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Covid-19 and Global Dollar Funding

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Today's liquidity conditions are like the waters receding before a giant wave.

The coronavirus outbreak and the shock that preventative measures introduced to manufacturing and services activity will lead to missed payments globally. Missed payments will force more and more firms to become deficit agents; as this cascades, banks and regional banking systems will become deficit agents.

Our main concern is about missed payments of U.S. dollars globally, as local central banks can deal with missed payments in local currency fairly easily.

Dollar funding is always the orphaned child of crises as the regions where the pressures flare up have no control over it and the Fed, uncomfortable with the reality of it being the *de facto* central bank of the world, takes time to step in…

…not necessarily in terms of rate cuts, but in terms of adding liquidity.

The safety net around the financial system has been enhanced since the GFC: FX reserves are plentiful, global banks have liquidity buffers and the standing FX swap lines are there to add liquidity. But FX reserves need to be monetized, the outbreak may reveal some design problems of Basel III, and FX swap lines are not for everyone. A lot can go wrong with the system's immune system…

In this issue of Global Money Notes, we present a framework to help macro traders think through how a crisis could spread through dollar funding markets, and what central banks can do to calm funding stresses: peripheral and core cross-currency bases are set to widen first, followed by Libor-OIS spreads…

…to at least 60 bps by June, if the outbreak worsens.

The biggest risk we see to the plumbing is the Fed cutting rates aggressively, without pledging an open-ended liquidity support through its balance sheet: due to the inversion, money funds have seen $600 billion of inflows last year, most of which went to fund dealers' and hedge funds holdings of Treasuries. Aggressive rate cuts could send those funds back to the bond market, just when the funds are needed in the money market due to missed payments.

According to ancient Andaman folklore, when you see the waters disappear, move inland and get to the highest point you can find, away from the shoreline. As banks hoard the highest form of liquidity – reserves – the periphery will come knocking for liquidity. Now's not the time to end QE. It's time to lean in…

Our flagship publications – Global Cycle Notes and Global Money Notes – are related. Global Cycle Notes tracks the global industrial production (IP) cycle due to its strong correlations with a wide range of financial variables including equity markets, bond yields, monetary policy decisions and commodity prices. Global Money Notes tracks the events that influence global funding spreads as funding spreads can have a strong influence on the same set of financial variables. Normally, the global IP cycle and funding spreads dance to different tunes and their impacts on asset prices can offset or amplify each other.

The coronavirus outbreak and the shock that preventative measures introduced to the global IP cycle and services activity mark a rare occasion when our two publications meet.

The supply chain is a payment chain in reverse…

…and so an abrupt halt in production can quickly lead to missed payments elsewhere.

Consider the difference between "value added" and "output" as measures of activity. Value added reflects a firm's output minus its inputs, or simply the sum of its profits and labor costs. Output reflects its total sales (revenues), and so are a measure of payments. So, output at the end of a supply chain is the sum of everyone's sales. Figure 1 shows the ratio of output to value added in manufacturing and services for the U.S. and China: the ratios for manufacturing are much higher than they are for services; and for China this is more extreme than the United States. China represents about 30% of global value added in manufacturing, but its share of payments, along the global manufacturing supply chain, is much bigger. This implies that a sharp shock to Chinese manufacturing will have a disproportionate impact on payments in the global goods sector, so a sharp IP shock is therefore a potential risk for widespread financial distress and missed payments globally.

The question is how much financial damage is done by the current IP shock and the fact that it coincides with a shock in services – a sector which is seldom volatile or cyclical.

Missed payments in manufacturing are one thing.

Missed payments in manufacturing and services at the same time are another.

On the following pages, we lay out a framework to help macro traders think about the possible impact of the outbreak on funding markets. When sketching such frameworks, it is helpful to describe how bad things can get and how central banks can calm markets.

Our focus is on global dollar funding markets, as we assume that local central banks can deal with local funding pressures deftly, which we already saw in the case of the PBoC.

In the case of dollar funding, the buck always stops with the Fed. But before pressures reach the Fed, the FX swap, Eurodollar and repo markets will exhibit some signs of stress.

Dollar funding is always the orphaned child of crises as the regions where the pressures flare up have no control over it, and the Fed, uncomfortable with the reality of it being the *de facto* central bank of the world, always takes its time to step in to ease the pressures until it's absolutely necessary. The time between the initial flare-up of stresses and the Fed's ultimate response is STIR traders' window of opportunity to harvest funding market dislocations. This issue of Global Money Notes presents some indicators to time the onset of stresses and identifies potential weak links in funding markets in some corners of Asia.

Part one describes our approach to thinking about funding pressures due to the outbreak, and why the initial impulse from the outbreak on funding is positive. Part two describes how missed payments will cause more firms to deplete their dollar deposits over time. Part three describes some cyclical and structural dampeners that help banks manage the drawdown of corporate deposits. Part four describes how interbank markets can be overwhelmed by deposit drawdowns and what central banks can do to alleviate pressures.

Part I – The Elephant in the Dark

Trying to figure out the funding market impact of the outbreak is difficult, as there are no real time macro data on things like trade finance, shipping finance, commodity finance, and it's hard to say how fast firms are going from running positive to negative dollar deposits at banks as missed payments accumulate, and how fast these deposit flows are pushing individual banks and regional banking systems from dollar surpluses to dollar deficits.

The last time we had to get a feel for the shape of potentially bad things to come was just ten years ago as a trader/analyst at the New York Fed and a strategist at Credit Suisse, respectively. One of us mapped the shadow banking system (see here) and the other wrote about the central role collateral played in the shadow banking system (see here).

There was no map of the shadow banking system – we had to imagine it and map it. There were no data about collateral – we had to collect it anecdotally to write about it.

This is another time to imagine…

Our deep-dive to dissect the potential funding market impact of the outbreak had a difficult start. The issue wasn't as much a lack of data, but rather conflicting color we've received from talking to various bank treasurers in Hong Kong, Singapore and Tokyo in recent weeks. Some banks saw rapid drawdowns of dollar balances by corporations and regional banks, while other banks saw positive dollar balances due to a fall in demand for trade finance, shipping finance and commodity finance. Initially that confused us, but upon further reflection, we found the conflicting color illuminating: every bank runs on double entry bookkeeping and it is natural that deficits at some banks show up as surpluses at other banks – the very role of interbank markets is to clear those imbalances.

The very fact that anecdotes are divergent tells us that some corporations are becoming deficit agents – that is, entities that are losing dollar deposits and will soon borrow dollars.

Conceptually, visualize a tilted J-curve when thinking about the funding impact of the outbreak over time. The initial funding impact is positive due to a dropoff in demand for funding related to the sourcing and movement of commodities and intermediate goods, but over time, missed payments due to a prolonged halt in manufacturing and services will start to dominate and the funding impact of the outbreak will flip from positive to negative.

The initial positive funding impact comes from three sources:

(1) Less demand for commodity finance, as commodities are not in demand and don't need to be mined and moved around (less demand for oil, coal and copper).

