHLBs).

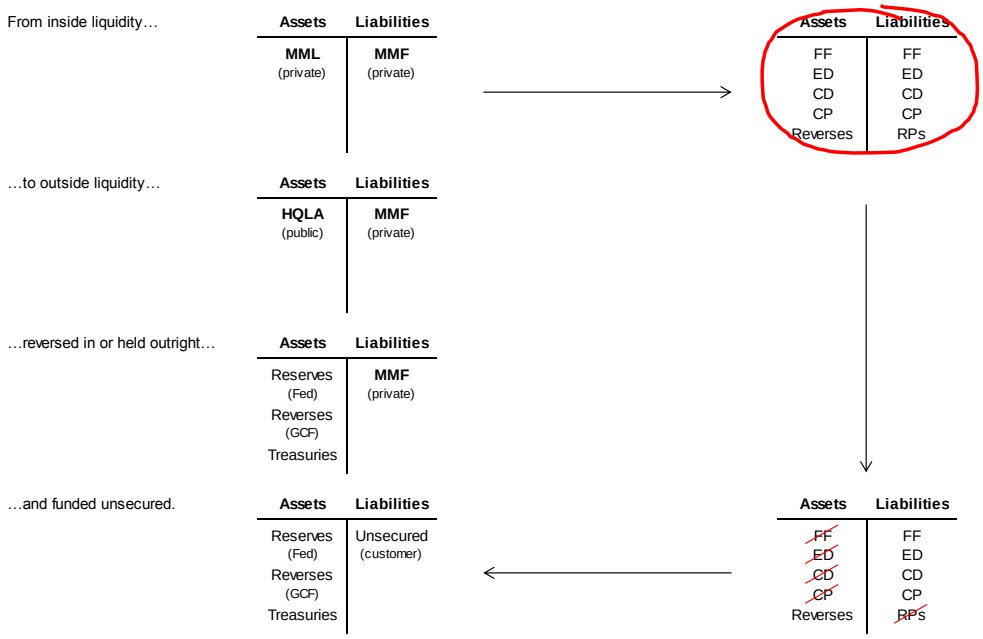
The FHLBs are the only banks left in the system that still have an incentive to lend to other banks on an unsecured basis on scale. On the flipside, the only banks that borrow from the FHLBs are highly rated foreign banks with an aim to arbitrage the FF-IOER rate pair and subject to a version of Basel III lighter than that that which applies to U.S. banks.

As we have discussed in previous issues of Global Money Notes (see here and here) the small size of the FF market (about $60 billion), the small number of FF market participants (10 lenders and a dozen or so borrowers) and the even balance of power between the two sides of the FF market make the FF rate prone to trade along a suspiciously straight line.

It appears that informal agreements between the two sides of a small market that's slowly (but surely) fading into irrelevance have more to do with where the effective FF rate trades than the Fed's new operational framework or the magnetic pull of IOER (see here).

Scrapping the FF rate as the Fed's policy target won't be a choice but a necessity, in our view.

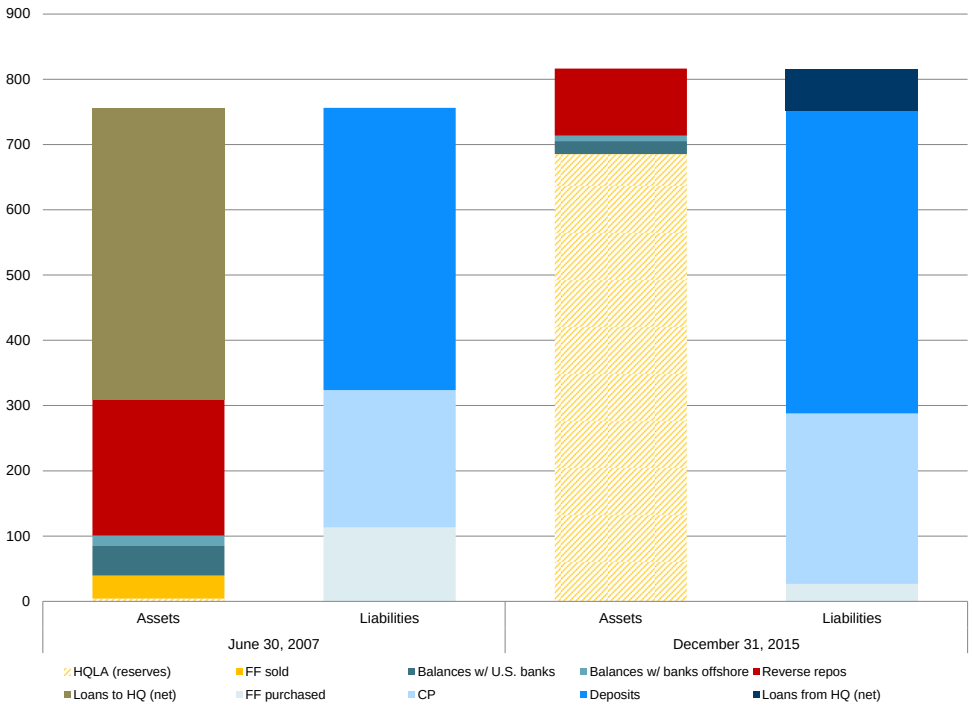
Figure 1: From "Inside" Liquidity to "Outside" Liquidity



