

## Global Money Notes #8

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### From Exorbitant Privilege to Existential Trilemma

We have yet to see what President Trump means for the Fed's independence and monetary policy going forward, but for now our expectation remains that the FOMC will remain willing and free to normalize short-term interest rates.

With that assumption in mind, this issue of *Global Money Notes* explains why an FOMC determined to normalize interest rates has no choice but to become a Dealer of Last Resort in the FX swap market and provide quantitative Eurodollar easing ("QEE") for the rest of the world through its dollar swap lines.

The U.S.'s exorbitant privilege – its ability to borrow in its own currency anywhere in the world thanks to a vast and deep Eurodollar market – is waning.

The first throw of sand at the gears of the global Eurodollar market was the adoption of Basel III which imposed liquidity requirements on a system born out of banks' desire to avoid reserve requirements in the first place (see [here](#)).

The second was money fund reform.

Prime funds' loss of over \$1 trillion in assets under management amounts to the clamping of a major global funding "artery" whose role was to bridge the Eurodollar market's marginal dollar needs. These needs are now bridged through a smaller and increasingly tight "vein" that's the balance sheet of American banks under Basel III. The result is a Eurodollar market that's structurally more expensive and less liquid and dominant than it used to be.

Basel III and money fund reform are turning the exorbitant privilege into an existential trilemma that's usually a problem for EM central banks with pegs to the dollar, rather than the Fed at the center of the dollar-based financial order.

According to the Fed's newfound trilemma, it is impossible to have constraints on bank balance sheets (restraining capital mobility in global money markets), a par exchange rate between onshore dollars and Eurodollars, and a domestically oriented monetary policy mandate. Something will have to give.

It's either the cross-currency basis, the foreign exchange value of the dollar or the hiking cycle. It's either the Fed's regulatory and monetary objectives, or control over the Fed's balance sheet size. It's either quantities or prices...

Cross-currency bases will have to go more negative before the Fed steps in, and -150 bps on the three-month dollar-yen basis is not an unlikely target.

In a way, QEE is the missing piece in a mosaic where the ECB and the BoJ continue on with QE at an aggressive pace, and investors in their jurisdictions are filling their duration gaps with higher-yielding U.S. dollar assets on a hedged basis. But the private provision of FX swaps to hedge these flows can't possibly keep pace with the public creation of euros and yen on massive scale.

Elephant-size €QE and QQE can only be countered by elephant size QEE: the Fed needs to lend banks a hand and provide dollar hedges more cheaply.

It's either Lender of Last Resort or Dealer of Last Resort.

Take your pick...

## Part 1 – Clamping an Artery

Going into the October 14 prime money fund reform deadline, institutional-class prime funds prepared for the worst and hoped for the best – they provisioned for about 70% of assets under management (AuM) leaving and expected that only 50% will leave. But outflows turned out to be far worse than expected – just under 90% of AuM – and so expectations that any margin of safety built into pre-cautionary liquidity buffers will quickly flow back to the CD and CP markets and compress rates post-deadline didn't materialize.

Judging from price action and high-frequency data on foreign banks' CD and CP issuance since May, the bulk of unsecured funding lost to prime money fund reform was replaced mostly through the FX swap market, and to a lesser extent through the term debt market.

With that shift, large American banks and asset managers (corporate bond funds) replaced prime money market funds as the marginal lenders of dollars to foreign banks, and by extension, the outer rim of the U.S. money market (the offshore FX swap market) and capital markets replaced the inner core (the onshore CD and CP market in New York).

Figure 1 shows the price impact of this shift in the FX swap market, and Figure 2 shows where we believe foreign banks' marginal funding curve currently trades: in our view, the orange curves are a more accurate reflection of foreign banks' marginal funding curve for dollars longer than 30-days than the blue U.S. dollar Libor curve. We plotted the orange lines by taking the average of three-month FX-swap implied costs of dollar funding for key currencies and the yields of major foreign banks' one- and two-year fixed rate debt.

Going forward, we expect these markets to be a deeper source of marginal (“just-in-time”) funding than the term CD and CP market. While at \$1 trillion the term CD and CP market remains large, its nature has changed. Pre-reform, prime funds represented a \$1 trillion pool of “omnipresent” liquidity that was sliced and diced according to foreign banks' needs: investors in prime funds rolled their o/n balances everyday which foreign banks could tap in custom terms and size any day – the way a marginal funding market is supposed to trade.

But this omnipresent pool of liquidity is now gone.

What's left is investors with a periodic as opposed to constant presence in the market. With that shift the term CD and CP market became more similar to the real estate market (where trades happen if a buyer wants exactly what a seller has at exactly the same time) than a marginal funding market where pools of liquidity are ready for any trade at any time.

The key question from here is how much money will come back to prime money funds.

If the answer is a lot, then rates could come down as prime funds pour money back into the term CD and CP market. The recent climb in rates will go down in history as cyclical.

If the answer is not much, then funding rates will stay elevated indefinitely. We've reached the “new normal” and the recent climb in rates will go down in history as structural.

Which one will it be?

It looks like the latter, for four reasons: regulatory constraints on generating yield, preference for safety over yield, economies of scale, and the “gravitational” pull of Basel III.

