

### **Special Topic: A Big Mess In the Short End May Foreshadow a Real Mess in the Long End<sup>1</sup>**

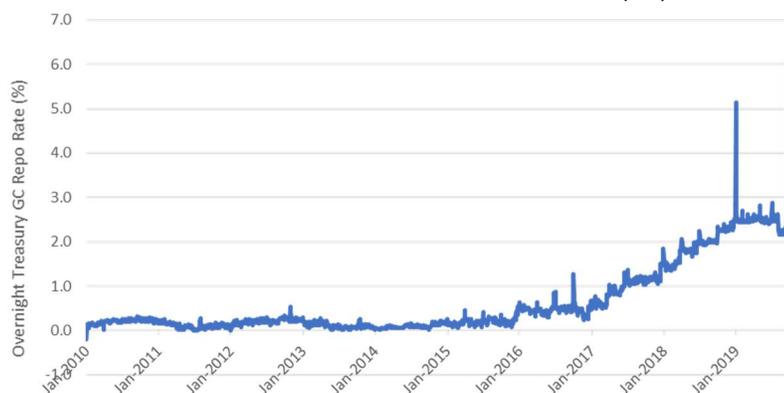
The US Treasury repo market, an important component of the short-term funding market, seized up in the middle of September. We devote our special topic this quarter to discuss some post-Global Financial Crisis (GFC) developments that led up to the seizure and whether this episode has longer-term implications for the US money market and foreshadows trouble for the broader market.

#### **What Happened?**

The repo market is where short-term collateralized financing is extended against various assets. The Treasury repo market is the largest of all global repo markets, with over \$1 trillion trading every single day, mostly via overnight repos. Regulators have so much faith in the Treasury overnight repo market that they are forcing the global market to move its floating rate benchmark from LIBOR to SOFR, a short rate based on overnight Treasury repo activity. A fully-functioning and liquid repo market (apart from periodic squeezes at month-end, quarter-end and of course year-end) is therefore a core Federal Reserve and regulatory assumption.

That fully-functioning assumption was called into serious question during the week of September 16<sup>th</sup>. Repo rates began rising on the 16<sup>th</sup> from 2.288% the previous day to 2.876%, but the real damage came on the 17<sup>th</sup> when the overnight repo rate spiked up to almost 10% before ending at a weighted-average general collateral (GC) rate of 6% for the day. As the week of September 16<sup>th</sup> was neither month-end, quarter-end or year-end, this seize-up in liquidity revealed that something might be amiss in the Treasury repo market, or perhaps in the broader money markets.

FIGURE 1. OVERNIGHT TREASURY GENERAL COLLATERAL (GC) REPO RATE. 2010 – 2019



Sources: Bloomberg, Advocate

The repo squeeze episode forced the Federal Reserve Bank of New York to step in and engage in open-market repo operations for the first time in over a decade. Markets took down \$56 billion of Fed overnight financing on the 17<sup>th</sup> and \$75 billion on the next day. While rates have stabilized, the repo market remained highly fluid and uncertain heading into the end of the 3<sup>rd</sup> quarter. This led the

<sup>1</sup> The author would like to thank Michael Bridger and Alex Tyo of Credit Suisse for their insights and discussions.

Fed to announce on September 20<sup>th</sup> that it would be providing a combination of overnight and term 14-day repos to the market into the end of the 3<sup>rd</sup> quarter.

The turmoil in the securitized market began infecting other markets, but the effects have thus far been minimal (effective fed funds rate rose to 2.30% for a day, 5bps higher than the upper end of the Fed's target range).

### How Did We Get Here?

Why did repo market liquidity go haywire? The simplistic answer is that the settlement of 3yr, 10yr and 30yr Treasuries that week plus companies withdrawing cash to pay quarterly taxes impaired money market liquidity. In our view, the repo problem highlighted the impact of Quantitative Tightening (QT) and various post-GFC regulations that have weakened the ability of banks to foster market liquidity during times of stress. Stated another way, banks are experiencing increased friction in delivering Fed liquidity to the marketplace.

