



BANK OF ENGLAND

# Speech

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## **The impact of leveraged investors on market liquidity and financial stability**

Speech given by

Sir Jon Cunliffe, Deputy Governor Financial Stability, Member of the Financial Policy Committee, Member of the Monetary Policy Committee and Member of the Prudential Regulation Committee

Managed Funds Association Global Summit 2020

12 November 2020

I am grateful to Tom Baines, Stephen Denby, Rand Fakhoury, Tom Farrington, Richard Gordon, Nick Jackson, Stephen Newell, Matt Roberts-Sklar, Yousif Taki and Oliver Wood for their assistance in drafting these remarks.

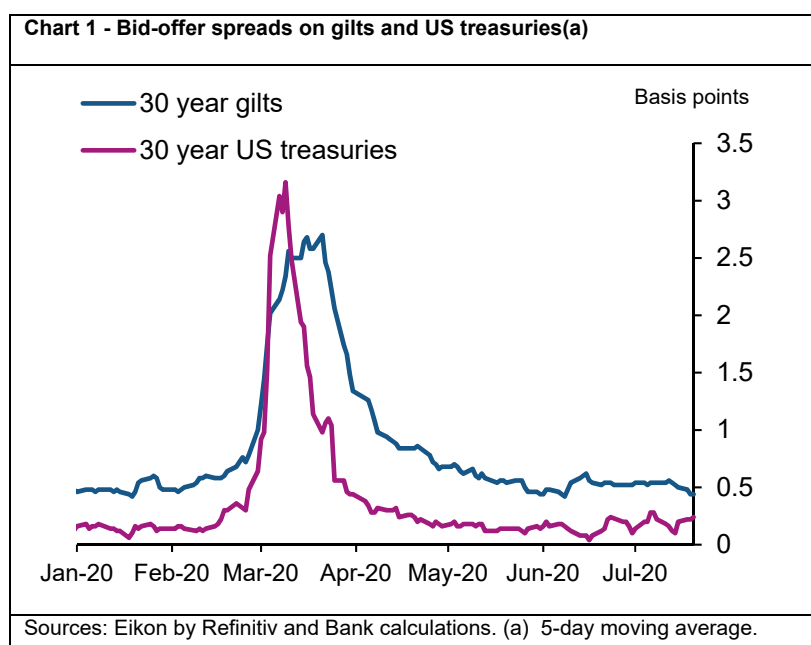
Thank you, Brooke, for that kind introduction and for inviting me to speak today on financial stability and market liquidity.

Earlier this year, we experienced the first real test of the financial system since the global financial crisis, 10 years ago. The pandemic that struck last spring was, and remains a true economic tail event; global GDP in the second quarter dropped by around 9%<sup>1</sup> and is not forecast by the IMF to return to pre COVID levels until at least 2022<sup>2</sup>. In the UK, GDP declined by nearly 20%<sup>1</sup> in the second quarter, the sharpest recession since that caused by the Great Frost at the beginning of the 18<sup>th</sup> century.

Economic prospects declined and economic risks soared in a matter of weeks. As they did so, the financial system came under a very severe stress from changing asset prices and demands for liquidity and from the shift to remote working.

The banking system appears to have come through this initial stress well, meeting the emerging demand from clients for liquidity, avoiding deleveraging and generally being able to provide support for the real economy. However, we saw extreme turmoil in financial markets – the so called ‘dash for cash’ – which was only calmed by massive central bank intervention.<sup>3</sup>

The resulting mass liquidation of assets had an impact on market liquidity even in the most liquid of markets. In late March, as you can see in **Chart 1**: the bid-ask spread on the US Treasury 30 year bond increased tenfold; the bid ask on the 30-year gilt increased by a factor of eight.



<sup>1</sup> See Bank of England [Monetary Policy Report – November 2020](#).

<sup>2</sup> See transcript of the [IMF's October 2020 World Economic Outlook press briefing](#).

<sup>3</sup> As described in speech by Andrew Hauser (2020), [Seven Moments in Spring](#).