Source: Credit Suisse

Figure 2: Money Dealing Now and Then

New York branches of foreign banks, *$ billions*



Source: FDIC, Credit Suisse

No problem, you say: we have the Fed's new overnight bank funding rate (OBFR) as an alternative to the FF rate. Unlike the FF market, the o/n eurodollar (ED) market frequented by U.S.-based banks is deeper ($250 billion versus $60 billion), more populous (hundreds of borrowers versus a dozen) and hence more reliable a yardstick of o/n bank funding conditions. In addition, the OBFR trades on top of the FF rate and also along a straight line, so the Fed's operating framework must be doing something right, right? Not so fast…

That OBFR also trades along a straight line has to do with the fact that bank funding desks use the FF rate as a reference point to price o/n ED deposits. Things get circular…

Furthermore, unlike the FF rate – a yardstick of o/n onshore interbank funding conditions – the OBFR is a yardstick of mostly offshore (as opposed to onshore) funding conditions and references mostly customer-to-bank (as opposed to interbank) trades. And that's a big deal.

It is a big deal because switching from the FF rate to OBFR as the Fed's policy target is not without a broad set of existential questions. Were that switch to happen the Fed would go from targeting an onshore rate to targeting an offshore rate; from targeting an interbank rate to targeting a customer-to-bank rate; from an operating framework built around TOMOs (or temporary open market operations) to one centered around POMOs (permanent open market operations); and by extension, from targeting interest rates by fine-tuning the amount of reserves to targeting the quantity of reserves in HQLA portfolios through episodic rounds of asset purchases (regulatory as opposed to quantitative easing).

Alternative Reference Rates and Basel III

The reasons why banks don't trade in the o/n FF market apply to all other unsecured segments of the interbank money market, including the eurodollar market. Whatever the volume of o/n eurodollar transactions there are *no* interbank trades there. Not one penny. And that opens up an existential can of worms for the concept of "IBOR" in general.

IBOR stands for interbank offered rates and submissions are based on the hypothetical question of "where you think you could get unsecured funding from other banks".

From other banks… at a time when unsecured interbank markets have already faded as a part of the ecosystem. LIBOR curves today (to the extent that submissions reflect actual trades) are based exclusively on customer-to-bank and *not* interbank trades.

It must be tough around the FOMC today. Your policy target (FF) is questionable. The OBFR is not a slam dunk to switch to. Benchmark ("IBOR") curves no longer measure what their name implies. Only the need for change is obvious. But not the direction.

A recent white paper of the Alternative Reference Rate Committee (ARRC) proposed two alternatives to choose from: the OBFR and some o/n Treasury general collateral repo rate.

The question of alternative reference rates and alternative policy rates are intertwined: ideally, they would be the same. So it is likely that the rate the ARRC will ultimately choose will also be the Fed's new target rate. But there are problems with both alternatives.

As discussed above, switching to the OBFR is not an easy deal (onshore versus offshore; interbank versus customer-to-bank; TOMOs versus POMOs; prices versus quantities).

But switching to a repo rate won't be simple either. In fact, it is *impossible* at present.

Why?

Because primary dealers do not have access to the discount window and so there is no ex-ante mechanism in place that would enable the Fed to cap repo rates in a crisis.