(2) Less demand for trade finance as factories remain shut across China and there is no demand for intermediate goods (see our latest Global Cycle Notes here).

(3) Less demand for shipping finance as new commodities and intermediate goods are not being sourced and because final goods are not being shipped.

Data on these financing activities are scarce, but a BIS report on trade finance from 2014 provides some contours: Figure 2 shows that trade finance is much bigger than commodity finance or shipping finance and is heavily reliant on banks, particularly in Asia.

When demand for trade and other financing falls, banks' funding needs naturally fall too, and as some funding that banks already raised to pre-fund customers' anticipated funding needs go unused, banks' liquidity portfolios get a temporary boost as well, which amplifies the initial positive funding impact. But this positive funding impulse is only temporary, and we are probably nearing the end of the initial grace period for global dollar funding.

Funding pressures will likely increase from here as missed payments accumulate and fixed costs drain dollar balances, forcing more firms to become deficit agents over time.

Part II – Contagion through Deficit Agents

Debt is agnostic to your circumstances – it must be serviced, otherwise you are bankrupt.

Factory closures and an abrupt halt in the assembly and shipment of final goods and quarantined metropolises therefore matter for firms as debts must be serviced regardless, and if dollars don't flow in from sales and payments, they have to be raised from banks.

Because the shock from missed payments is biggest in high-value added supply chains, we use the tech supply chain as our main example for mapping out how missed payments can propagate and to frame our thinking about missed payments in some other industries.

Thus, as we noted above, "the supply chain is a payment chain in reverse" and when output is not being shipped, the assembler/seller of final goods in China does not have inflows to pay the suppliers of intermediate goods, so firms in Japan, Korea and Taiwan are not having inflows either – every firm along the chain starts to become a deficit agent.

Beyond the initial deficit entry – not getting paid for components already shipped – deficits will multiply over time due to fixed costs. Think about servicing assets – plants, offices, ships, other transportation fleets – and servicing the debt that's financing these assets.

We know from a series of papers from the BIS that dollar-denominated debts dominate corporate balance sheets globally (see Figure 3) – their servicing will drain dollar balances.

Even though principal on these debts is due far out in the future, interest payments must be serviced at high frequency – every three to six months – and common sense would suggest that interest payments are normally financed from proceeds generated through operating activities: the orderly assembly, production and shipment of final goods.

Prolonged periods without dollar inflows will make servicing even the interest portion of debts problematic, so local banks could soon be tapped to raise dollars to service them.

As deficit entries accumulate across supply chains and across industries, deficit agents will multiply and spiral into a deeper deficit balance. These funding pressures will either lead or coincide with pressures on credit spreads – the two can even amplify each other.

Japanese banks became big lenders in trade finance post-GFC (see here) and a large part of their dollar funding needs through the FX swap market is related to trade finance.

Japanese banks' role in trade finance runs on the assumption of "business as usual" where the main entities they typically finance are the assemblers of final goods, not necessarily the producers of intermediate goods. If Japanese banks' funding the assemblers is what normally providers dollars to the producers of intermediate goods, if the assembly process comes to a halt and related demand for trade financing drops off, producers of intermediate goods have to get their dollars from somewhere else – from local banks, in local jurisdictions. That switch in funding sources has the potential to re-distribute pressures across cross-currency bases – less pressure on the $/¥ basis and more pressure on the Korean won basis for example – and cause earnings shocks too as other countries' banking systems cannot raise dollars as cheaply as Japanese banks.

That's because the dollar funding leg of FX swap trades are the same for everyone, but the local funding leg of FX swap trades are the cheapest in Japan as that's where interest rates are negative – indeed, this has been a major factor in the rapid growth of large Japanese banks' market share in trade finance and shipping finance post-GFC.

Value added shares further complicate the potential impact on cross-currency bases.

High value added firms (chipmakers) are more at risk of negative payments shocks than low value added firms (assemblers). That's because the assembler gets the big payment, but keeps only a small portion to pay manual laborers and passes the rest of it on to the

chipmakers as a payment for intermediate goods. That means that the impact on funding pressures coming from missed payments along the manufacturing supply chain will mirror the value-added share of different jurisdictions along the funding chain. Figure 4 shows that Japan, Korea and Taiwan dominate the value added share of the tech supply chain that runs through China, which means that cross-currency bases are more at risk of widening on the back of missed payments in Japan, Korea or Taiwan than in China.

Ironically, the stock of FX reserves is much greater in China than in Korea or Taiwan, so the risk of a payments shock is not at all proportionate to the stock of FX reserves in some jurisdictions. Further complications come from the composition of FX reserves, which is the least favorable in Taiwan as we'll explain in detail in part four of our analysis.

Lower value added manufacturing supply chains are impacted by the outbreak as well, which will potentially lead to potential stresses in other jurisdictions across the world.

But the value created through these supply chains are small relative to tech supply chains (think T-shirts and rubber ducks), so the funding impact will be smaller and also less dollar centric, which means that local central banks should be able to handle the fallout.

Once we understand the funding impact along the global manufacturing supply chain, it's easy to run with the theme to look for parallels in the service industry, and in industries that combine manufacturing and services through high-value branding.

Consider, for example, an Asian airline that stops having inflows due to reduced demand to fly to, from and across Asia. The initial positive impact on funding comes from the reduced demand for jet fuel – which is also mirrored in the reduced funding needs of commodity houses that would fund the sourcing and shipment of jet fuel for airlines – but the deficits accumulate over time from keeping pilots and cabin crews on payroll, paying the rent on parking spots and gates at hundreds of airports the world over, and servicing the debt that finances the fleet of aircrafts. The longer passengers don't fly, the longer the planes are grounded, and the more the airline's dollar deposits are depleted: the airline gradually becomes a deficit agent, like chipmakers above. Hotels are next…

Similarly, think about the dropoff in the demand for luxury goods in China, and the need to keep artisans on payroll in Paris and Milan and financing the rent on a global portfolio of prime retail stores in London, New York, Zurich or Hong Kong or at empty airports.

Value added along these chains isn't high in the traditional sense, but because of branding: brands make the prices high, and high prices pay the rents. It's very easy to see how luxury brands can become deficit agents as cities are quarantined and people spend less.

These two service sector examples are admittedly extreme, but for framing purposes: they demonstrate well how the outbreak can impact a growing range of industries globally.

We know that these impacts are already happening and are impacting more and more firms in both manufacturing and services – the barrage of negative earning guidance we read about every day suggest that more and more firms are going from running positive dollar balances to depleting dollar balances on their way to become deficit agents.

As more and more companies report negative earnings guidance globally, STIR traders should be mindful of the trend that more corporations are becoming deficit agents and the growing risk that this represents for the current calm in global dollar funding markets.

As corporations deplete their dollar balances, the banks they bank with are also being pushed into becoming deficit agents and as outflows accumulate at more banks, pressures will accumulate in interbank markets where the deficit *banks* go to get funded.