In the UK, the Bank launched its largest and fastest single programme of asset purchases - £200bn of gilts and corporate bonds, equivalent to around a tenth of UK GDP. And similar unprecedented action was needed in the US and elsewhere to stabilise markets.

As with all such episodes, there are important lessons to be learned about what functioned well and what proved fragile under stress, and what and how we can improve.

I should like to talk today about what this stress has told us about market liquidity, and changes in the financial system over the last 10 years and how these may impact upon financial stability.

I should start with some definitions.

By financial stability, I mean first and foremost ensuring the financial system does not amplify economic shocks and, if possible, serves to dampen them. In other words, that the financial system as a whole doesn't make things worse. And if possible, that it makes them better.

A very important part of that is ensuring that the financial system does not cause the shock in the first place, as it did 10 years ago. But, as we are seeing now, the shock can originate outside the financial sector and in such cases it is just as important to ensure that the dynamics of the financial system do not amplify it.

By market liquidity, I mean the ability to transact in reasonable size at or close to mid-market prices prevailing prior to the trade<sup>4</sup>.

There are two ways to turn liquid assets into cash: either by simply selling them, using the liquidity available in the market; or by using funding liquidity, borrowing cash by pledging them as collateral. Crucially, funding liquidity also relies on market liquidity because secured loans, such as repo, assume the collateral can be liquidated.

The popular memory of the global financial crisis is one of the near failure of the banking system due to insufficient bank capital to absorb losses and insufficient banking liquidity to meet obligations.

But market liquidity can be as important to financial stability as bank solvency or bank liquidity.

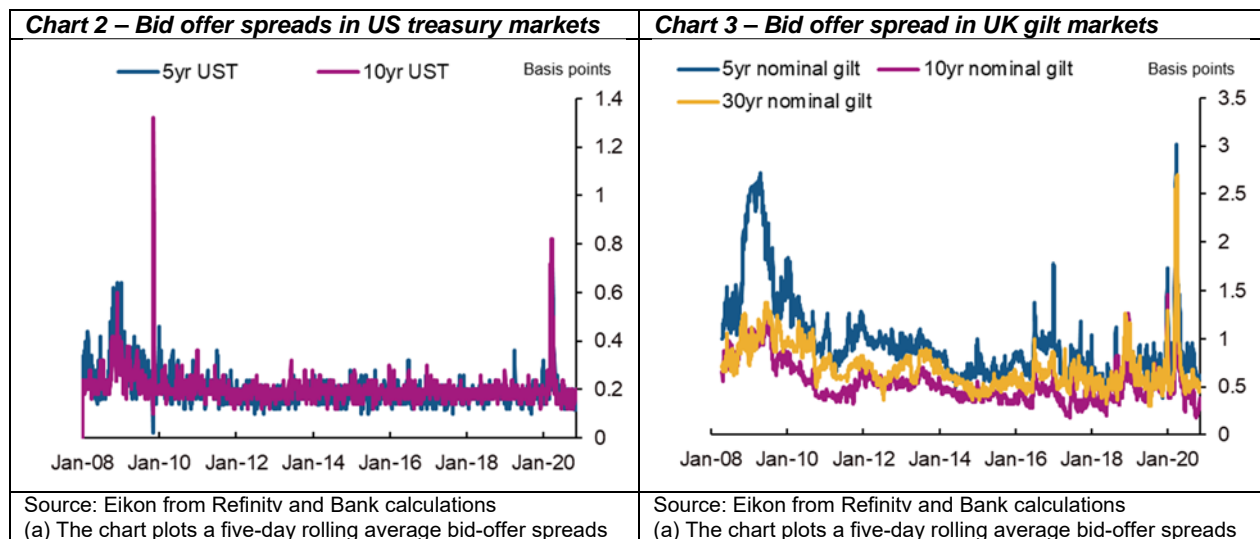
The ability to use the liquid asset buffers that banks and other firms hold to meet stress can depend on market liquidity directly, for example for those holding government bonds or futures. It can also depend on it indirectly if firms cause an intermediary to liquidate assets. For example, if a firm redeems shares in a money market fund, that fund may need to liquidate assets in order to satisfy this redemption or to replace cash buffers.