And if you can't cap it, you can't target it…

That said, it would make total sense for the Fed to target an interdealer repo rate going forward. In fact the new (post-Basel III) world order begs for it. Banks have access to reserves at the Fed and reserves are the main form of HQLA they hold to survive a 30-day liquidity storm as required by the LCR. In English this means that banks can bleed liquidity (lose reserves) for weeks before they tap markets for liquidity or the Fed as the last resort.

These massive reserve holdings – representing weeks' worth of liquidity needs – are the reason why banks no longer trade liquidity among each other anymore. Everyone's flush…

In contrast, broker-dealers do *not* have access to reserve accounts at the Fed. For them HQLA is Treasuries reversed in through GCF repo trades or Treasuries held outright. In a 30-day storm, broker-dealers won't have the luxury of running down reserve balances. They will have to repo out HQLA (their unencumbered Treasury portfolio) from the get go. In other words, dealers are flush with collateral, not reserves. And collateral ***ain't*** money…

On a day-to-day basis, the interdealer GCF repo market is the main market where liquidity gets redistributed within the dealer community (between primary and non-primary dealers).

The volatility of the o/n GCF repo rate is similar to what the volatility of the FF rate used to be when banks too were liquidity constrained, similar to the way dealers are liquidity constrained today. Figure 3 (overleaf) plots the behavior of the o/n GCF repo rate versus that of the FF rate: like electrocardiograms, flickers mean life and flatlines the opposite of life. The o/n GCF repo market is the *only* functioning money market left standing today.

But the GCF repo market is a market where broker-dealers account for the bulk of activity and where banks are present only as *opportunistic* lenders and seldom ever as borrowers (banks typically lend in the GCF repo market if the o/n GCF repo rate is above IOER and typically don't borrow as repos encumber collateral, reduce HQLA and worsen one's LCR).

And because it is broker-dealers that do the bulk of borrowing and lending in interdealer markets, capping a *repo* target rate in a crisis is possible only if dealers too have access to the discount window (IOER serves as a ceiling for the o/n GCF rate only in normal times, not crisis times). President Dudley's recent speech on Amelia Island arguing for discount window access for primary dealers should be understood in this context. In specific:

"Now that all major securities firms in the U.S. are part of bank holding companies and are subject to enhanced prudential standards as well as capital and liquidity stress tests, providing these firms with access to the Discount Window might be worth exploring."

President Dudley's call to emancipate the Fed from Lender of Last Resort (for banks) to Dealer of Last Resort (for the system as a whole – both traditional and shadow) *despite* the spirit of the Dodd-Frank Act (which limits the Fed's 13(3) lending authority) may signal the Fed's discomfort with the OBFR as a target rate and preference for a repo rate instead.

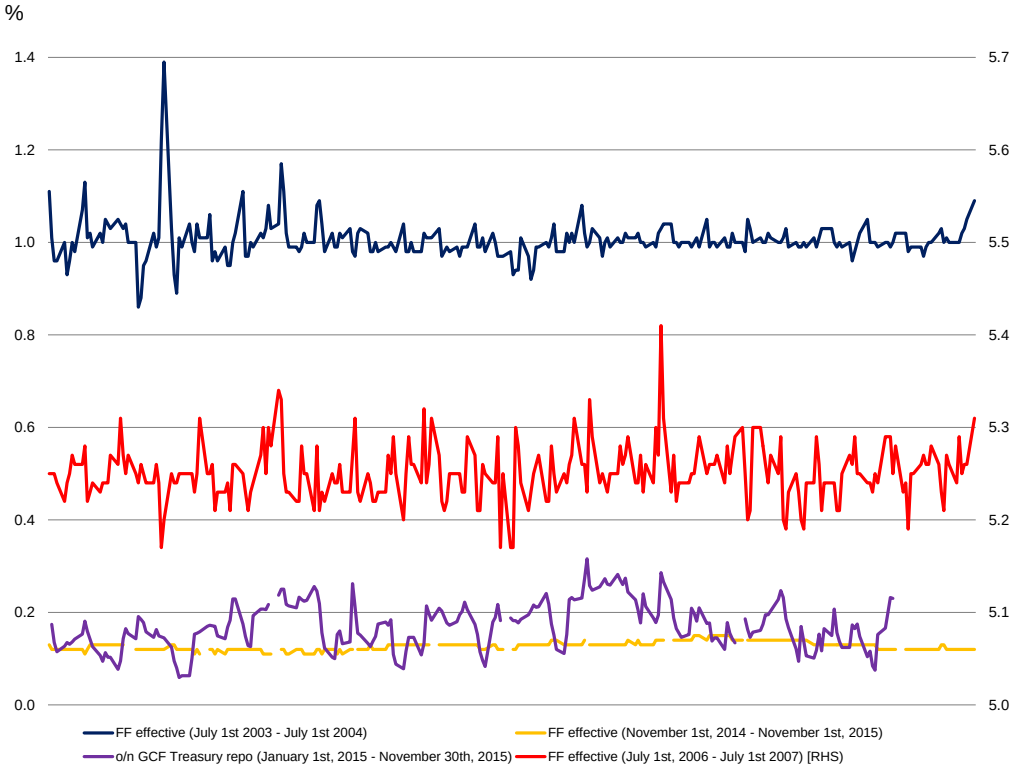
After all, a local interdealer repo target rate would get around the global customer-to-bank aspects of OBFR. But then the Fed has be comfortable with a target rate that's a funding rate for shadow banks, not banks – there… the devil's ugly head popped up again.