But not yet…

Part III – Immune Systems and Liquidity Buffers

Firms burning through their dollar balances on their way to becoming deficit agents won't show up as funding stresses in interbank markets right away due to some dampeners.

In the case of the tech supply chain, cash-rich firms atop the value chain presumably serve as important dampeners as they extend intra-firm credit. Other dampeners include the Federal Reserve which is currently adding liquidity through bill purchases and repos, the equity market selloff, and last but not least banks' HQLA portfolios, thanks to Basel III.

That said, dampeners are just that – they are no panacea: cash-rich tech firms can help their suppliers for a limited time only; the Fed is planning to stop adding liquidity soon; the benefits from an equity market selloff are limited; and the outbreak has the potential to reveal some design weaknesses in the structure of Basel III. We'll discuss each in turn.

First, anecdotally, cash-rich firms atop tech supply chains are currently dampening the funding fallout from the coronavirus – as an example, think about flows from cash-rich tech firms' bank accounts going to suppliers' bank accounts in Japan, Korea or Taiwan, thereby slowing the burn of suppliers' dollar balances and delaying their day of reckoning – the day when they flip-flop from surplus to deficit agents *vis-à-vis* their bank. But the cash balances of tech firms are limited, as most of their wealth is in bonds (see here), and if the outbreak worsens, tech firms will have to repo bonds to help their suppliers. Such forms of financing will cause contagion in funding markets (pun intended) – a theme that has many variants and which we'll return to in more detail in part four of our analysis.

Second, the Fed's bill purchases and repo operations are adding liquidity for now – the best kind of liquidity at that, which are reserves. The bulk of these injections ended up with foreign banks' New York branches (see Figure 5). These are on top of the temporary HQLA surplus from the dropoff in demand for trade, shipping and commodity financing and are an additional dampener that currently help some banks fund the outflow of corporate deposits and others recycle corresponding inflows through interbank markets.

Third, the equity market selloff serves as a dampener too. Without going into too much technical detail here, the equity market selloff has a positive funding market impact through two channels: equity derivatives desks at banks need less unsecured funding to fund their equity inventories (see here) and, as investors go from equities to Treasuries, Treasury desks at primary dealers get to reduce their Treasury inventories and see a rotation in their HQLA portfolios from bonds to cash – the reverse of last year (see here).

Fourth, and most important, we now have a global banking system where all major banks have to pre-fund 30-day outflows by running HQLA portfolios. Maybe the biggest reason why we have not seen funding stresses from missed payments due to the outbreak yet, are these portfolios. In that sense, this crisis is playing out differently from the GFC, where funding stresses showed up real time ("T+1"), as banks had no liquidity buffers to tap into as deposits slipped away from them. HQLA portfolios are powerful dampeners.

That said, the LCR and HQLA portfolios are not panacea.

Some jurisdictions already mandate currency matching HQLA portfolios with outflows, but some jurisdictions do not, and in those jurisdictions the outflow of dollar deposits can quickly show up in the FX swap market if HQLA is held mostly in local currency assets…

…and that's the least of potential problems.

It is important to remember that the type of deposits that firms are exhausting currently are operating deposits. And that's a potential problem for banks. Operating deposits are one of the best types of funding for banks under Basel III due to low outflow assumptions, and that presents a potential design weakness of Basel III under current circumstances:

the 25% outflow assumption on these deposits means that losing them can inflict considerable damage on banks' liquidity profile as a dollar of outflow in operating deposits means an outflow of four credits of HQLA and an abrupt drop in their LCR compliance!

Barring regulatory forbearance – banks' and supervisors' equivalent of *force majeure* – these dynamics can quickly push banks to go to funding markets to fix their LCRs, which would stress unsecured funding markets and can push Libor-OIS spreads wider.

With their thinking shaped by the experiences of the GFC, the architects of Basel III assumed that only financial, non-operating deposits are slippery. They did not consider a scenario in which a rapid drawdown of operating deposits can occur without offsetting inflows over prolonged periods. Of course, DSGE models will suggest that there is nothing to worry about, as corporations burning through their operating deposits is due to people not buying phones, not flying and not shopping for luxury goods, which means that retail deposits with even lower outflow assumptions than corporate deposits must be accumulating somewhere – retail surplus agents – so the impact should be LCR positive!

Maybe, maybe not.

In our experience, finance is anthropological (see here) and the diversity assumed away in DSGE models is always what comes back to bite you. It is perfectly possible that corporations bank with different sets of banks than the people that stopped spending; if so, the deficit banks will borrow from surplus banks in interbank markets at high prices.

Firms depleting their dollar balances, pushing individual banks and local banking systems into deficits, and banks struggling to fund outflows is stage one of potential stresses; stage two is when firms start borrowing dollars from the same banks as their obligations to pay continue but their dollar balances are empty. There are two corporate lifelines: for big, public corporations the CP market, and for everyone else, credit lines from banks.

Firms tapping the CP market at the same time as banks are fixing their LCRs isn't good; neither is many firms tapping their credit lines from banks all at the same time – another potential scenario that can reveal another potential design weakness of Basel III.

Potential outflows related to the drawdown of corporate credit lines form a part of the 30-day outflows that banks have to pre-fund, but similar to the outflow assumption on operating deposits, the drawdown assumptions on corporate credit lines are very low – only 10%. Similar to the outflow of operating deposits, the drawdown of credit lines can inflict significant damage on LCRs which banks would have to fix in unsecured markets.

Missed payments due to the outbreak is the type of event that could cause many corporations to draw on their credit lines at the same time – and so what supervisors provisioned for as an idiosyncratic shock (a random corporation drawing on a credit line) becomes systemic (a random virus that forces all lines to be called all at the same time).

Corporations have not called their credit lines yet to "test" their banks if they're there, but they soon could. This is a fast-moving risk STIR traders should be the most aware of.

Even with regulatory forbearance on LCR compliance, the underlying funding mechanics of such a massive liquidity call could be overwhelming for the repo and FX swap markets, unless all HQLA portfolios are made up of reserves at the Fed, and we know they're not.

A flood of corporate drawdowns could force the entire banking system into becoming a deficit agent – the extreme example of the outbreak infecting the top of the hierarchy: from firms to individual banks, to country level banking systems, to financial centers and, as contagion spreads and turns the global banking system into a deficit *system*, to the Fed – the only entity that can serve as a surplus agent to match the needs of a deficit system.

No, that's not an overstatement. We saw something similar in September!

Part IV – Breathing Machines and Central Banks

Collateral is dead, long live reserves…

…should be everyone's key takeaway from the repo market dislocation in September. Mind you, that dislocation was caused by corporate tax payments and Treasury settlements, events that individual banks were prepared for, but the entire system apparently was not.

The cascade of missed payments and the changes they could force in dollar flows globally is not something that individual banks can prepare for and so the system cannot either.

Could missed payments quickly run up to $200-300 billion? That's not unrealistic.