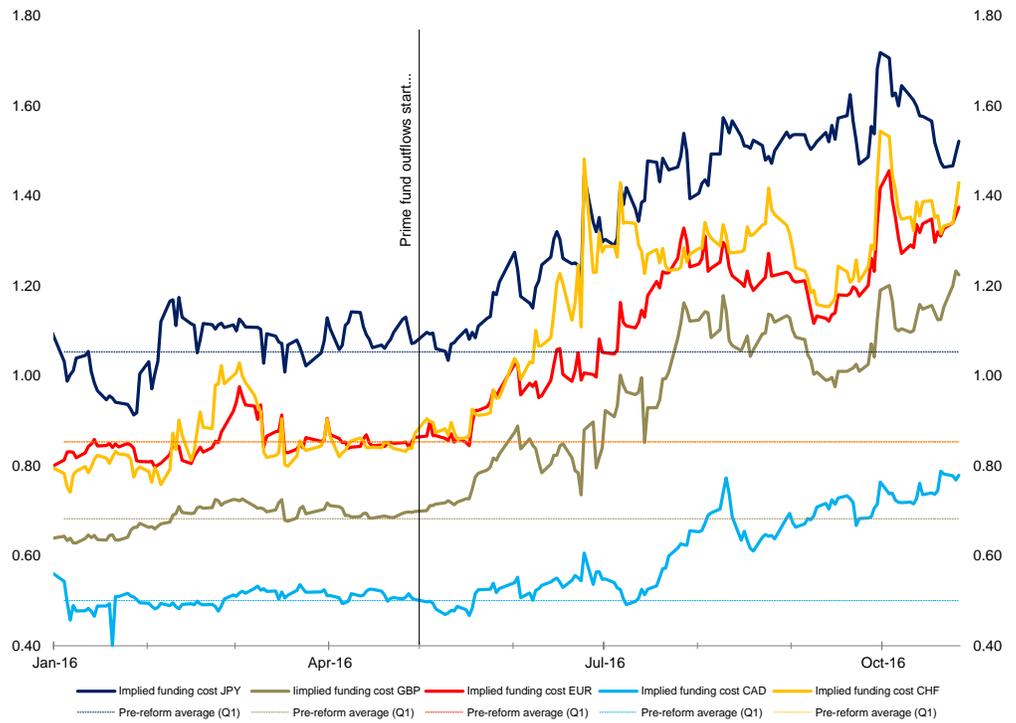
First, the SEC's new liquidity rules will limit prime funds' ability to generate yield to lure money back from government funds. The new rules effectively turn half the portfolio of prime funds into a government fund, which will limit yield spreads over government funds to about a half of their historical average.<sup>1</sup> Whatever spread prime funds will have over government funds, it won't be enough to compensate investors for the risk of liquidity gates.

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<sup>1</sup> The SEC's new rules require prime money funds to hold at least 30% of their AuM in liquid assets such as U.S. Treasuries. But since reaching the 30% minimum would require the imposition of liquidity gates and fees, prime money funds are implementing the new rules with a considerable margin of safety, running their liquidity buffers at close to 50% of their AuM on average.

**Figure 1: Funding at the “Outer Rim”**

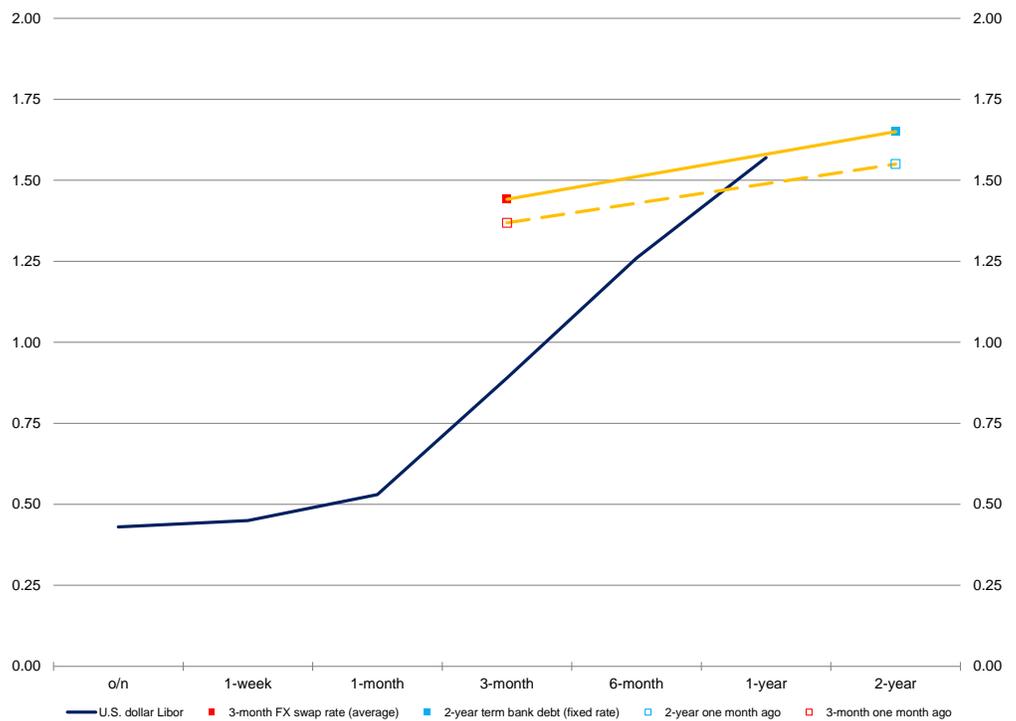
FX swap-implied costs of three-month U.S. dollar funding, %



Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service

**Figure 2: Which is the True Marginal Bank Funding Curve?**

%, as of October 28, 2016 unless otherwise noted



Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service

Second, reforms will also limit treasurers' demand for yield and hence prime money funds. When regulatory reforms are turning prime funds from a liquidity vehicle to a credit vehicle, effectively cutting the system's menu of options for safe, par on demand vehicles from three (demand deposits, government funds and prime funds) to two (demand deposits and government funds), the natural response of investors is to gravitate toward safety (that is government funds), not yield (that is, prime funds). This, combined with prime funds' constraints to generate yield going forward, will severely limit flows back into prime funds.

Third, if there is neither yield pickup, nor reach for yield, the future of what is left of institutional-class prime funds looks rather bleak. Institutional prime funds lost \$800 billion in AuM since 2015, leaving only \$100 billion in assets to look after (see Figure 3). Whether such a small asset-base can support overheads that were scaled to manage trillions, not billions is yet to be seen. Economies of scale matter and are make or break.

Fourth, the future of retail prime funds also looks bleak due to the gravitational pull of Basel III. Retail prime funds lost \$250 billion in AuM since 2015, with only \$250 billion left. Retail deposits are "gold" for large American banks as they require no HQLA and count as NSFR at face value. In an era when banks like Goldman Sachs are paying over 100 bps for checking accounts, funds will continue to migrate out of prime funds paying only 25 bps.

If we are right that prime funds will shrink further from here, the steepening of the Libor curve, the widening of Libor-OIS spreads and the increase in offshore dollar funding costs we have witnessed to date are all structural, not cyclical. At best we are looking at funding markets to stabilize at current levels, and at worst we are looking for the curve to steepen, spreads to widen and cross-currency bases to sink much deeper into negative territory as prime money market funds fail to attract cash back and continue to bleed assets over time.