We believe that three major long-term developments contributed to this liquidity episode which signals long-term liquidity issues in the marketplace:

1. Declining available bank liquidity and balance sheet weakened support for money markets.
2. Quantitative Tightening shifted Treasuries from stable hands into "sensitive" hands.
3. Banks are incentivized to hoard reserves due to post-GFC regulations.

#### ***1. Declining available bank liquidity and balance sheet weakened support for money markets***

Bank regulations proliferated in the aftermath of the GFC, ranging from Dodd-Frank in the US to EMIR in the EU to Basel-III globally. In our view, Basel-III regulations adversely impacted US money market liquidity. In particular, Liquidity Coverage Ratio (LCR) and leverage ratio calculations limited bank liquidity and balance sheet provision to money markets.

#### **Lower Liquidity Due to Less "Available Reserves"**

The declining level of bank excess reserves after peaking in 2014 laid bare market liquidity problems:

FIGURE 2. HISTORICAL EXCESS RESERVES HELD AT THE FED (\$ MILLIONS), 2007 - 2019



Sources: Bloomberg, Federal Reserve, Advocate

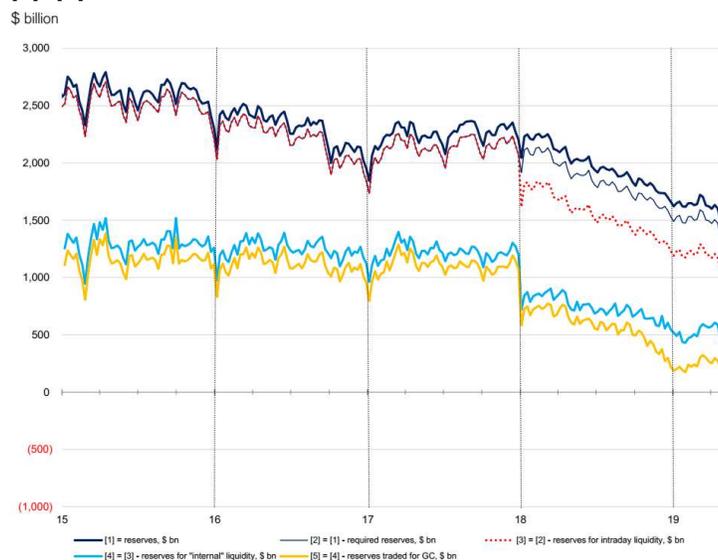
The amount of excess reserves is nominally \$1.3 trillion, a large amount by any means. But excess reserve is not the same as the amount of reserves a bank can readily put to work in the capital markets. In fact, the level of “available reserves”, defined here as the amount a bank feels comfortable deploying externally, may only be a small fraction of the headline amount.

### LCR and RLAP – Available Reserves is a Lot Less than Excess Reserves

Basel III Liquidity Coverage Ratio rule requires banks hold sufficient High-Quality Liquid Assets (HQLA) to fund cash outflows for 30-days. Credit Suisse research<sup>2</sup> describes the impact of post-GFC liquidity constraints on banks. Banks not only must hold sufficient HQLA to cover LCR at the end of each trading day, but also need sufficient Resolution Liquidity Adequacy and Position (RLAP) as a “gone concern”. This constrains banks to hold sufficient reserves to cover the maximum amount of intraday outlay rather than the end-of-day balance because if they are “gone” by the middle of the day, their liquidity coverage must remain sufficient even if they are no longer around to receive additional cash by the end of the day.

Credit Suisse estimates that the actual amount of “available reserves” was a paltry \$300 billion compared to the headline \$1.5 trillion reserve at the end of May. With current bank reserve even lower now, the amount of “available reserves” that banks can deploy to put out liquidity fires is likely less than \$300 billion.