Could funding markets in New York City be overwhelmed if forced to recycle an extra $200-300 billion? Easily. If reserves were insufficient to deal with routine tax payments and Treasury settlement in September, and if the Fed only added just over $150 billion of excess reserves since then (see Figure 6), a mass drawdown of corporate credit lines due to missed payments could push the U.S. banking system back into deficit in short order.

Demand for reserves ain't linear…

…and banks' estimates of their "lowest comfortable level of reserves" are circumstance dependent. The worse the outbreak gets, the floor to banks' comfort levels will rise and so the effective amount of excess reserves added since September could fall rapidly as banks decide to hoard reserves as a "vaccine" instead of lending them opportunistically.

Like our reference to the Spanish flu in our 2020 outlook (see here), Governor Quarles' recent speech about opening up the discount window to help large banks monetize their Treasuries under stress scenarios was eerily prescient. What are some of the dynamics that could start pushing rates around in the repo and FX swap markets before too long?

There are at least three:

(1) U.S. banks gradually starting to pull back from lending in the repo market and starting to monetize Treasuries to fund the drawdown of corporate credit lines.

(2) Tech companies starting to monetize their bond portfolios to roll the lifeline they extended to their strategic suppliers in various corners of Southeast Asia.

(3) Foreign central banks starting to tap into their FX reserves to help local banks, and the pressures these flows might cause to repo and FX swap markets.

Each of these examples makes us think it unlikely that the Fed should or will be able to step back from adding liquidity after the tax season. Now is not the time to step back…

…it's time to lean in!

First, U.S. banks are less liquid today than they were a year ago, because they have been absorbing collateral from the Fed as the Fed has been busy tapering its balance sheet – talk about bad timing. Figure 7 shows the rotation in large U.S. banks liquidity portfolios away from reserves and into collateral in recent quarters and this rotation will make the funding of corporate credit lines harder and the appeal of the Quarles proposal greater.

Second, tech companies repoing their bonds to fund their suppliers are a similar story, but unlike banks, their port of call won't be the discount window, but the repo market. Now, if the Fed is the marginal lender in the repo market now to the tune of $150 billion, a new marginal supplier of collateral will give the Fed no choice but to upsize its repo ops.

Third, tech companies' repo needs will be small potatoes relative to foreign central banks': while tech companies need to backstop suppliers, foreign central banks may need to backstop individual banks and would have to raise considerable dollar liquidity to do that.

We'll consider the cases of China, Japan, Korea and Taiwan as potential deficit *regions*.

In the case that banks in China are overwhelmed with a drawdown of dollar deposits, their natural port of call will be the PBoC for dollar liquidity. In turn, the PBoC's port of call will be dealers first in Hong Kong and London and then the primary dealers in New York.

The PBoC – like all major central banks – keeps a portion of the liquidity tranche of its FX reserves in FX swaps, where they lend U.S. dollars in exchange for euros and yen.

But if they need to start lending dollars to local banks through bilateral arrangements, China effectively flip-flops from being a lender of dollars to being a borrower of dollars in the FX swap market, and dealers in Hong Kong and London now have to find the missing link to their previously matched $/¥ and €/$ FX swap books. As the PBoC goes from funding carry traders in the FX swap market to helping local banks bridge dollar deficits, it naturally transmits local imbalances globally and carry traders end up holding the bag…

…the Fed's dollar swap lines could be called by FX swap dealers in London.

Once the PBoC exhausts its dollar liquidity in cash markets like the FX swap market, it will next tap its Treasury portfolio and will either repo or sell those Treasuries through dealers in New York to raise more dollars to lend to local banks. The one place the PBoC won't go to raise dollars is the Fed's dollar swap lines – because it has no line to the Fed!

China's dollar needs will therefore stress private balance sheets in London and New York, not public balance sheets, unless a swap line between the PBoC and the Fed is created.

Remember that the breakdown of the payment chain in reverse hurts high value added intermediate goods producers much more – in jurisdictions like Japan, Taiwan and Korea.

Here, the first observation we'd make is that none of these countries have as big a stock of FX reserves as China, so the drawdown on their FX reserves from missed payments will be disproportionate; that said, differences in the composition of FX reserves will help some countries weather funding stresses better than others. Consider the case of Japan.

Japan's Ministry of Finance is the single largest account holder at the New York Fed's foreign RRP facility with $150 billion on deposit – see Japan's reserves portfolio here.

Thus, while the PBoC would start withdrawing liquidity from money markets the moment it starts to ease the dollar needs of domestic banks, the BoJ would add *de novo* liquidity as it pulls funds out of the foreign RRP facility and deposits them at local megabanks…

…from Sagittarius-A* to the big bang, and if the big bang ain't big enough, the BoJ has access to the dollar swap lines at the Fed. Let's consider the case of South Korea next.

Like the PBoC, the BoK does not have FX swap lines with the Fed and unlike the BoJ, it only has a small amount in the foreign RRP facility (see Figure 8), so the market impact of the BoK's responses will likely be similar to the PBoC's but with a much smaller splash.

Taiwan appears to be a case unlike any other.

As described in an impressive detective work by Brad Setser and Constructive Ambiguity, Taiwan's reserves are lent in the FX swap market but not versus euros and yen, but against domestic currency which provide the hedges for Taiwanese life insurers' U.S. fixed income portfolios – this is how Taiwan's central bank recycles Taiwan's massive current account surpluses, which are routinely north of 10% of Taiwan's GDP.

Now consider that if Taiwan's central bank is dependent on chipmakers' sales to add to or just to roll life insurers' U.S. dollar hedges, missed payments due to factory closures and chipmakers' growing dollar deficits are a risk to Taiwanese life insurers' steady bid for U.S. Treasuries, mortgages, callable bonds and credit and their ability to sell vol insurance!

Conclusions – Asymptomatic ≠ Not Contagious

Liquidity kills you quick…

…but the countries at the eye of a potential storm learned that lesson during the Asian financial crisis, and the banks that form the backbone of the global financial system learned that lesson during the GFC. Safety nets have been enhanced and expanded, with the Fed's dollar swap lines with the ECB, the SNB, the BoE, the BoC and the BoJ being the most important. These regions are therefore well insured for funding stresses, and Japan has a lot of liquidity on deposit at the Fed before it would tap the swap lines.

We are more worried about other jurisdictions.

In the coming weeks, there will likely be dozens of research notes in which DSGE-types will show that most emerging market countries have multiples of their import bills in FX reserves, arguing that you should not worry about liquidity problems. That is precisely our point: most FX reserves are invested in the FX swap market or are in U.S. Treasuries and MBS, not on deposit at the foreign RRP facility, and when foreign central banks begin to monetize their FX reserves, GC repo rates and the €/$ and $/¥ currency bases will feel it.

Central banks are lenders of last resort, not lenders of first resort and the time it takes for them to go from one mode to another can take a long time and it can take a short time.

In August 2007 it took a long time – subprime was "contained".

In September 2019 it took a day – with a 15 minute delay.