And even then, don't forget that before DoLR and a repo target rate become reality, the Fed will have to get a lot of lawyering done in a climate that's all but cooperative.

Until we hear more about DoLR, do know that the OBFR is the *only* game in town.

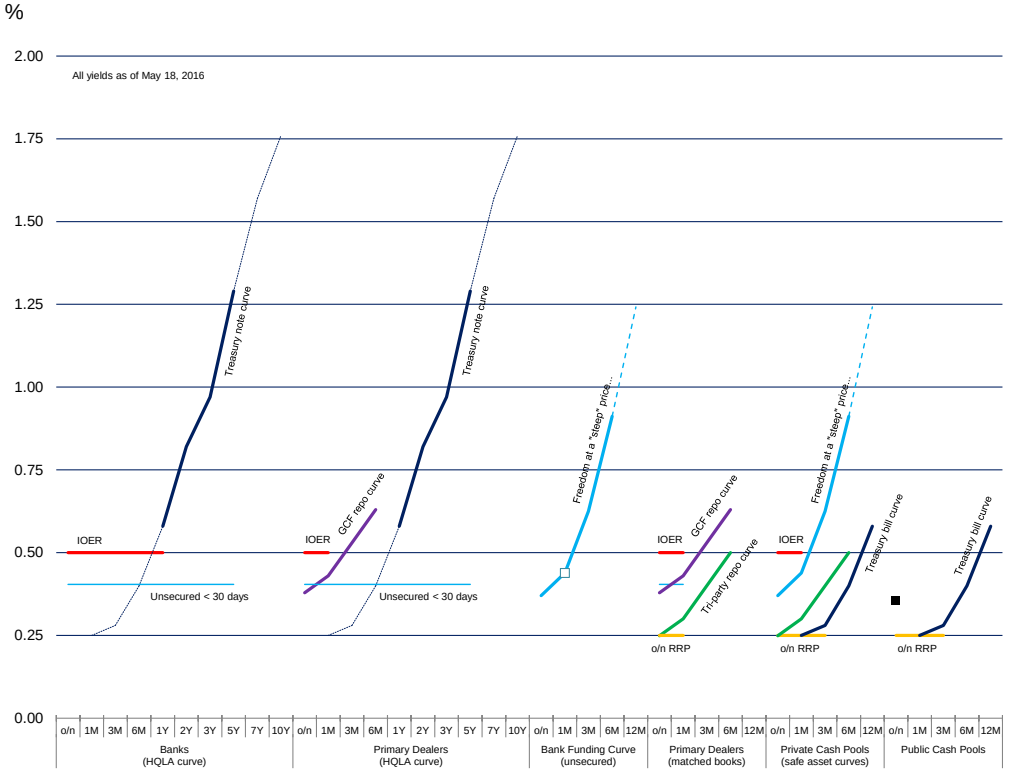
Is it essential that an alternative reference rate be capped by the Fed's discount window? Most definitely. When the relationship between the FF and Libor rates broke down in 2007 (i.e., when the par exchange rate between onshore and offshore dollars broke down) the Fed had to roll out dollar swap lines to regain control of Libor (the old reference rate). OBFR is capped by the swap lines (see here) but if the target becomes a repo rate, the Fed – learning from experience – will prefer to have a mechanism for control in place…