FIGURE 3. HISTORICAL MEASURES OF RESERVES – [1]: BANK RESERVES, [2]: RESERVES EX-REQUIRED RESERVES, [3]: [2] – INTRADAY LIQUIDITY REQUIREMENT (LCR AND RLAP), [4]: [3] – INTERNAL LIQUIDITY REQUIREMENT (FOREIGN BANKS), [5]: [4] – RESERVES ALLOCATED TO GC REPO.



Sources: Federal Reserve, Credit Suisse

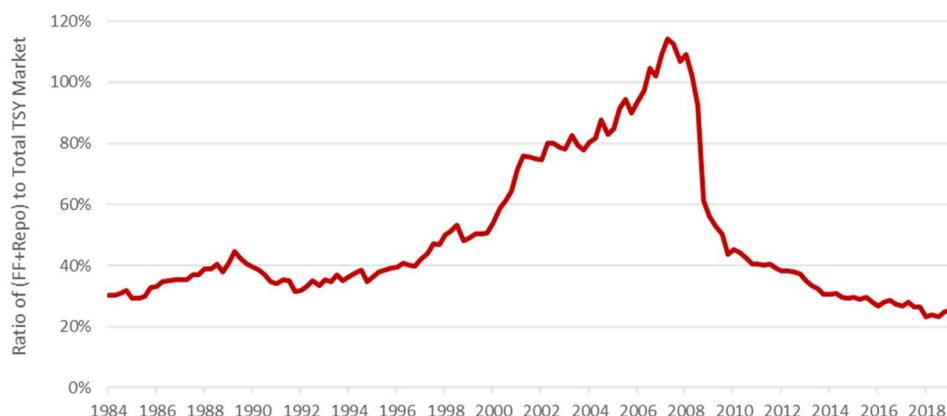
<sup>2</sup> Credit Suisse Research - “Global Money Notes #22 – Collateral Supply and o/n Rates”, Zoltan Pozsar, May 2019

With the amount of “available reserves” so much lower than the notional \$1.3 trillion of reserves, episodes of liquidity squeezes will likely occur with increased frequency and will force the Fed to undertake more open-market repo operations, perhaps via a standing repo facility.

### Lower Available Bank Balance Sheet to Help Market Finance Treasuries

Banks’ ability to support the repo and Fed Funds market has declined in recent years in part due to post-GFC regulations. Meanwhile, the size of Treasury market has grown considerably since the GFC. At the end of Q2-2019, the size of the public Treasury market size was \$18 trillion versus only \$6 trillion at the end of 2007. Bloomberg’s Cameron Crise put together the following chart that illustrates the ratio of repo and fed funds market size relative to the total Treasury market size. The current ratio stands at less than 30%, lower than levels reached in the early 1980s and less than a third of the peak ratio in 2007.

FIGURE 4. RATIO OF TSY REPO MARKET PLUS FED FUNDS RELATIVE TO SIZE OF US TREASURY MARKET, 1984 - 2019



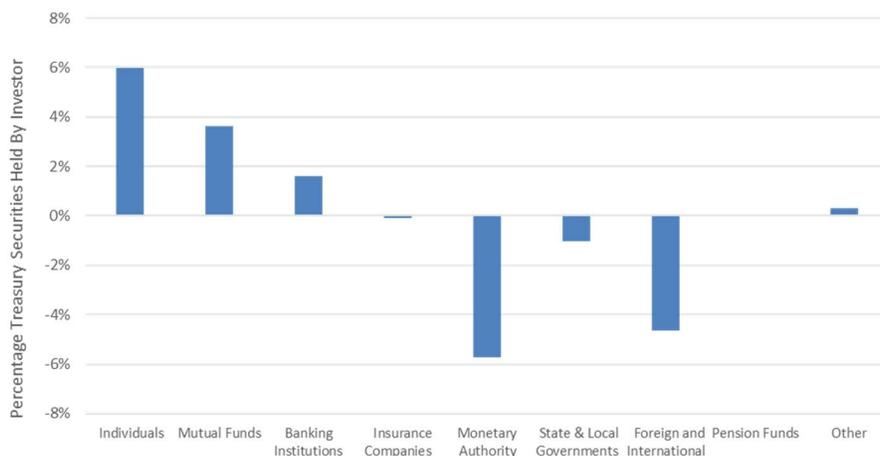
Sources: Treasury Dept, SIFMA, Federal Reserve, Bloomberg