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<sup>4</sup> See Anderson et al (2015), "[The resilience of financial market liquidity](#)", Financial Stability Paper No. 34, October 2015.

Following an economic shock, investor appetite usually shifts from risky to safer, more liquid, assets which generally increases demand in the government bond market. This occurred at the outset of the Covid-19 episode. However, as conditions became more severe, there was exceptionally high demand for cash and near-cash, short-dated assets.

As I mentioned earlier, and you can see in **Charts 2 and 3**, market liquidity suffered even - and most rapidly - in the deepest markets for the safest assets at the core of the system, most notably the US Treasury market. This deterioration, on first examination, appears to have been materially greater than might have been expected from the increase in volatility.



To learn the lessons from the ‘dash for cash’, we need to understand the dynamics of what occurred in these markets.

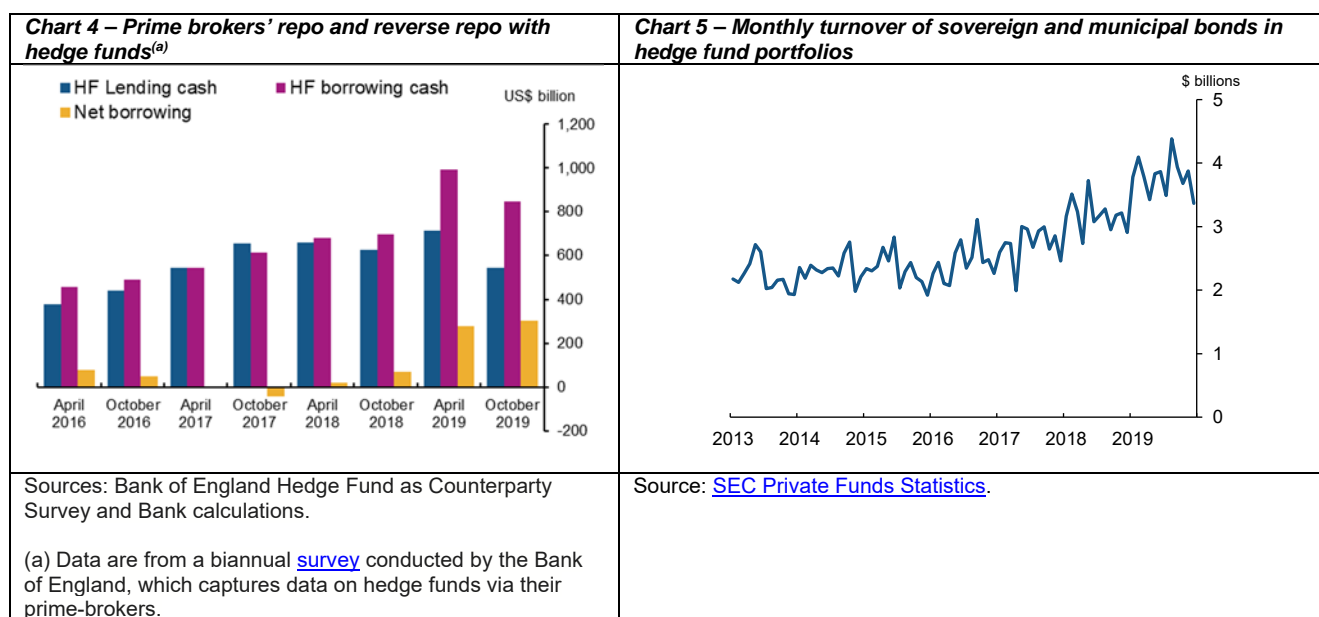
To pose the question in an extreme form, was it simply the result of a massive, precautionary shift to cash in which sellers overwhelmed buyers and the ability of market makers to take risk?

Or, as markets adjusted sharply, were there dynamics and fragilities in the financial system that both amplified the demand for cash and reduced the ability of the core markets to provide it?