The end-state of the system is one where foreign banks raise their marginal dollars mostly in the FX swap market (from American banks) or the capital market (from asset managers).

The end-state is dominated by American banks because post-reform, they are the only ones left with access to cheap retail dollars onshore to lend offshore via FX swaps – all foreign banks that used to lend via FX swaps raised dollars wholesale from prime funds (for a review of the impact of money fund reform on the FX swap market see [Appendix 1](#)).

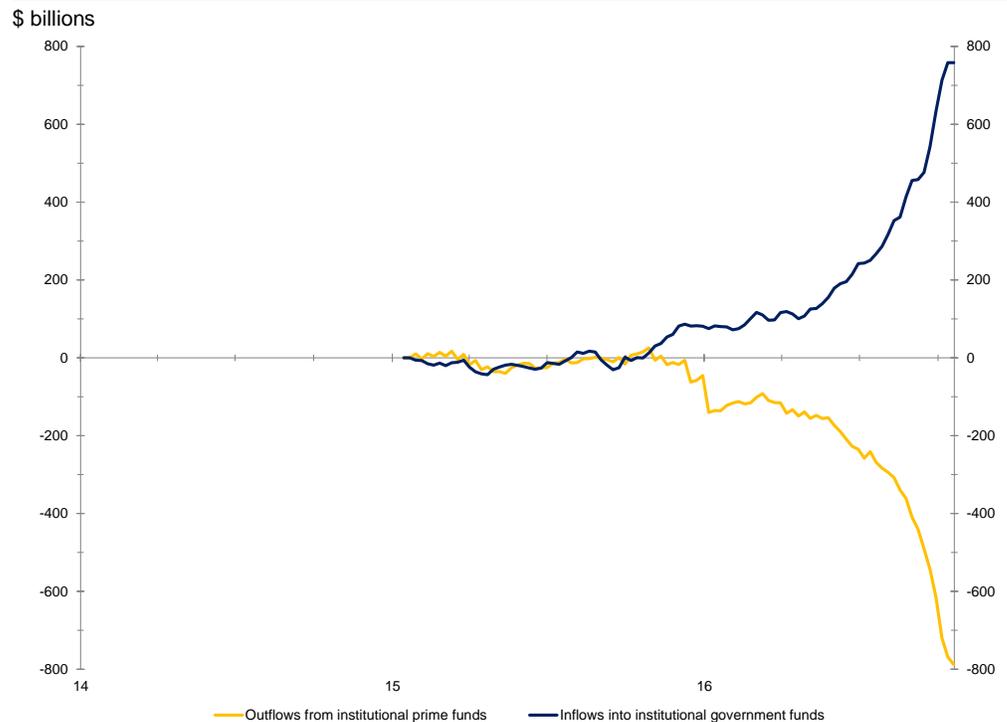
As large American banks grow to dominate the FX swap market, they will inevitably become the marginal price setters in the system. Going forward, the key questions from a pricing perspective will be how American banks' growing FX swap books will push up against their balance sheet constraints: (1) how much balance sheet they will have to onboard these trades from an SLR perspective; (2) what will these trades do to their LCR; (3) what will the looming requirement to currency-match HQLA portfolios mean for their appetite to do these trades; and (4) will the Volcker Rule let them run speculative books?

None of these constraints mean anything good for the marginal cost of Eurodollar funding going forward, which means that what's referred to as a "global dollar shortage" is bound to get worse in the future. But in light of the points raised above, none of this is about a shortage of dollars *per se*, but rather a shortage of balance sheet to intermediate dollars (please, let's forget the whole "shortage versus scarcity" debate and call a spade a spade).

Effectively, what we have here is a case where money fund reform amounts to the clamping of a major global funding "artery" and a redirection of flows through a smaller and increasingly tight "vein" that is the balance sheet of American global banks under Basel III.

For a sense of scale, consider that over \$1 trillion has left prime funds. Now consider the image of American banks absorbing these flows through hamstrung balance sheets...

...what you see is an elephant inside a snake (see Figure 4), and a global dollar funding market structurally more expensive and less liquid and dominant than it used to be.

**Figure 3: Tectonic Shifts**

Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service

## Part 2 – QEE and the Fed as Dealer of Last Resort

What does all this mean for the Fed?

Quite a lot, which makes the fact that no Fed official devoted a speech to the topic of prime money fund reform and its local and global repercussions puzzling to say the least.

First, the local repercussions.

Prime money fund reform just made the [ARRC](#)'s quest for an alternative reference rate more difficult and will increase the allure of a repo rate as an alternative (see [here](#)). Outflows from prime funds to date have reduced the volume of o/n Eurodollar trades from \$250 billion to \$90 billion today (see Figure 5).<sup>2</sup> By the time the dust of reform will settle, the OBFR will have lost most of its volume advantage over the fed funds rate, in our view.

Next, the global repercussions.

The message that emerged from the previous section is that the era of cheap marginal flows into the Eurodollar market are over. Tapping the CD and CP markets via prime funds is a thing of the past and the future likely belongs to American global banks that are set to become the dominant price-setters of the marginal dollars the rest of the world needs. The key to figuring out where cross currency bases will settle is to figure out the interaction between American banks' growing [FX swap books](#) and their [balance sheet constraints](#).

The more dollars American banks will intermediate through the FX swap market, the less balance sheet they will have left over for everything else, and the higher the price of the marginal FX trade will have to be. Standard logics of arbitrage do not hold under Basel III: with balance sheets no longer unlimited, the more you arb the higher the marginal price.<sup>3</sup>

<sup>2</sup> This is because institutional-class prime money funds were the single biggest lenders of o/n Eurodollars in the Caribbean-based segment of the Eurodollar market as measured by the Federal Reserve's new overnight bank funding rate (OBFR).

<sup>3</sup> Banks arbitrage differences between onshore and offshore funding rates by borrowing onshore in the CD and CP market from prime money funds and lending the proceeds in the FX swap market. Such arbitrage trades inflate banks' balance sheets.

Either way we look at it, cross-currency bases are bound to get more negative, with no private mechanism in place to check three-month points from sinking as low as -150 bps.

The limit to this will be the extent to which the rest of the world will be able to cope with higher dollar funding costs and how these will feed back to the Fed's reaction function.