Since banks are no longer able to expand their balance sheets at will (as they could in the pre-GFC days), they can only provide “available reserves” to money markets. The \$300 billion of “available reserves” estimated by Credit Suisse only amounts to 2% of the public Treasury security market, a very small drop in the ocean indeed.

### II. Quantitative Tightening shifted Treasuries from stable hands into “sensitive” hands

A major consequence of Quantitative Tightening has been the evolution of the Treasury investor base away from central banks (stable hands that are not dependent upon US capital markets) to the broad investor universe which is much more sensitive to interest rates, balance sheets and repo-market financing. In other words, QT not only reduces the amount of available liquidity in the money market by extinguishing reserves, but also places a heavier burden on this lower-liquidity money market to finance the extra Treasuries that the Fed no longer buys. The impact of QT on market liquidity is thus amplified beyond the absolute reduction of reserves.

FIGURE 5. CHANGE IN TREASURY HOLDER UNIVERSE: FROM END-OF-2014 TO Q2-2019



Sources: Treasury Department, SIFMA, Advocate

The above chart shows that the biggest decline in Treasury holdings since the peak of QE in 2014 came from two sources: monetary authorities (the Fed) holdings now contains 6% less of all outstanding Treasury securities, and international investors now hold 5% less. The slack has been picked up by individuals (households and non-profits), mutual funds (including money market funds, closed end funds and ETFs) and banking institutions. These replacement Treasury investors clearly operate differently from balance-sheet indifferent investors (central banks) and international investors who do not require leverage.

### **III. Banks are incentivized to hoard reserves due to post-GFC regulations**

Pre-GFC, banks kept practically zero excess reserves at the Fed. They received no compensatory interest on any reserves on deposit at the Fed, nor was there any extra regulatory or balance sheet benefits they could derive from such reserves. During that period of zero excess reserves, the Fed conducted monetary policy with the help of periodic repo operations that were designed to either inject or withdraw temporary liquidity and reserves into the banking system and manage the effective fed funds rate towards its target.

Changes in Federal Reserve policy and bank capital and leverage regulation since 2008 produced several changes that increased the attractiveness of excess reserves to banks:

1. Central bank reserves receive the top tier asset classification to help meet bank's liquidity requirements under Basel 3
2. Excess Reserve yield is attractive relative to comparable HQLA-1 assets such as Treasuries, without the ancillary duration risk.
3. Reserves have very favorable Risk-Weighted Asset (RWA) characteristics

## Reserves are the Highest Quality Liquid Assets

Under Basel 3, central bank reserves receive the top tier classification of High Quality Liquid Asset Level 1 (HQLA-1) in terms of a bank's Liquidity Coverage Ratio requirement. This means that reserves are accorded the same regulatory benefit as Treasuries.

## Reserve Yield Is Attractive

The Fed began paying interest on reserves in October 2008. Interest on Required Reserves (IORR) and Interest on Excess Reserves (IOER) are set to the same rate, currently at 1.80%. How attractive is IOER relative to other HQLA-1 assets such as Treasuries? With the US yield curve now inverted out to 10-years, short-maturity instruments are now producing higher yield than long maturity bonds, without the ancillary duration risk. The table on the following page shows that IOER currently yields more than Treasury notes from 2-years out to 10-years in maturity. IOER yield advantage remains even after the Fed cut IOER yield by 30bps at its September meeting.