There are many areas in which one might look to see whether such dynamics were at play – liquidity mismatches in open-ended funds, margin calls, reduced activity of bank broker dealers. Given the inter-connectedness of modern market-based finance, and the role played by these core markets, any evaluation of this episode has to be comprehensive in nature. The review currently underway by the Financial Stability Board (FSB), of which I will say a little more at the end, adopts such a comprehensive, ‘holistic’ approach.

But I want to drill down today on one of the developments we have seen in recent years, namely the increasing importance of non-banks for market liquidity.

In most core markets, such as bonds and derivatives, the dominant intermediaries who provide market liquidity remain dealer banks.<sup>5</sup> However, since the financial crisis, less regulated non-banks - particularly leveraged investors such as hedge funds - have increasingly been taking on roles previously dominated by dealers. For example, you can see in **Charts 4 and 5** that in recent years hedge funds have been increasing their lending of cash as well as their borrowing, and we have seen a continual increase in turnover by hedge funds in sovereign and municipal bonds.

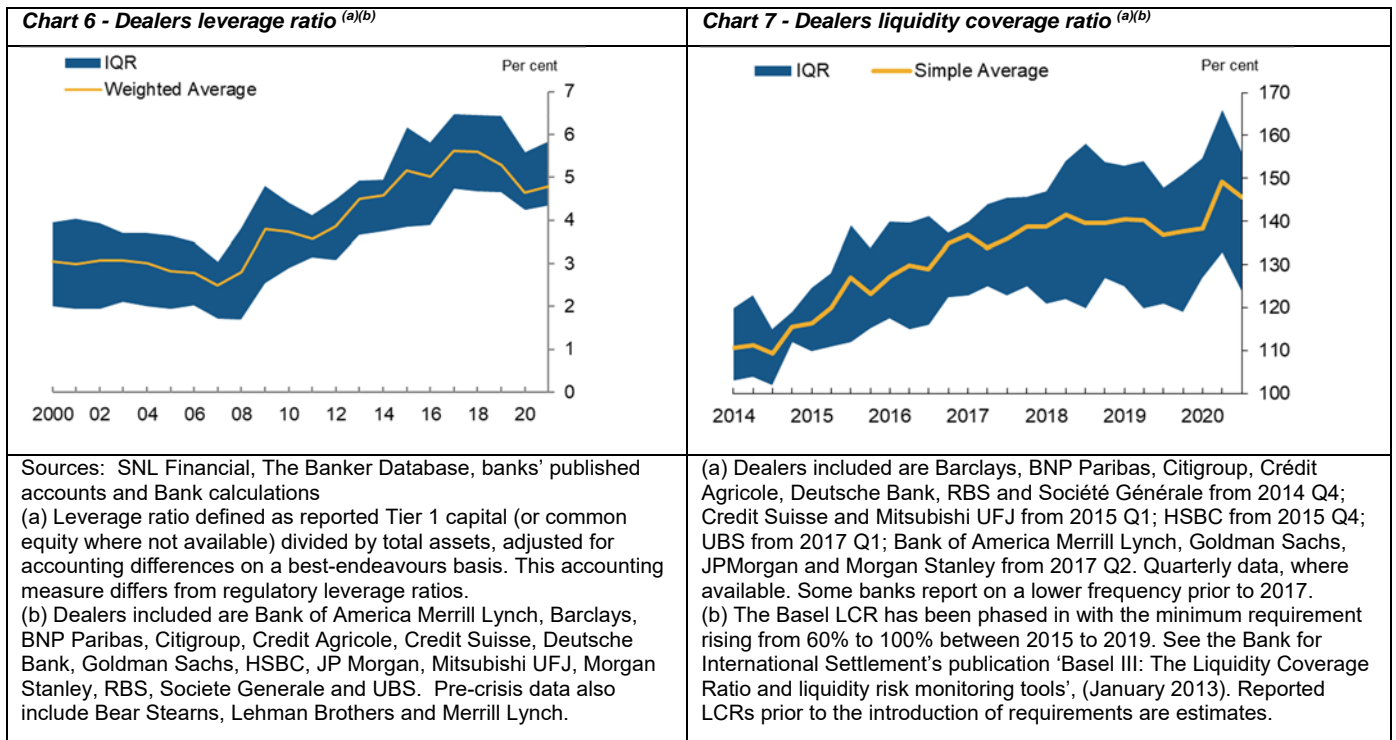


This has been due, in part at least, to post crisis reforms which strengthened the resilience of bank dealers and to changes in banks’ risk appetite.<sup>6</sup>