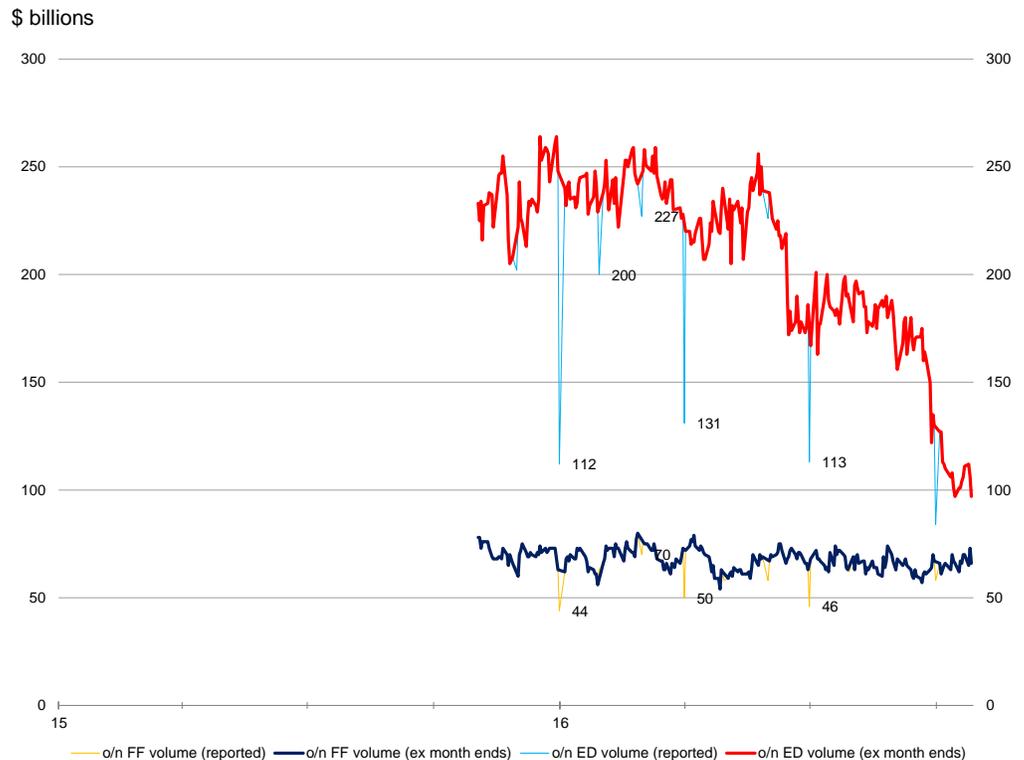
There are at least three feedback channels.

First, an ongoing increase in the FX swap-implied cost of dollar funding and increasingly negative cross-currency bases mean tighter financial conditions for the rest of the world. In turn, tighter financial conditions point to slower, not faster global growth as foreign banks pass on higher costs to their customers or worse: de-lever their books. These dynamics are disinflationary on the margin and don't help interest rate normalization back in the U.S.

Second, increasingly negative cross-currency bases mean rising hedging costs for foreign investors on their U.S. dollar assets, which force them out the duration curve and down the credit spectrum. In turn, this tends to ease financial conditions, raise financial stability risks, and also blunt the traditional channels of monetary policy transmission back in the U.S. Chairman Greenspan's conundrum is back and spreading to mortgage and credit curves.

Third, everything described above goes hand-in-hand with a further strengthening of the dollar (see Figure 6) – this is because increasing hedging costs are prompting foreign investors to reduce their hedge ratios or take on naked exposures, both of which tend to drive the appreciation of the dollar. If the Fed leaves the intermediation of all of the rest of the world's marginal dollar needs to American banks' constrained balance sheets, offshore financial conditions may tighten and the dollar may strengthen to the point where they are no longer consistent with the path the Fed envisioned for the funds rate (see [Shin, 2016](#)): rounds of RMB devaluation would follow which also won't help interest rate normalization.

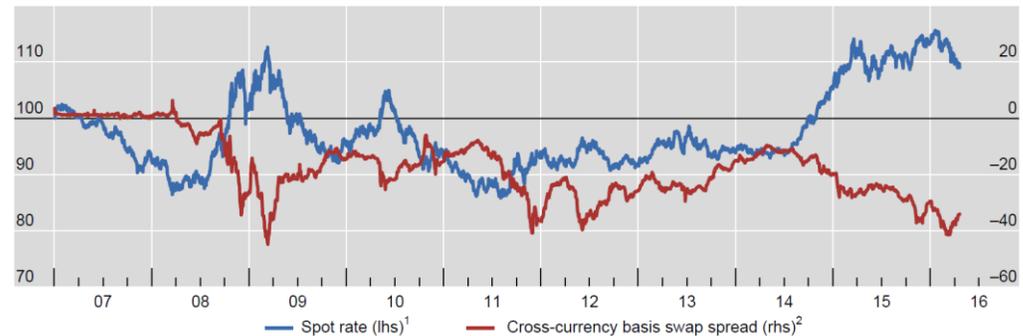
**Figure 5: It's Back to the Drawing Board for the ARRC...**



Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service

### Figure 6: The Cross-Currency Basis and the U.S. Dollar

January 2<sup>nd</sup>, 2007 = 100 (LHS), basis points (RHS)



<sup>1</sup> Simple average of bilateral exchange rate of the dollar against CAD, EUR, GBP, SEK, CHF and JPY. Higher values indicate a stronger US dollar. <sup>2</sup> Simple average of the five-year cross-currency basis swaps against CAD, EUR, GBP, SEK, CHF and JPY vis-à-vis the US dollar.

Source: BIS

It seems like balance sheet constraints are in conflict with monetary policy objectives...

Balance sheet constraints are driving prices in a way where financial conditions abroad are tighter than financial conditions in the U.S. Where borrowing a Eurodollar is more expensive than borrowing an onshore dollar. The feedback of this on the U.S. dollar and financial stability risks are making interest rate hikes less possible and also less effective.

What to do?

In this environment, the only bank that could counter the tendency of cross-currency bases to sink deeper and deeper into negative territory is none other than the New York Fed.

It could do so by scrapping its philosophy that it should primarily serve the system as a Lender of Last Resort – providing a liquidity backstop when no one wants to lend – and become a Dealer of Last Resort – providing a backstop to prices when dealers hit their balance sheet constraints and have no room left to make markets at reasonable spreads.