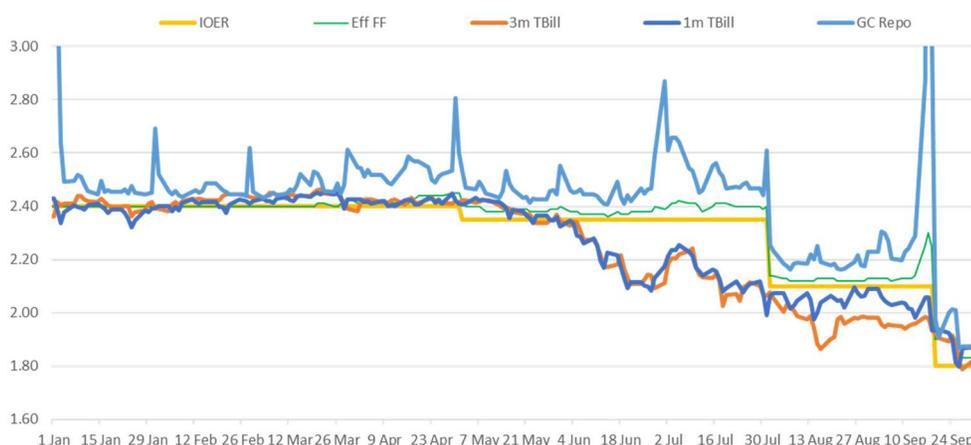
FIGURE 6. CURRENT YIELD AND DURATION RISK OF IOER AND TREASURIES BY MATURITY

Asset	Current Yield	Risk (Duration)
IOER	1.80%	0
2-yr Treasury note	1.62%	1.9
5-yr Treasury note	1.55%	4.7
10-yr Treasury note	1.68%	9.0
30-yr Treasury note	2.13%	22.5

Yield data as of September 30, 2019. Sources: Treasury Department, Bloomberg

How does IOER compare to other money market instruments? While the fed funds rate is higher than IOER, it is an unsecured interbank rate and therefore is not held in the same regard as central bank reserves (HQLA-1). Against other HQLA-1 assets, IOER yielded higher than T-Bills until the Fed reduced IOER by 30bps on September 18. GC Treasury repo rate tends to be higher than IOER but receives less favorable bank capital treatment than reserves (see next section).

FIGURE 7. YIELDS OF IOER, EFFECTIVE FED FUNDS, 1M- AND 3M-TBILL AND GC TSY REPO IN 2019



Sources: Barclays, Bloomberg, Advocate

### Reserves Receive Favorable Capital Treatment

Under Basel III, Risk Weighted Assets (RWA) is used to calculate a bank's capital ratios. RWA calculations take the following asset risks into consideration:

- Credit risk
- Market risk
- Operational risk

Reserves are attractive because reserve RWA is considerably lower than other comparable instruments which may have either higher credit, market or operational risk-weighting, or a combination of the three.

FIGURE 8. COMPONENTS OF RWA FOR: BANK RESERVES AT FED, TREASURIES, OVERNIGHT GC TSY REPO AND FED FUNDS

Asset	Credit Risk	Market Risk	Operational Risk
Bank Reserves at Fed	0	0	Very Low
T-Bills, T-notes	0	Very Low-to-Medium	Very Low
Overnight GC TSY Repo	Very Low-to-Low*	0	Low
Fed Funds	Low-to-Medium	0	Low-to-Medium

\*GC Repo credit risk accounts for counterparty credit quality and risk of underlying collateral. Sources: Basel III, Advocate

In the pre-GFC days, any excess reserves would be quickly invested if there are higher-yielding investments. A bank could readily invest any and all excess reserves in fed funds or repo during a liquidity squeeze since it would entail moving from a zero-yielding asset into a higher yielding asset without giving up any regulatory benefits. In today's world, the attractiveness of reserves (yield, cash-equivalent, regulatory and capital benefits) means that banks are likely to hoard excess reserves even if there are more attractive opportunities in the money markets. This reserve stickiness means the amount of cash banks are willing and able to lend externally is significantly less than the headline excess reserve, and signals reduced bank support for money markets in times of stress.