That said, the Fed's response time last September was sped up by the fact that the markets exhibiting stresses were the o/n repo and federal funds markets, which are the core of U.S. money markets. The stresses we are imagining here would first strike:

(1) peripheral cross-currency bases (e.g., KRW/USD) as missed payments grow;

(2) €/S and $/¥ bases as reserve managers stop lending in the FX swap market, to help banks and banking systems deal with dollar outflows in their jurisdictions;

(3) U.S. dollar Libor-OIS spreads as banks start fixing their LCRs that are being damaged by outflows of operating deposits and corporate credit lines; and lastly,

(4) o/n GC repo markets as FX reserve managers and large banks are scrambling to turn collateral into cash to fund banks' and corporate customers' liquidity needs.

Stresses would strike in that specific order, which means that peripheral funding markets would show signs of stress first and core funding markets would show signs of stress last.

That risks a slow balance sheet response from the Fed…

…on top of the Fed's plan to soon end liquidity injections via repos and bill purchases.

Chair Powell's opening shot to rate cuts could further complicate a complicated picture…

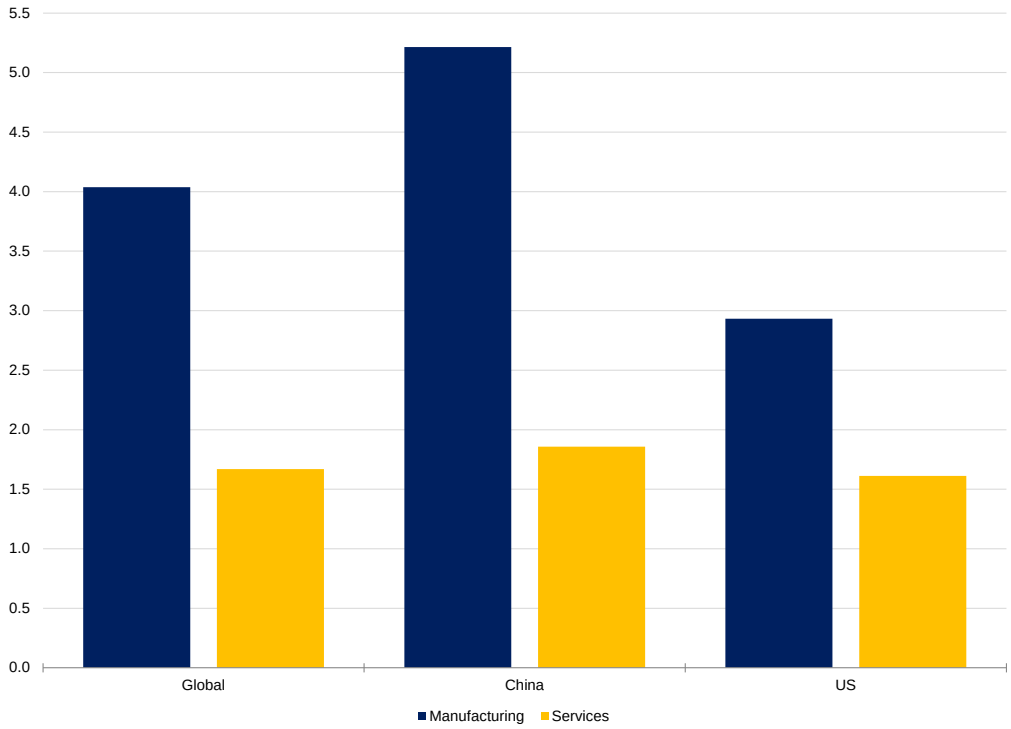
given that the yield curve has been inverted for over a year, Treasury supply has been absorbed by primary dealers and hedge funds on the margin, funded in the repo market by money funds. Figure 9 shows that money funds have absorbed $600 billion of inflows over the past year and rate cuts could send those funds back to the bond market, precisely when the funds are needed in the money market. Our concluding point is this:

If the outbreak worsens, funding market pressures can easily escalate. Rate cuts will help, but rate cuts, if they re-steepen the curve materially, can exacerbate funding pressures.

Our recommendation for the Fed would be to combine rate cuts with open liquidity lines that include a pledge to use the swap lines, an uncapped repo facility and QE if necessary.