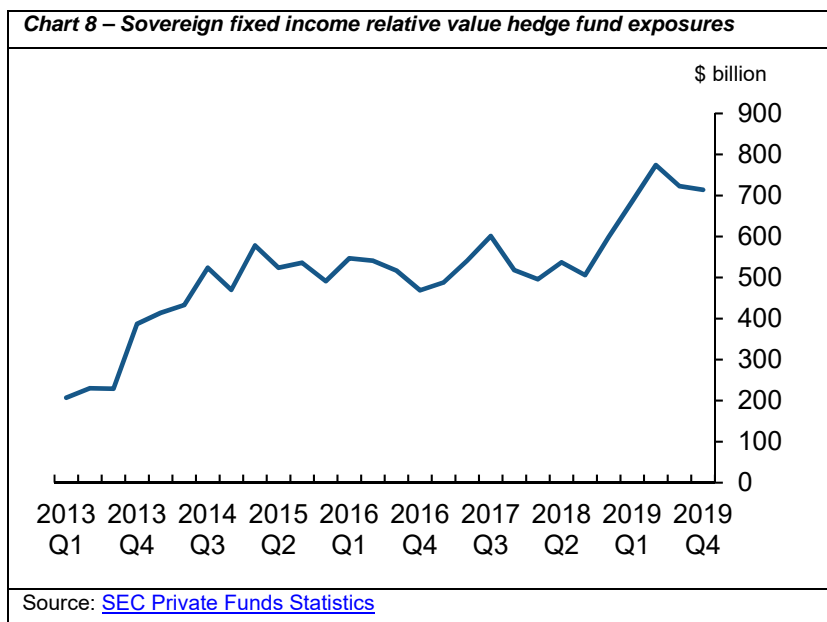
As you can see in **Chart 6**, the weighted average dealers’ leverage ratio has increased from around 2 percent prior to the GFC to 5 percent in recent years. And **Chart 7** shows that over the last 5 years the dealers’ liquidity coverage ratio has increased from around 110 percent to over 140 percent.

<sup>5</sup> In some core markets, most notably spot FX and some futures markets, principal trading firms play an increasingly important role. See, for example, [July 2019 Financial Stability Report](#), Box 3.

<sup>6</sup> Post crisis reform also disincentivised proprietary trading. See [“Proprietary Trading Review”](#), Bank of England Prudential Regulation Authority, September 2020.



These changes have contributed to bank dealers being less willing to employ their balance sheets as opposed to simply matching buyers and sellers. This has been especially true for banks' involvement in trades that arbitrage the difference between prices of closely related assets, and potentially require significant balance sheet commitment. Leveraged non-banks have taken the opportunity to occupy some of this space.<sup>7</sup> For example, **Chart 8** illustrates a marked increase in sovereign fixed income relative value hedge fund exposure.



<sup>7</sup> [Boyarchenko et al \(2020\)](#) argue that changes in regulation and market structure since the 2008 crisis made it more expensive to engage in arbitrage activity, both for dealers and for hedge funds via their prime brokers.

The role leveraged investors play in supporting market liquidity is dependent on funding from dealer banks. The amount of leverage required to render such activity a profitable proposition varies from market to market depending on a fund's strategy and the perceived risk.

In 'business as usual', leveraged funds can add to market liquidity and efficiency.

This is particularly true of arbitrage trades mentioned above, which help ensure that inefficient spreads do not emerge between assets of the same economic value.