### What Can the Fed Do?

As we stated earlier, a key factor behind the recent repo-market turmoil is the growing danger from banks disintermediating Fed liquidity provision to the market. The hoarding of reserves and the lack of balance sheet netting for Fed repos makes it harder for Fed temporary and permanent liquidity to get into the broad market in today's balance-sheet conscious world. But all is not lost – we believe that the Fed has a choice of measures, some of which may lessen the impact of the post-GFC regulations pertaining to liquidity disintermediation, but watch out for unanticipated consequences!

1. Keep reducing IOER to make reserve yield unattractive. Lessening reserve yield relative to other money market instruments may encourage some banks to shift part of their hoarded reserves into money market investments. However, the other advantages of reserves (cash-equivalence, regulatory and capital advantage) do not go away. Reducing IOER further may

widen the short-rate corridor within which Fed funds trades and could end up elevating short-rate volatility, something the Fed clearly would not want.

2. Add permanent reserves via mini-QE to buy Treasury Bills. Adding some reserves back would obviously increase the liquidity buffer to banks, but using that to buy T-Bills is the force-multiplier. An increased supply of T-Bills tends to drain short-term liquidity as money-market funds deploy cash to buy T-Bills. Employing QE focused on T-Bills purchased directly from the Treasury would result in less supply of publicly-available T-Bills, helping to free up and enhance money market liquidity.
3. Permanent Repo Facility (PRF). PRF has been much discussed by street research so we will not dwell on it. This program would set a fixed Treasury repo rate that would be available for unlimited size. The repo rate for the facility is likely to be considerably higher than the fed funds rate so it would not interfere with normal market repo operations, but be available if a squeeze occurs. It would require the Fed inventing a new program which generally takes a few months. Note that a PRF would NOT reduce the balance sheet strain on banks that wish to pass the Fed liquidity onto their clients as Fed repos are NOT balance-sheet netted in a matched book context, unlike repos cleared on the FICC. PRF could relieve some reserves banks are currently setting aside for daylight overdraft mitigation (RLAP) if a bank has certainty it can secure repos from the Fed at all hours of the day at a known (albeit high) rate.
4. PRF accessible by non-banks. This would address the bank disintermediation issue by providing liquidity directly to market participants. It would necessitate a new program, with additional safeguards necessary to address non-bank counterparty risk (perhaps a higher rate and overcollateralization requirement).
5. Make Discount Window Great Again. The Fed already has a punitive rate facility called the Discount Window (DW) which has been little used since the height of the GFC. It could modify that program to provide collateralized lending to banks (the discount rate is currently 2.75%) or non-banks (at a more punitive “secondary credit rate” of 3.25%). This option may be attractive and put into place quickly because the Discount Window facility is already in place and would not require the invention of a completely new program.

FIGURE 9. SOME POTENTIAL FED MEASURES AND IMPACT ON PERMANENT RESERVES, IMPROVING MONEY MARKET LIQUIDITY AND WHETHER IT CONSTITUTES A NEW FED PROGRAM

Potential Fed Measure	Add Reserve Permanently?	Improve Liquidity Available to MMKT?	New Program?
Reduce yield on reserves (IOER)	N	Maybe	N
QE to focus on T-Bills	Y	Y	N (Revive QE)
Permanent Repo Facility (PRF) for Banks	N	?*	Y
PRF Open to Non-Banks	N	Y*	Y
Open DW to All (with TSY collateralization)	N	Y	N (Modify DW)

\*Balance sheet constraints on banks to extend Fed liquidity to market. Source: Advocate

### Summary and Long-Term Implications

The recent repo market turmoil highlighted the impact of the post-GFC regulations on market structure.