Figure 1: A Recipe for Shocks from Missed Payments

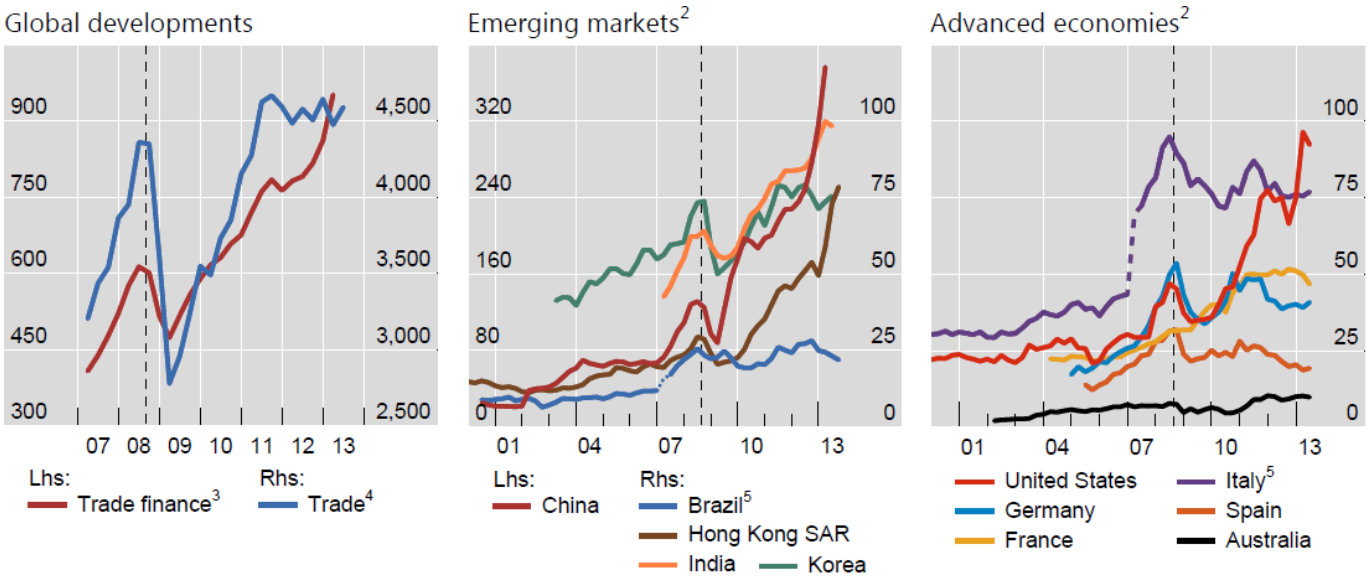
Ratio of output to value added



Source: World Input-Output Database, Credit Suisse

Figure 2: Trends in Trade Finance

$ billions

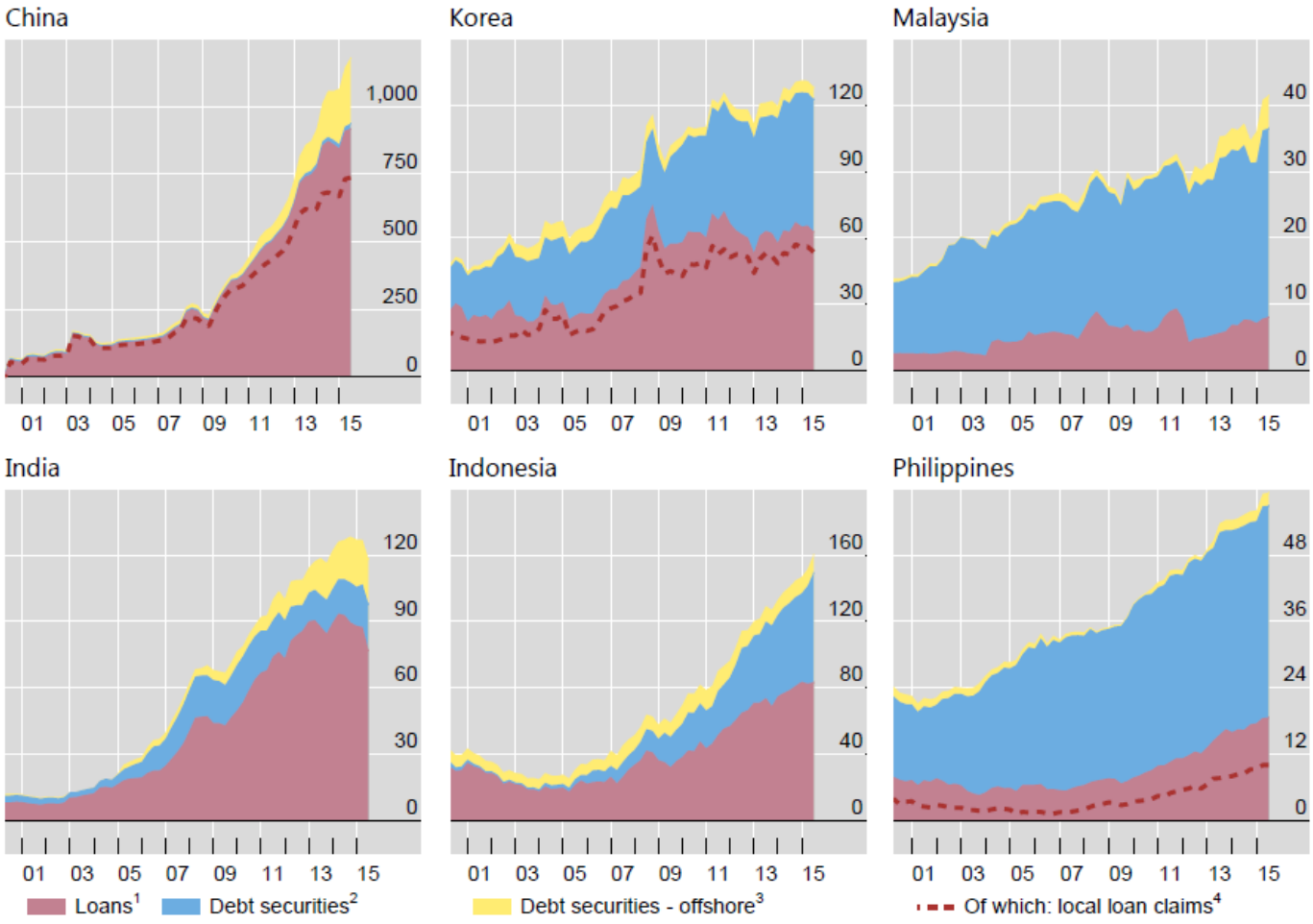


[1] Dashed line: Q3 2008. [2] Stock of bank-intermediated trade finance. [3] Sum of trade finance in Australia, Brazil, France, Germany, Hong Kong SAR, India, Italy, Korea, Mexico, Spain and the United States. [4] Global merchandise trade (average of exports and imports). [5] Structural breaks in Q1 2007. Brazil: inclusion of import loans. Italy: inclusion of export and import guarantees.

Source: CGFS, IMF, national data

Figure 3: U.S. Dollar Credit to Selected Non-Bank Borrowers

$ billions

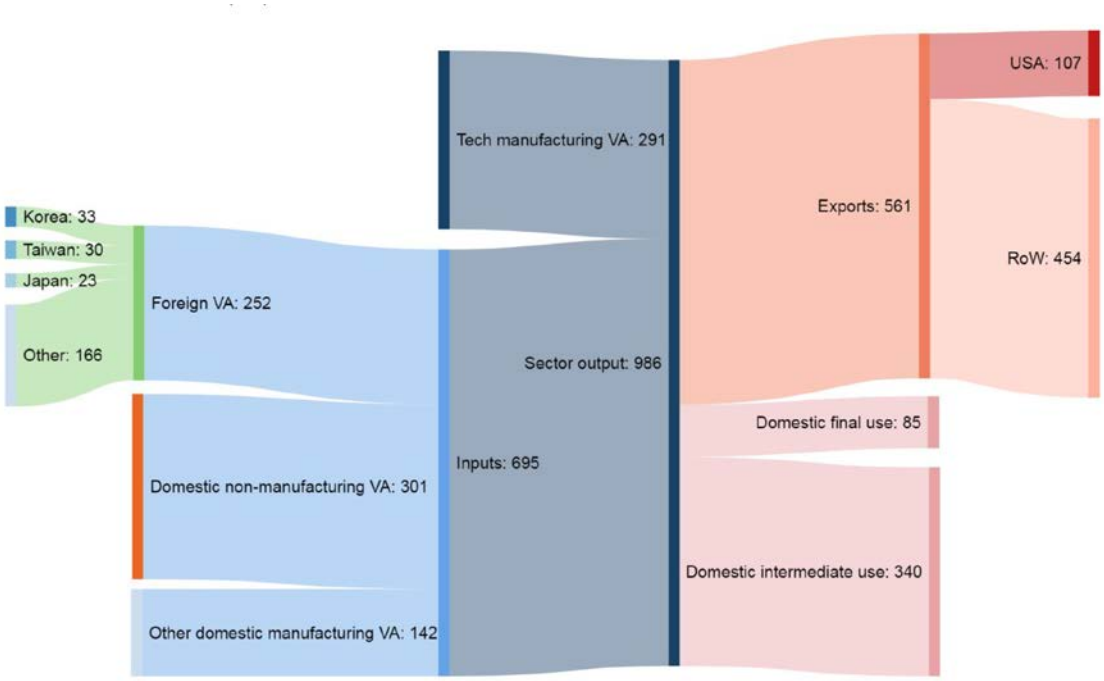


[1] US dollar loans to non-bank residents of the country listed in the panel title. [2] Outstanding US dollar international bonds issued by non-bank residents of the country listed in the panel title. [3] Outstanding US dollar international bonds issued by offshore affiliates of non-banks with a parent entity headquartered in the country listed in the panel title. [4] US dollar loans booked by banks located in the country in the panel title to non-bank borrowers in that country. For China and the Philippines, figures are estimates based on national data.