The tool to use is the Fed's dollar swap lines but the aim would no longer be to backstop funding markets, but to police the range within which various cross currency bases trade.

Just as the reasons why various cross currency bases spiked during 2008 and 2011 (credit and sovereign risks) were different from the reasons why they have been widening since 2014 (Basel III and money fund reform), the mindset with which the dollar swap lines should be deployed today should also be different – not to provide a liquidity backstop because prime funds won't lend to banks, but to provide a balance sheet backstop because private market makers are pushing up against their balance sheet constraints, and are giving quotes that are strengthening the dollar and forcing the Fed to stay on hold.

Of course, if the Fed were to switch from treating the swap lines as a funding backstop to a pricing backstop, its attitude toward being tapped would have to be relaxed. In English, this means that long held notions of stigma would have to be expunged from the market's conscience and everyone would have to adopt a mindset where if banks' quotes are more expensive than the quotes of the Fed, everyone would default to trading with the Fed with no further thought, period – much like the ECB's repo facilities are routinely tapped.

Will this really happen?

It's not unlikely. We know from the July FOMC minutes that the Fed is actively looking into "approaches to reducing perceived stigma associated with borrowing at the discount window" and is conscious that "the dollar is the principal reserve currency and that monetary transmission in the U.S. occurs through globally connected funding markets".

The Fed's ongoing review of its Long-Run Monetary Policy Implementation Framework (to be published in January) may conclude the Fed should become a Dealer of Last Resort and be willing to make markets once spreads hit certain levels (the "outside" spread). Not doing so would have unwanted feedbacks on the dollar, the RMB's peg to the dollar, and the Fed's ability to raise rates. Were the Fed to turn into a Dealer of Last Resort, it would give up control over its balance sheet and so should charge more for the dollar swap lines.

Recognize that the theme we've been emphasizing about the U.S. money market (see [here](#)) – that the sovereign has effectively crowded out private banks in money markets onshore<sup>4</sup> – is also inevitable in money markets offshore. The Eurodollar market is a private system and the historically tight relationship between onshore and offshore funding curves implied a "par exchange rate" between onshore dollars and Eurodollars – OIS, Libor and FX swap curves were all on top of each other. The widening spreads between Libor and OIS, and Libor and FX swap-implied dollar funding rates (that is, the cross-currency basis) reflect a structural breakdown of the par exchange rate between onshore dollars and Eurodollars – just as the crisis of 2008 marked a similar breakdown. But 2008 was a panic. It was temporary. Today is structural. It feels more persistent than temporary. It is driven by balance sheet constraints due to Basel III which limit American banks' ability to serve as private dealers of dollars from onshore to offshore. It also means that a dollar abroad is more expensive than a dollar at home, which will continue to push the spot value of the dollar higher and higher unless the Fed decides to give up control over its balance sheet and ease the shortage of offshore dollars by becoming a public dealer of Eurodollars.

Regulatory reforms turned the exorbitant privilege into an existential trilemma typically associated with emerging market economies with fixed exchange rates to the U.S. dollar.

According to the impossible trinity of yore it is only possible to have two of three goals: free capital mobility, a fixed FX rate and monetary policy oriented toward domestic goals.

The Fed now faces the impossible trinity in a new form: it's impossible to have constraints on bank balance sheets (restraining free capital mobility in global money markets), a par exchange rate between onshore and offshore dollars across the term structure, and a monetary policy oriented toward domestic goals. Either way, something will have to give:

- (1) Reforms – the domain of Governor Tarullo – are limiting balance sheet quantities and driving a wedge between the price of onshore and offshore dollars as evident in more negative cross-currency bases. This contributes to the dollar's strength.
- (2) Monetary policy independence – the domain of Chair Yellen – is under threat, as a stronger dollar increases the chance of further RMB devaluation by the PBoC. The deflationary risks inherent in RMB devaluation limit the Fed's ability to hike.
- (3) Quantitative Eurodollar easing ("QEE") for the rest of the world is the solution, which is President Dudley's domain. If the increasing cost of Eurodollars is what's driving the appreciation of the dollar, and the appreciation of the dollar is what stands in the way of the Fed's hiking cycle, it appears that the right thing to do is to break the impasse and give the rest of the world what it needs through the swap lines so as to relieve the pressure on the dollar so that the FOMC can hike.

It's either quantities or prices...

Monetary policy divergence is not a new phenomenon – we've seen it in the past. But in the past, unconstrained balance sheets ensured that cross currency bases were minimal (or in other words, deviations from covered interest parity weren't large or persistent).

<sup>4</sup> Look no further than the demise of prime funds and rise of government-only funds, the increased volume of bills issued by the U.S. Treasury, the increased volume of floaters issued by the FHLBs and the increased size of the Fed's foreign repo pool and o/n RRP facility as counterparts to less short-term funding raised by banks and primary dealers' diminished repo books.

Under the old regime, the focus was on prices and tight spreads – or in the present context a “par exchange rate” between onshore and offshore dollar funding curves. Quantities (balance sheet) were endless, and the volume of matched money market books that accumulated through global banks’ money dealing activities – borrowing in onshore segments of the money market in order to lend offshore – were massive indeed. No longer.

Basel III restricting quantities and money fund reform clamping a main funding artery is turning the Fed’s world on its head. Quantity constraints will have to be relaxed if the Fed wants to have monetary independence and parity between onshore and offshore dollars.

Barring the scrapping of Basel III or the blanket exemption of reserves from the SLR, quantitative Eurodollar easing (“QEE”) for the world – the fixed-price, full-allotment broadcast of Eurodollars globally through the dollar swap lines – is the solution we need.

In a way, QEE is the missing piece in a mosaic where the ECB and BoJ continue with QE and investors in their jurisdictions are looking to fill their duration gaps with higher-yielding dollar assets on a hedged basis. But the private provision of FX swaps to hedge these flows cannot possibly keep pace with the public creation of euros and yen on mass scale.

## Conclusions

Elephant-size €QEs and QEs can only be countered by elephant-size QEEs by the Fed: the Fed needs to lend banks a hand and provide Eurodollars more cheaply to the world...

It’s either regulatory and monetary objectives or the Fed’s balance sheet size.

It’s either the cross-currency basis, the dollar or the next hike.

It’s either Lender of Last Resort or Dealer of Last Resort.