Opportunities for such strategies have grown in recent years, most notably in sovereign fixed-income relative value trades as we just saw in **Chart 8**.

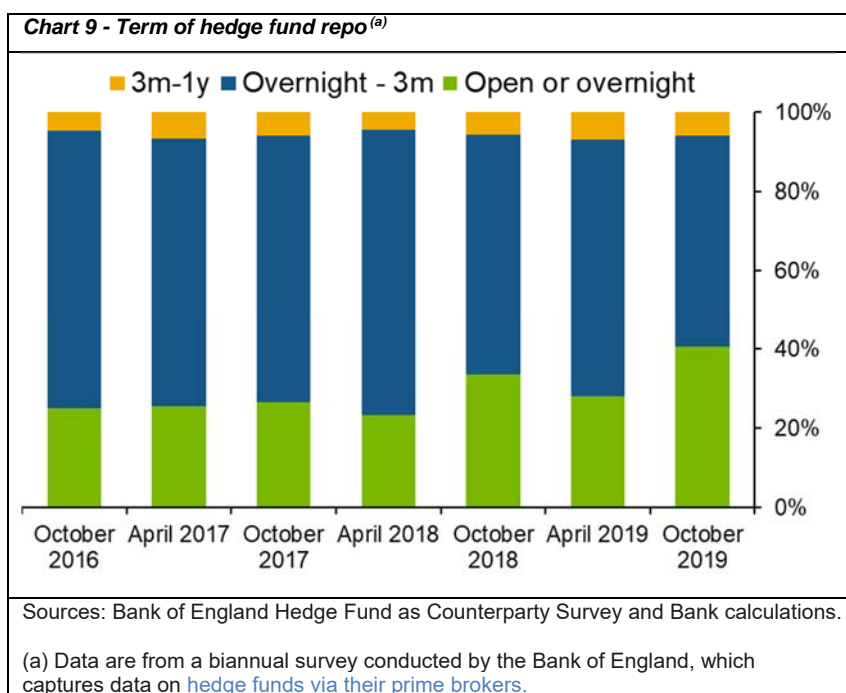
However, while it can add to market liquidity and efficiency in normal times, highly leveraged arbitrage can add fragility and act as an amplifier in conditions of severe but plausible systemic stress and high volatility.

During such periods, leveraged non-banks' own, prudent, risk management procedures may lead to a sharp reduction or withdrawal of arbitrage activities.

High levels of leverage mean that small price moves can lead to large losses relative to the fund's Net Asset Value, while at the same time growing margin requirements reduce the amount of funding to support trading. This combination of losses and liquidity demands can very quickly generate pressure on funds to delever, either because of internal risk limits, withdrawal of funding or higher margin/haircuts making trades less attractive.

Such deleveraging by levered funds can reduce the supply of market liquidity, while at the same time increasing the demand for market liquidity

These trades often inherently involve some form of liquidity and maturity mismatch. Positions in long maturity sovereign bonds are often funded in repo markets in overnight or other very short-term transactions **Chart 9**, for example, shows an increase in the proportion of short-term hedge fund repo.



In order to maintain these positions, funds rely on continued provision of funding from their repo counterparties, who tend to be banks. And there is significant ‘tiering’ of access to funding in volatile markets, with smaller less profitable funds likely to see their access to funding reduced most acutely in a stress.

To illustrate some of these dynamics under stress, I should like to focus on the experience, last March, of funds that were engaged in the US Treasuries cash-futures basis trade.

Going into the March shock, hedge funds had been arbitraging deviations in price between US Treasuries and US Treasury futures. This involved purchasing bonds, funding these by borrowing cash in repo markets,<sup>8</sup> and selling futures.

This activity helped to support market liquidity while volatility was low. It helped ensure pricing relationships between instruments were predictable, providing intermediaries with effective hedging tools to manage their risks.

The activity also supported futures markets liquidity. In recent years, asset managers have increasingly chosen to use Treasury futures to manage exposures to the yield curve - as you can see in **Chart 10**. This has been driven by liquidity, operational simplicity and the leverage embedded within these derivatives. The activity of arbitragers balanced this flow, supporting liquidity in the futures market.