- Excess reserve in the pre-GFC world was not highly regarded, but it has been magically transformed into a highly-prized asset by the combination of the most favorable LCR regulatory classification (HQLA-1) and high yield relative to other comparable assets.
- Regulatory balance sheet constraints such as Liquidity Coverage Ratio (LCR) and RLAP have dramatically increased the pressure on banks to hold onto their excess reserves rather than lend it out to help broad market liquidity.
- Banks' available reserves is considerably lower than the topline \$1.3 trillion excess reserve figure, perhaps less than \$300 billion.
- Reserves receive the most favorable RWA treatment in capital ratio calculations, giving banks another reason to hoard reserves.
- The end of QE saw Treasury ownership evolve away from unlimited balance sheets (central banks) to limited balance sheets (banks and investors), generating additional demand on the repo market to finance those Treasuries that the Fed no longer buys.
- The amount of available bank balance sheet to the market has declined significantly relative to the size of the market, especially for Treasuries.

The lack of dry powder vis-à-vis available reserves and limited bank balance sheet pose systemic risks to the US money market that, if not addressed by the Fed, could have very significant long-term implications, including:

1. Significant friction in the Fed's ability to transmit monetary policy, rates and liquidity to the market.
2. Increased occurrence of large repo squeezes not just during month-end, quarter-end and year-end periods, but also during times of Treasury auction and corporate bond settlements, corporate tax season and other times of liquidity demands.
3. Increased volatility and uncertainty for the Fed's new benchmark SOFR.
4. The necessity of more frequent Fed system-repo operations even in the current environment of large notional excess reserves, almost as if we're back in the days of zero excess reserves.

Those are just base cases. One real danger would be a scenario in which investors liquidate a large supply of bonds onto this creaky liquidity and balance sheet infrastructure.

### Scenario for A Real Mess in the Bond Market

One scenario that could push this delicate balance over the cliff is the unwinding of asset allocation into the bond market in recent years. The bond market has grown tremendously since the global financial crisis, much of it driven by flows into bond funds and ETFs. For example, the size of the Treasury market has grown from \$6 trillion in 2007 to \$18 trillion today, and Treasuries held by what we term “sensitive investors” (individuals, mutual funds and banking institutions) rose from \$2.5 trillion at the end of 2014 to \$5.0 trillion at the end of Q2-2019. Even a 20% reversal of this recent rise would unload \$500 billion of Treasuries onto the market. That is only Treasuries and doesn’t account for a similar deluge of corporate bonds that may be sold in a mass liquidation.

In an era of tight bank balance sheets, hoarding of excess reserves and limited availability of bank credit extension to the money market, any large-scale liquidation of bonds will be hard for counterparties to manage from a risk perspective, and hard to hold from a balance sheet and repo funding perspective. A bond liquidation scenario would cause long-end interest rates to normalize higher and steepen the yield curve, something that would be initially welcomed by the Fed and the banking system (as a steeper curve should improve bank net interest margin), so investors hoping for an immediate asset-based intervention by the Fed are likely to be very disappointed.

We see the following steps in the development of this scenario:

1. Some unknown triggering event causes interest rates to rapidly spike higher. While we have no idea of what that event could be, one obvious “known unknown” could be the resolution of the trade war between the US and China.
2. Higher interest rates produce negative performance in bond funds, especially long-maturity bond funds such as TLT.
3. Investors begin to liquidate out of bond investments into other assets. What might they buy? The trade-war resolution scenario could be viewed as highly favorable for equities.
4. Banks and primary dealers are inundated with bonds sold by funds and ETFs. They try to find the other side of the market but most investors would likely be better sellers in this scenario.
5. Some of the duration risk taken on by dealers and banks in this liquidation could be transferred to other market such as futures and swaps. For example, banks could sell bond futures or pay-fixed on swaps to negate the duration risk from bonds. Swap spreads would push wider, perhaps may even normalize into positive territory. Bond futures would cheapen relative to their basket of deliverables. But arbitrageurs may be unable to take advantage of this situation as they would require access to the repo market to implement their strategies.
6. The aggregation of liquidated bonds in the hands of “temporary buyers” (dealers, banks and other market-makers) results in a deluge of bond collateral and demand for financing, creating another squeeze event in the repo market. Repo rates spike higher.
7. Fed’s initial step would be to offer banks overnight and term repos. Banks that are balance sheet constrained (tapping the Fed repo facility and then offering to their client results in a