Take your pick...

## Appendix 1 – Pricing at the Outer Rim

Figure A-1 lists the four steps involved in foreign banks' and investors' use of FX swaps. It also demonstrates the example of a firm borrowing euros to arbitrage funding costs. All three cases are examples of market participants borrowing dollars via FX swaps.

Figure A-2 aims to explain how two of these borrowers (banks and real money accounts) link up with the suppliers of dollars via FX swaps, using the dollar-yen basis as an example.

On the demand side we have real money accounts such as insurance companies and pension funds with a need to hedge dollar investments (motivated by search for yield), and banks with a need to fund dollar loans (search for lending opportunities outside of Japan).

On the supply side, we have prime money funds that lend dollars onshore (in New York to the New York branches of Japanese banks which then "forward" those dollars to Tokyo) and institutional cash pools that lend dollars offshore (from New York or anywhere in the world to Tokyo). Institutional cash pools include FX reserve managers like the RBA (see page 44 of their latest [annual report](#) for a sense of their size in the FX swap market), multilateral accounts like the IMF or the World Bank, asset managers and hedge funds.

Structurally, these four groups of players line up such that Japanese real money accounts only have access to the FX swap market for dollars, but not the cheaper CD and CP market where money funds lend. Japanese banks have access to both sources, but they historically opted for the latter as CD and CP funding is typically cheaper than FX swaps.

On the lending side, regulations allowed prime funds to lend only in CD and CP markets but not the FX swap market, and institutional cash pools were free to lend wherever. Free to be, they historically opted for FX swaps as swaps paid better than CD and CP. Not doing so would have been like not picking up €500 bills from the pavement day after day.

Those who could borrow dollars only through FX swaps (real money accounts) and those who chose to lend dollars only through FX swaps (institutional cash pools) "met" through the matched books of market makers – global banks active in the FX swap market.

No market is ever balanced, however, and market makers' job is to smooth temporary imbalances in order flows through their speculative books. Demand for dollars in Tokyo has been persistently stronger than the supply of dollars from cash pools, and global banks bridged this structural dollar shortage by tapping markets onshore to lend offshore. It is here – in the speculative books – where the price of the marginal FX swap trade is set.

Figure A-3 builds on Figure A-2 by adding the typical tenors that each participant trades in.

Japanese real money accounts borrow at the three-month point of the FX swap market (to hedge quarterly coupon flows), and banks borrow in the three-month CD and CP market from prime funds to minimize their HQLA funding costs while staying LCR compliant.

Institutional cash pools typically lend at the richest point of the FX forward curve, which, given the hedging needs of real money accounts and banks, is the three-month point. Correspondingly, market makers' books are dominated by matching three-month swaps.

Imbalances in order flows also involve mostly three-month FX swaps. Global banks fund these speculative long positions with funding that is structurally cheaper to raise. For non-American global banks these come from prime funds at tenors shorter than 30-days.

But for American global banks these funds are essentially for "free" – they have endless amounts of retail deposits at their disposal, and if they need to raise funds elsewhere, the FHLBs are there to offer one-week or one-month money at 55 and 60 bps, respectively.

Given these structural funding relationships, Figure A-4 demonstrates what the demise of prime money funds means for the balance of pricing power in the system going forward.

First, it means that Japanese banks (and banks from other jurisdictions as well) will lose access to cheap onshore dollars via CD and CP and will replace them with FX swaps.

Second, just as Japanese banks will be shifting toward FX swaps for funding, the size of non-American speculative books in the market will be shrinking. This is because the cheap source of CD and CP funding from prime funds to non-American global banks that are active arbitrageurs of the difference between offshore and onshore rates will be gone.

Enter the American bank, which, as noted above, has a funding advantage over everyone else and hence is uniquely positioned to dominate the FX swap market going forward.

As large American banks grow to dominate the FX swap market, they will inevitably become the marginal price setters in the system. The key questions from a pricing perspective will be how an increased volume of speculative FX swaps positions will interact with American banks' regulatory constraints – how much balance sheet will they have to onboard these trades from an SLR perspective; what will these trades do to their LCR; what will the looming requirement to currency-match HQLA portfolios mean for their overall appetite to do these trades; will the Volcker Rule let them run speculative books?

Figure out these questions and you will find the 'keys to the kingdom'. And remember this: under Basel III, the more dollars American banks intermediate via FX swaps, the less balance sheet they will have left over for everything else, and the higher the price of the marginal FX trade will have to be. Standard logics of arbitrage do not hold under Basel III: with balance sheets no longer unlimited, the more you arb the higher the marginal price.<sup>5</sup>

Either way we look at it, cross-currency bases are bound to get more negative, with no private mechanism in place to check three-month points from sinking as low as -150 bps.

The limit to this will be the extent to which the rest of the world will be able to cope with higher dollar funding costs and how these costs will feed back to the Fed's reaction function

In this environment, the only bank that can counter the tendency of cross-currency bases to sink deeper and deeper into negative territory is none other than FRBNY (see above).

Other than money fund reform in the U.S., there are at least three risks on the horizon which point to a further increase in American banks' dominance in the FX swap market.

First, money fund reform in the EU. Investors should know that about half of money funds in the EU are U.S. dollar-denominated. If the EU reforms follow the spirit of U.S. reforms, we can expect a further steepening of the U.S. dollar Libor curve, a further migration of funding from Eurodollar CD and CP markets to FX swaps, a further reduction in funding for non-American global banks for arbitrage, and more on the plate of American global banks. If institutional-class prime outflows were the first wave to push the Libor curve steeper and cross-currency bases more negative, and retail-class prime fund outflows are the second, then EU money fund reform will be the third. We should forget about Libor normalization...

Second, shortages of JGB bills are making it increasingly difficult for hedge funds and asset managers to find assets to invest yen collateral when lending dollars via FX swaps. This will naturally impede the volume of FX swaps intermediated through matched books, and will pressure large American banks to increase their speculative books further. This will exacerbate balance sheet pressures and push cross-currency bases more negative (note that unlike hedge funds and asset managers, large American banks can deposit yen at the BoJ via their Tokyo branches and so aren't limited by the shortage of JGB bills).