Source: BIS

Figure 4: The Chinese Tech Sector's Manufacturing Supply Chain

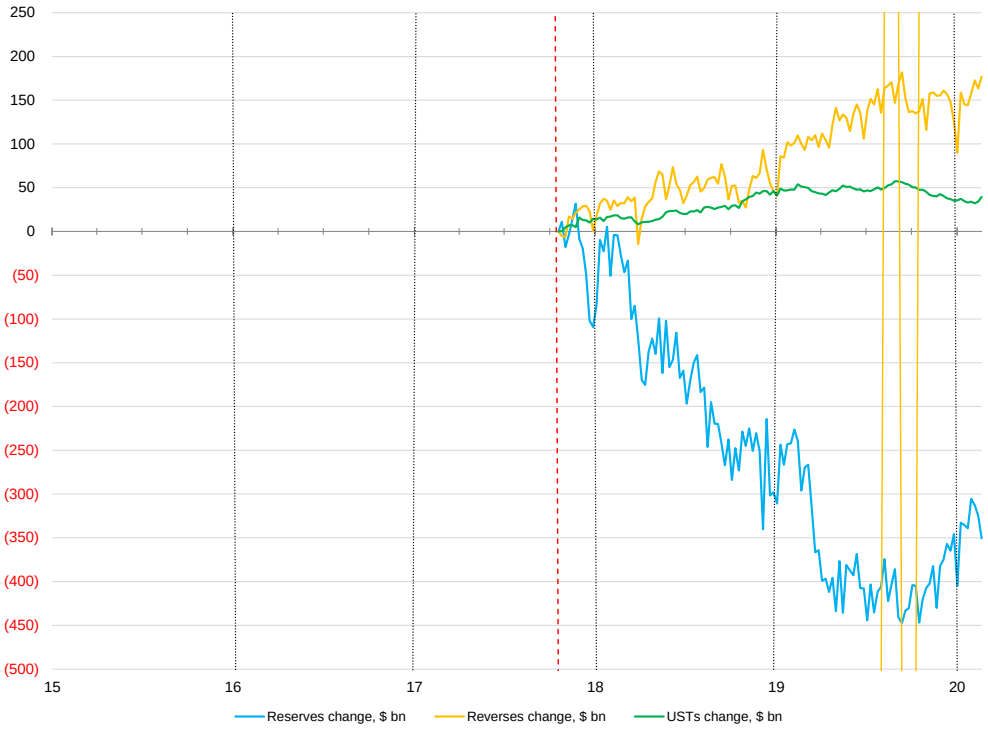
$ billions, as of 2014; value added (VA) = labor costs plus profits



Source: World Input-Output Database, Credit Suisse

Figure 5: Foreign Banks Absorbed the Bulk of Liquidity Injected by the Fed

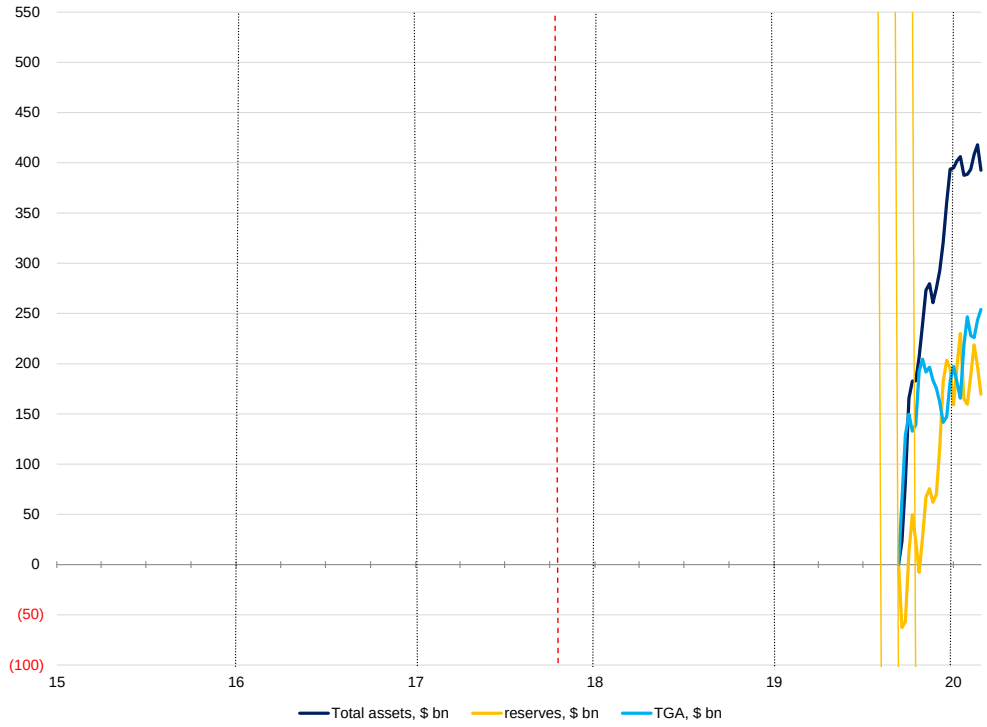
$ billions, vertical red line marks the start of taper and orange lines mark the end of taper, the start o/n repos and bill purchases, respectively



Source: Federal Reserve, Credit Suisse

Figure 6: This Does not Look Like "Foam on the Runway"