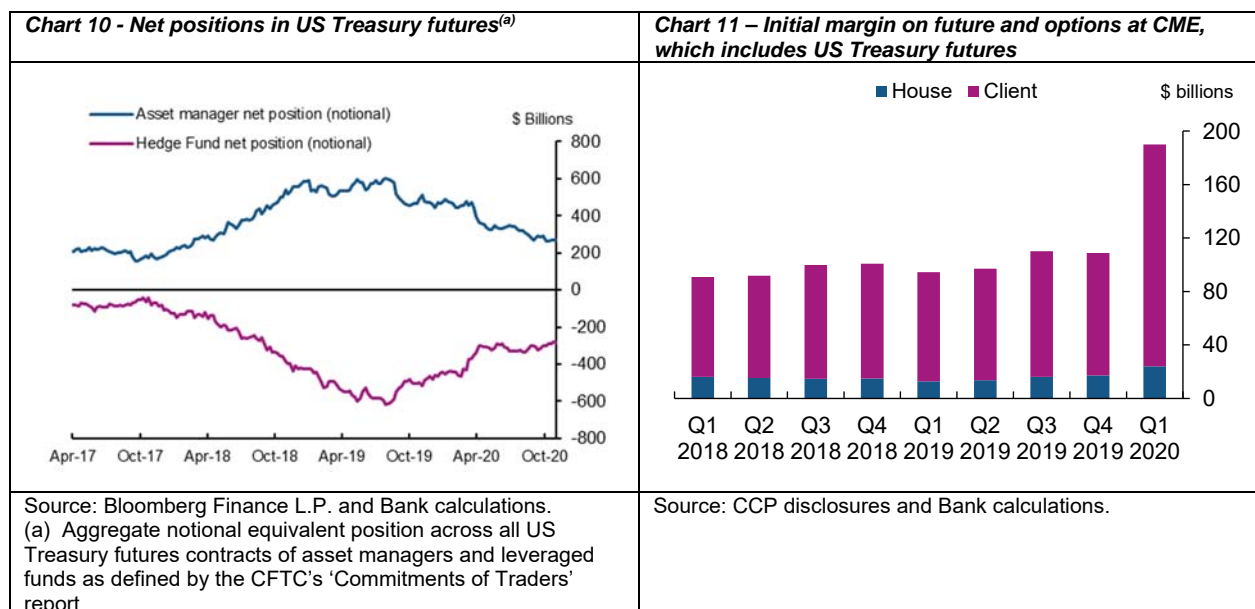
<sup>8</sup> See “[Have hedge funds increased their use of repo borrowing?](#)”, Bank of England Bank Overground blog, February 2020



The basis differential however existed for a reason: the attractiveness of the future relative to the cash bond despite their apparent substitutability. The arbitrageurs were exposed to the risk that, under stress and conditions of extreme volatility, the gap between the future and the cash market would increase, perhaps due to the cost of financing or margin, or due to an increase in the liquidity differential between the products.