Third, the reform of the U.S. corporate tax code and the potential re-patriation of hundreds of billions of cash currently parked abroad. These offshore cash balances form an integral part of the funding base of Eurodollar loan books across the globe. Were these cash balances to flow back into the U.S., then even more of the funding of Eurodollar assets would have to come from large American banks through FX swaps. The impact of this on cross-currency bases would make money fund reform look like baby stuff (see Figure A-5).

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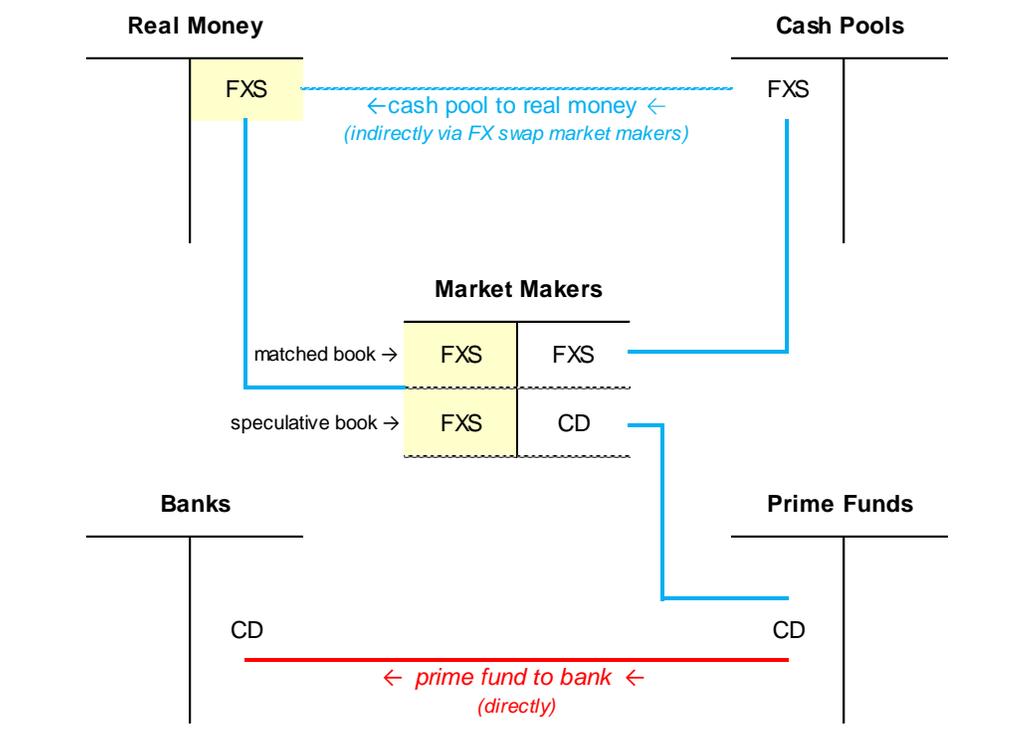
<sup>5</sup> Banks arbitrage differences between onshore and offshore funding rates by borrowing onshore in the CD and CP market from prime money funds and lending the proceeds in the FX swap market. Such arbitrage trades inflate banks' balance sheets.

Figure A-1: FX Swap Uses

	Japanese Bank (dollar funding)	Real Money (dollar hedges)	Corporations (bargain hunting)	
[1] Fund in ¥.  Time: t (spot)	¥ (cash)   ¥ (deposit)	¥ (cash)   ¥ (alpha)	€ (cash)   € (bond)	Time: t (spot) Fund in €. [1]
[2] Exchange ¥ for \$ spot (buy \$). (currency risk)  Time: t (spot)	<del>¥ (cash)</del>   ¥ (deposit) \$ (cash)	<del>¥ (cash)</del>   ¥ (alpha) \$ (cash)	<del>€ (cash)</del>   € (bond) \$ (cash)	Time: t (spot) Exchange € for \$ spot (buy \$). [2] (currency risk)
[3] Spend \$ on U.S. dollar assets. (currency, duration and credit risk)  Time: t (spot)	<del>¥ (cash)</del>   ¥ (deposit) \$ (loan)	<del>¥ (cash)</del>   ¥ (alpha) \$ (bond)	<del>€ (cash)</del>   € (bond) \$ (spend)	Time: t (spot) Spend \$ on dividends paid or whatever [3] (currency risk)
[4] Hedge by selling \$ from quarterly interest flow s forward for ¥ at today's forward FX rate. (duration and credit risk, no more FX risk)  Time: t + 90 days (FW)	spot FW <del>¥ (loan)</del>   ¥ (deposit) ¥ (buy FW)   \$ (sell FW)	spot FW <del>¥ (cash)</del>   ¥ (alpha) \$ (bond) ¥ (buy FW)   \$ (sell FW)	spot FW <del>€ (cash)</del>   € (bond) \$ (spend) € (buy FW)   \$ (sell FW)	Time: t + 90 days (FW) Hedge by selling \$ from cash inflows from sales [4] forward for € at today's forward FX rate.
Net Cash Flows:  Time: t (spot)  Time: t + 90 days (FW)	spot FW \$ (loan)   ¥ (deposit) ¥ (buy FW)   \$ (sell FW) ↓	spot FW \$ (bond)   ¥ (alpha) ¥ (buy FW)   \$ (sell FW) ↓	spot FW \$ (revenues)   € (bond) € (buy FW)   \$ (sell FW) ↓	Time: t (spot)  Time: t + 90 days (FW)  Use ¥ to pay back original ¥ deposit if it is not rolled over. Use ¥ to pay a return in ¥ to Japanese pensioners. Use € to service debt denominated in €.