- doubling of balance sheet charges given that Fed repo cannot be netted down against FICC for leverage calculations) would be largely unable to pass the benefit to the broader market.
8. While investors would be paying for Fed to provide non-financing interventions, the Fed is unlikely to offer more than funding assistance for a while. The Fed should be initially quite happy for a significant steepening of the yield curve to take place and may not act until after rates and yield curve have normalized.
  9. Earlier we discussed some other measures the Fed could take that do not involve outright bond purchases, including the revival of some GFC-era programs.
  10. Finally, if the bond market is sufficiently dislocated, the Fed may have no choice but to reinstate some form of bond purchase program to sop up the bonds that the market cannot absorb. It could be done via open market purchases (new QE) or longer-term repo operations that temporarily removes the collateral and extends long-term financing.

### **Conclusion**

The ability of US banks to extend liquidity support to money markets during times of trouble has been impaired by post-GFC regulatory changes. One unintended consequence of these regulatory changes is that banks are very much incentivized to hoard excess reserves and are limited in their ability to provide contingent liquidity and balance sheet to the market. This weakens money markets, limits the ability of financial intermediaries moving in to take advantage of and heal market dislocations, and results in greater frequency and severity of liquidity spikes in the repo and money markets. The reduction in US banking system reserves from QT has brought this liquidity plumbing problem into sharp focus. The repo market turmoil in September is a mere foreshadowing of the new world order.

The recent repo turmoil had only a minor effect on the broader market (Fed Funds traded 5bps above the top end of its band for a day before dropping back), but it is symptomatic of the curtailed ability of the banking system to provide balance sheet and financing support to the market when it is needed most. This comes at an inopportune time when bond market size has grown tremendously and ownership of Treasuries is shifting from the Fed to investors who are sensitive to market rates and short-term financing. A foundation-shaking test of counterparty balance sheet and financing strength could come from a tidal wave of bond liquidations arising from a partial reversal of the recent influx of cash into global bond markets. Our advice to readers: get ahead of the crowd and **consider pruning back some bond exposure** or lock in term-financing to avoid getting trampled by elephants when they are fighting for the exit. Our advice to the Fed: buy T-Bills with that next QE and get ready to dust off and modify some GFC-era programs or invent new programs to address this regulation-driven liquidity disintermediation, because it is not going to heal itself.

*Scott Peng*  
*Chief Investment Officer*  
*Advocate Capital Management*

**DISCLAIMER**

This report reflects Advocate market views and opinions and does not constitute investment advice or research.

Nothing in this report constitutes investment advice, nor does any mention of a particular financial instrument, index or interest rate constitute a recommendation appropriate to the circumstances and needs of an investor to buy, sell, or hold any financial instrument, security, or investment discussed therein. Furthermore, this report does not constitute an offer to sell or issue investment interests or securities of any kind in a commodity pool, investment fund or any other type of advised account. Such advice or offer can only be made by delivery of an offering memorandum or a CTA Disclosure Document that has been filed with and accepted by the National Futures Association (NFA). Any such offer will be subject to the terms and conditions contained in such documents, including the qualifications necessary to become an investor.

The Manager may hold or control funds which may hold long or short positions in, or otherwise be interested in the financial instruments mentioned in this report.