Figure 3: An 'Electrocardiogram' of the U.S. Money Market



Source: DTCC, Federal Reserve, Credit Suisse

Figure 4: New Curves, New Relationships – Everything's in Play…



Source: Federal Reserve, DTCC, The Bank of New York, Credit Suisse

Rules of the Game

The New New Testament (Basel III) comes with its own set of Ten Commandments which we list below and plot in Figure 4. Ignore them or face money market purgatory…

1. Unsecured interbank markets are dead. Long live secured interdealer markets. The o/n interbank FF rate is not much of a measure of anything anymore, really. The o/n interdealer GCF repo rate is the only meaningful money market rate today.

2. Focusing on where the effective FF rate trades within the Fed's target range is like missing the forest for the trees. The greatest story never told is that the Fed's target range is a *de facto* corridor for the o/n secured rates complex: the o/n RRP rate is a hard floor under o/n tri-party Treasury repo rates and IOER is a soft ceiling for the o/n GCF Treasury repo rate.[2] The o/n tri-party and GCF Treasury repo rates represent primary dealers' core borrowing and lending rates on the liability and asset side of their matched repo books, respectively. In that sense, the o/n RRP and IOER rates set the range within which primary dealers can make two-way markets on an o/n basis (the "inside" spread; see Exhibit 5 overleaf).

3. The o/n RRP rate will always provide a hard floor under o/n tri-party Treasury repo rates as long as the o/n RRP facility remains full allotment.

4. Those calling for the o/n RRP facility to be abolished (citing low utilization rates) should calm down and realize that o/n tri-party repos with dealers, Treasury bills and o/n RRPs with the Fed are substitutes. The reason why usage of the o/n RRP facility has been falling lately was due to a $400 billion increase in the effective bill supply since the first rate hike (see here). More bills mean less need for o/n RRPs. That said, low usage today does not mean low usage forever. If bill supply shrinks and a full allotment RRP facility is not there to fill the void, the floor will leak.

5. The IOER rate will always provide a soft ceiling for the o/n GCF repo rate. Banks with large reserve balances serve as opportunistic lenders in the GCF repo market and will always pour money into it if the o/n GCF repo rate creeps above IOER. For banks, this is an asset swap (swapping o/n reserves for Treasuries reversed in through an o/n GCF repo trade) with zero impact on liquidity (LCR), leverage (SLR) or capital (RWA) positions. Not all banks that have access to the GCF repo market will do this arbitrage trade – only those banks that have built their HQLA portfolios with an eye to harvest the option value of reserves. These banks – and one in particular (JPM) – are the system's main money dealers today.

6. Embrace the HQLA curve: for the bank operating subsidiaries of global banks the HQLA curve is IOER up to the point where Treasuries start yielding more and for their dealer subsidiaries the HQLA curve is the GCF repo curve up to the point where Treasuries held outright start yielding more than Treasuries reversed in.

7. O/n unsecured rates (OBFR) are a soft floor under o/n GCF repo rates. O/n GCF trades are a source of HQLA and because HQLA must be unencumbered at all times, they cannot be funded secured, only unsecured. Primary dealers will never let o/n GCF repo rates settle below OBFR; if they did, funding HQLA reversed in via o/n GCF repos would be a negative carry trade (see Exhibit 6 overleaf).

8. Closely related, for as long as banks are subject to the Liquidity Coverage Ratio and there are more reserves in the system than required by Regulation Q, the FF and OBFR rates will always trade below IOER: as discussed above, IOER is an integral part of banks' HQLA curve and banks will always price o/n funding in a way that makes the funding of an o/n HQLA ("base HQLA") a positive carry trade. The quantity of reserves in the system does not matter much in determining the spread between FF and IOER for as long as there are substantially more reserves in the system than what banks are required to hold for reserve requirements (about $100 billion) and major banks are subject to the Liquidity Coverage Ratio.

[2] All repo rates mentioned on this page refer to o/n tenors and Treasury collateral.