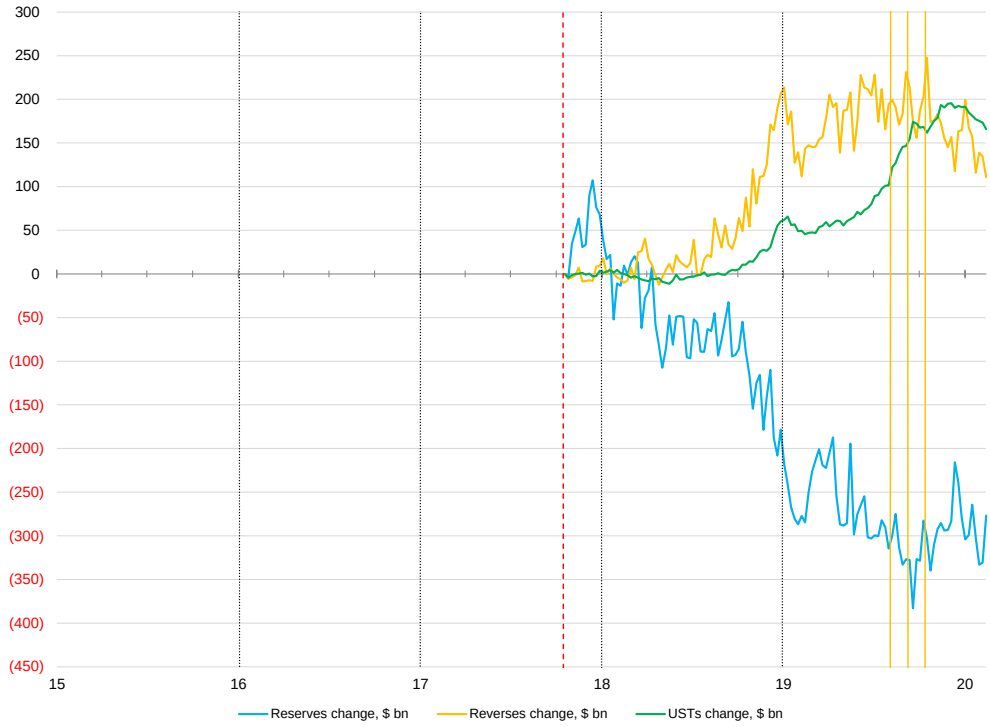
$ billions, vertical red line marks the start of taper and orange lines mark the end of taper, the start o/n repos and bill purchases, respectively



Source: Federal Reserve, Credit Suisse

Figure 7: Thanks to Balance Sheet Taper, U.S. Banks are Much Less Liquid

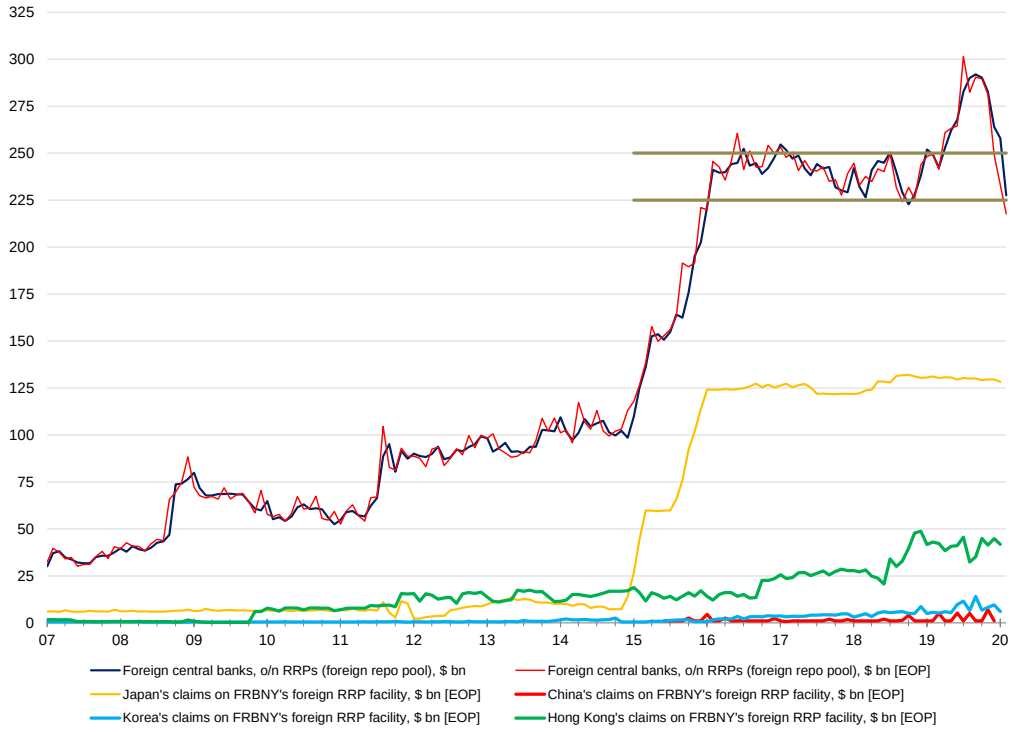
$ billions, vertical red line marks the start of taper and orange lines mark the end of taper, the start o/n repos and bill purchases, respectively



Source: Federal Reserve, Credit Suisse

Figure 8: Foreign Central Banks' Claims on FRBNY's Foreign Repo Pool

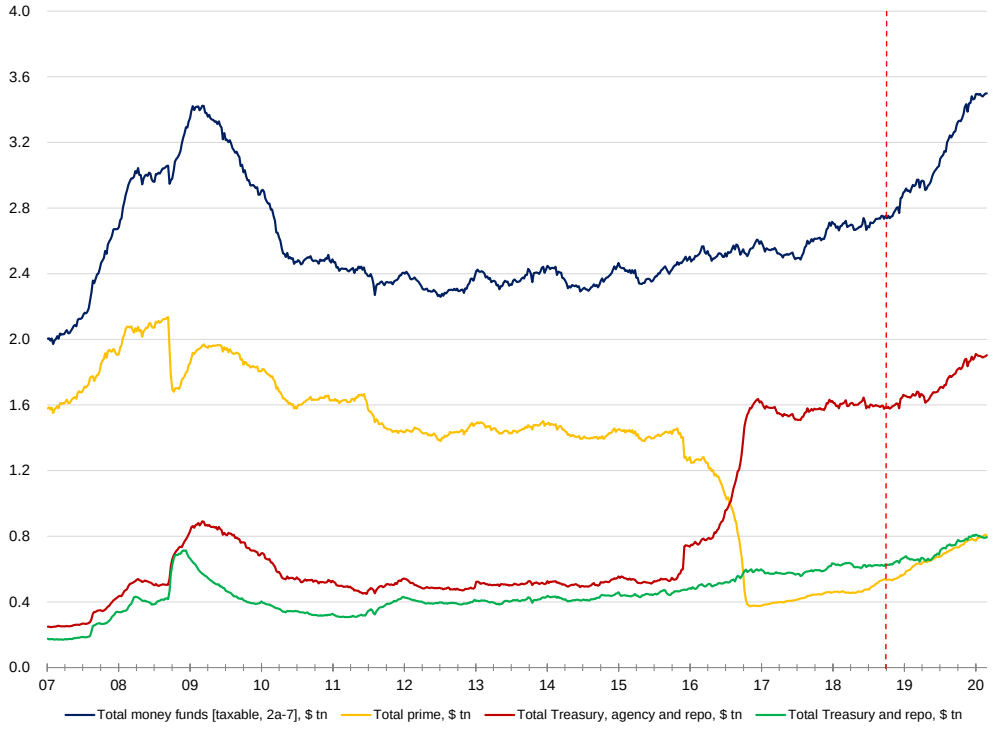
$ billions, proxy (country data show FX reserves at "other central banks, BIS and IMF")



Source: IMF, Federal Reserve, Credit Suisse

Figure 9: What if the Tide Washes Out if the Fed Cuts Rates Aggressively?

$ trillions, vertical dashed line marks the start of the curve inversion relative to three-months FX hedging costs



Source: ICI, Credit Suisse

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