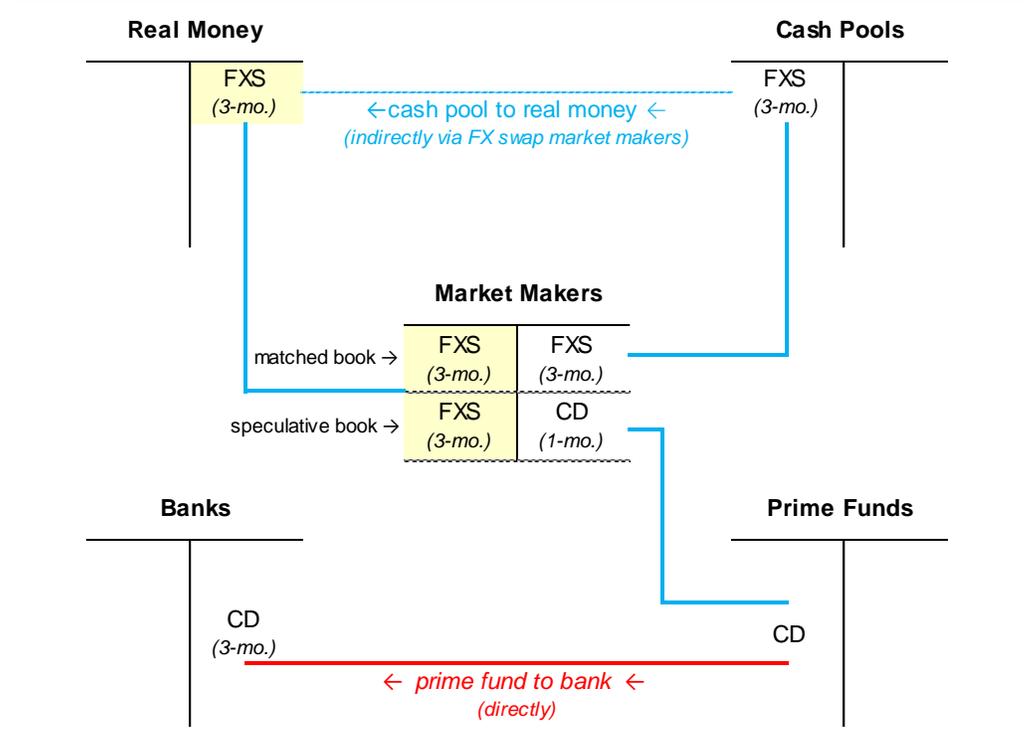
Source: Credit Suisse

**Figure A-2: FX Swap Links**



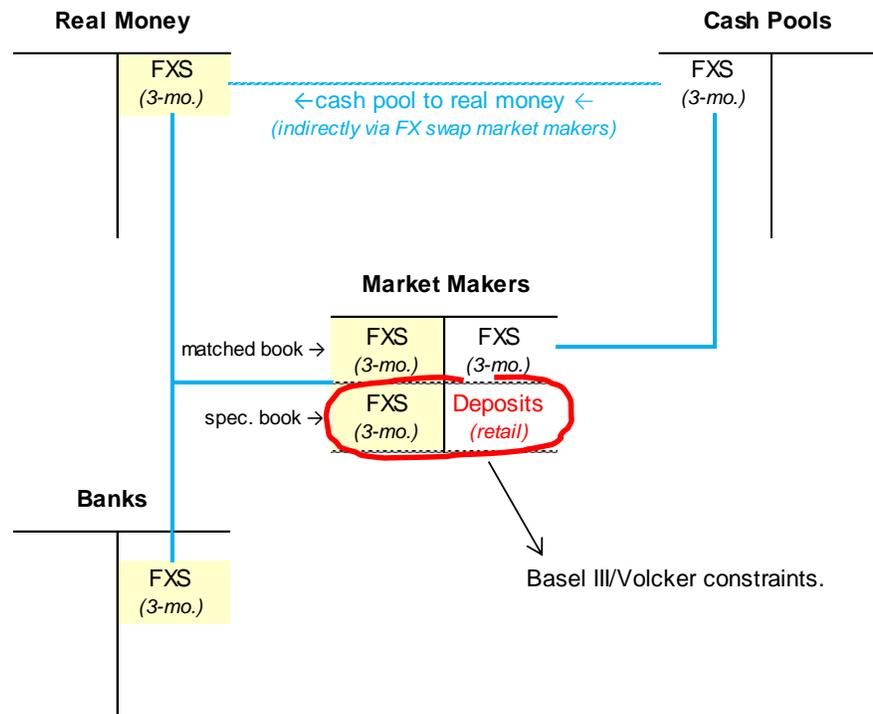
Source: Credit Suisse

**Figure A-3: FX Swap Terms**



Source: Credit Suisse

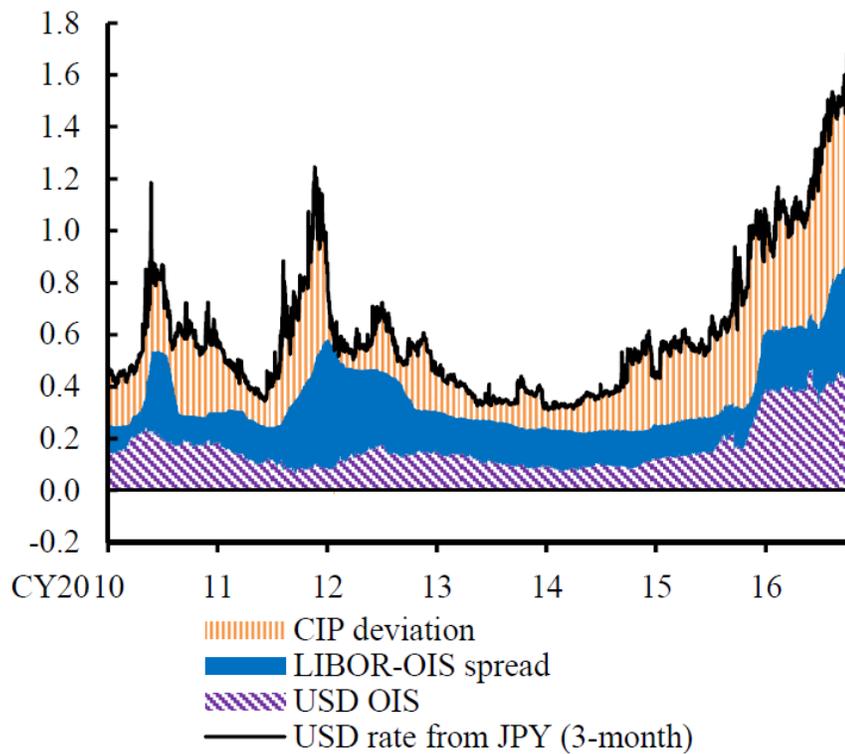
**Figure A-4: FX Swaps without Prime Money Funds**



Source: Credit Suisse

**Figure A-5: Another Trillion, Another Percentage Point...**

Three-month FX-swap implied cost of dollar funding for yen-based borrowers, %



Source: Bank of Japan

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