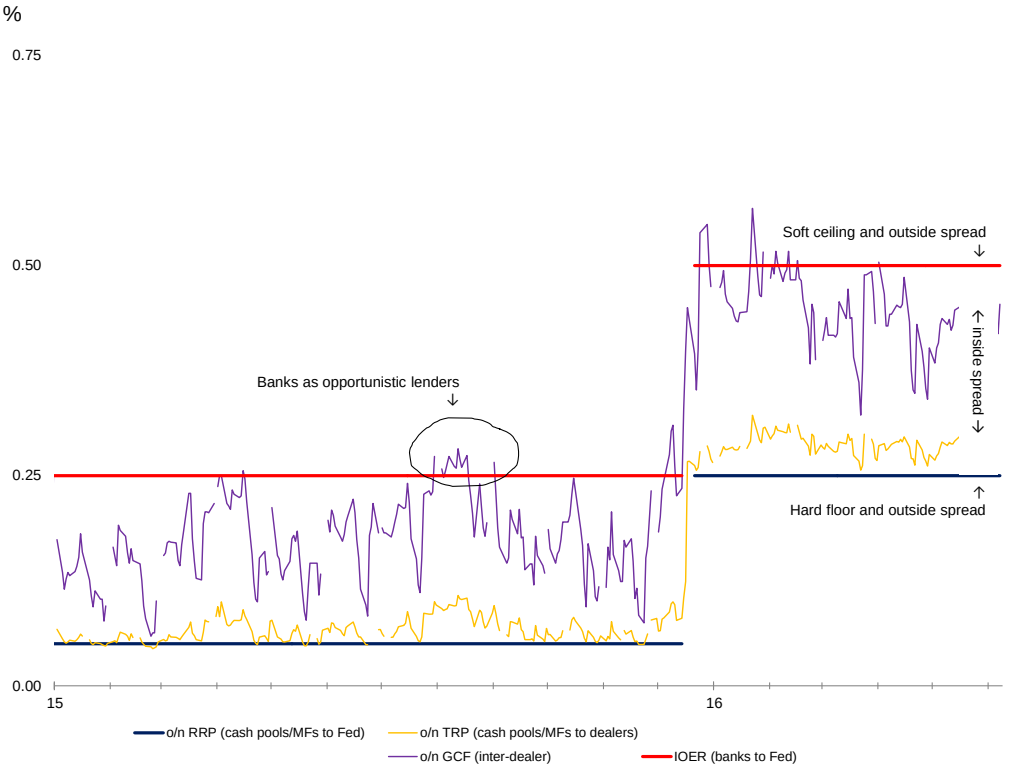
9. The steepness of the unsecured bank funding curve beyond the 30-day point is structural and reflects the price of "freedom": three- and six-month funding have no HQLA requirements and with term funding banks can do anything they please.

10. The Fed's foreign repo pool is most definitely a policy tool. The Fed's repos with foreign central banks and multilateral organizations pre-date the tri-party repo system and are executed on a bilateral basis. They return cash early, at 8:30 AM, in an era when repo trades that settle through the tri-party platform – including o/n RRPs with the Fed – return cash at 3:30 PM. Investors find out the rate they will earn overnight at around 4:00 PM – so late because the Fed needs time to finish its daily survey of where dealers got funded during the day. The rate paid by the foreign repo pool is very close to the o/n GCF repo rate but it is not the same. Our instinct says that it *matches* the volume weighted average rate of o/n GCF repo trades done both bilaterally and on a tri-party basis and which the Fed derives from the above dealer survey. And so the Fed pays a *market* rate. But the fact that the rate on the foreign repo pool matches a market rate and hence does not influence interdealer repo rates does not mean that it does not impact things elsewhere. Since late 2014, the rate paid by the foreign repo pool has been "surfing" the structural widening between o/n GCF and tri-party repo rates and has been consistently yielding more than Treasury bills. Over this period, the foreign repo pool morphed into a superior alternative to bills – *nothing* beats o/n trades with the Fed with an 8:30 cash return yielding more than term bills. As foreign central banks traded out bills and into the foreign repo pool – greased by an apparently secret removal of "the constraints imposed on customers' ability to vary the size of their investments" – the effective supply of Treasury bills increased by $250 billion. And since o/n tri-party Treasury repos, Treasury bills and o/n RRPs with the Fed are substitutes (see point 4 above), $250 billion in extra bills meant $250 billion worth of bids *not* hitting primary dealer's shrinking balance sheets begging for o/n tri-party trades they cannot make, and that much in bids *not* hitting the Fed's o/n RRP facility. If the o/n RRPs facility and Treasury bills are substitutes and the foreign repo pool and Treasury bills are substitutes as well, then the o/n RRP facility and the foreign repo pool are substitutes too. Both facilities are full allotment but one at an administered price and one at a market price, and both facilities are in the business of providing safe, short-term assets in an era where *quantities* matter more than prices.[3] So to reiterate, the foreign repo pool *is* a policy tool. And just like the use of metaphors from physics to describe how FF trades, saying that the foreign repo pool is not a policy tool when in fact it is confuses, rather than illuminates at a time of change. In Exhibit 4 (see Page 7 above) the foreign repo pool is marked by a black dot – an allegory for the foreign repo pool as the system's wandering black hole…

And with all that dig in, and enjoy Money Markets after QE and Basel III…

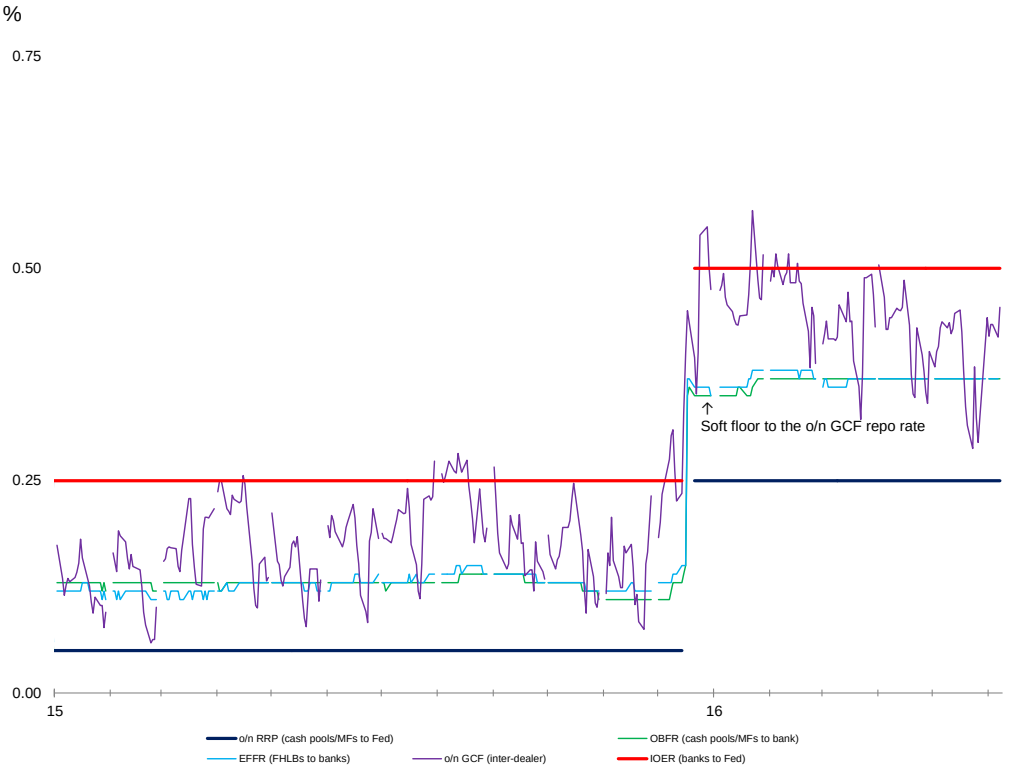
[3] The foreign repo pool is in a league of its own. Central bank facilities are either fixed price, full allotment (where the central bank sets the price and the market determines the quantity) or fixed size, variable price (where the central bank sets the size and the market determines the price). Oddly, the foreign repo pool is neither: its size is full allotment and its rate varies with the market (in fact its rate is the interdealer market rate). It is a gift wrapped in gold: giving an interdealer rate for a segment of cash pools in violation of the hierarchical nature of money markets, where only dealers should earn the interdealer rate and only those private cash pools that are big enough to extract a pound of flesh from primary dealers. The foreign repo pool flattens the hierarchy…

Figure 5: A Target Range for the o/n Secured Rates Complex



Source: Federal Reserve, DTCC, The Bank of New York, Credit Suisse

Figure 6: A Soft Floor for o/n GCF Repo Rates



Source: Federal Reserve, DTCC, Credit Suisse

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