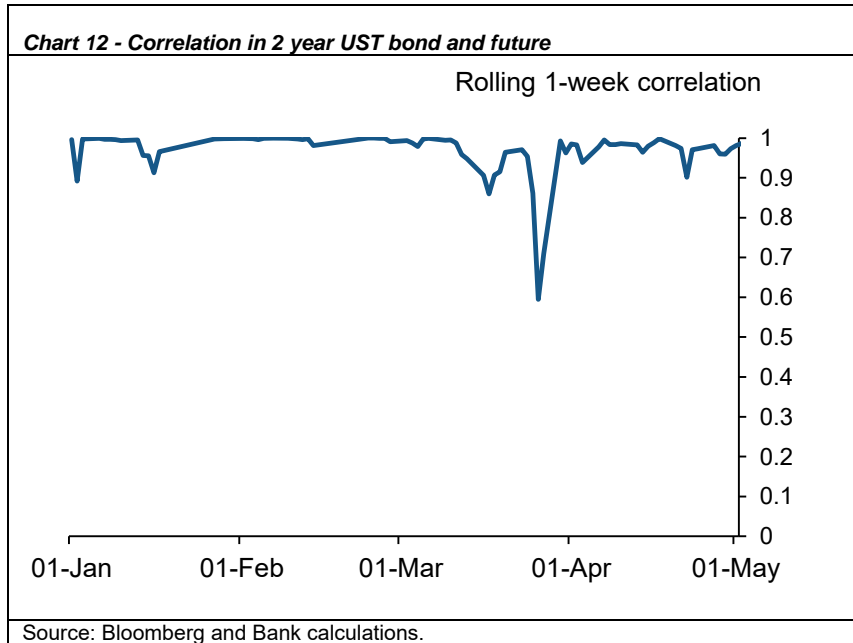
During March this risk crystallised. There were substantial selling flows in cash US Treasury markets, as the ‘flight to safety’ became the ‘dash for cash’.<sup>9</sup>

These selling flows widened the price differences between cash bonds and futures, with arbitrageurs accruing significant losses as a result. As margin requirements and concerns over the availability and cost of funding grew as shown in **Chart 11**, arbitrageurs in aggregate reduced exposure to these positions, increasing the stress still further.



In sum, arbitrageurs had turned from buyers to sellers, at a time when dealers were already struggling to absorb selling flows. Pricing relationships between bonds and bond futures broke down as you can see in **Chart 12**, removing a key hedging tool that intermediaries had relied upon to transfer risk. And the demand and supply for futures became unbalanced. Arbitrageurs had gone from being a stabiliser of the market to being an amplifier of market stress.

<sup>9</sup> For example, see Schimpf et al (2020), “[Leverage and margin spirals in fixed income markets during the Covid-19 crisis](#)”, Bank for International Settlements, Duffie (2020) [Still the world’s safe haven?](#), Barth and Kahn (2020), “[Basis Trades and Treasury Market Illiquidity](#)”, Office of Financial Research., Di Maggio (2020), “[The role of hedge funds in the 2020 Treasury market turmoil](#)”.



The dynamic unwinding of leveraged relative value trades following a tail event is not new. Perhaps the closest, most famous example was Long-Term Capital Management in 1998.<sup>10</sup> But we have not before seen such a combination in a systemic stress.<sup>11</sup>

How big a role did the crystallisation of these risks have on the disappearance of liquidity in core markets, particularly the US Treasury market, during the turmoil last spring?

As I have noted, there were many other demands on market liquidity during that episode: investment funds, including money market funds, selling assets following or in anticipation of redemption; official sector sellers; risk parity funds unwinding leveraged positions; and increases in both initial and variation margin calls.

But the episode also showed the impact that extreme price volatility, reliance on dealer funding and margin calls can have on the role some leveraged non-banks play in supporting market liquidity.

There is strong evidence that it led to funds deleveraging and exiting from trades.<sup>12</sup>

The important question, however, from a financial stability perspective is not only whether these dynamics occurred but also whether they were large enough to have material impacts on market liquidity.

<sup>10</sup> See "[Hedge Funds, Leverage, and the Lessons of Long-Term Capital Management](#)", Report of The President's Working Group on Financial Markets, April 1999.

<sup>11</sup> The 1999 [report into LTCM](#) highlights some issues familiar from the recent stress: "The principal policy issue arising out of the events surrounding the near collapse of LTCM is how to constrain excessive leverage. By increasing the chance that problems at one financial institution could be transmitted to other institutions, excessive leverage can increase the likelihood of a general breakdown in the functioning of financial markets. This issue is not limited to hedge funds; other financial institutions are often larger and more highly leveraged than most hedge funds."

<sup>12</sup> See Barth and Kahn (2020), "[Basis Trades and Treasury Market Illiquidity](#)", Office of Financial Research.

This is not a straightforward question to answer. Assessing the impact of the dynamics I have set out is complex and requires granular analysis.

The good news is that we have much better data than we had 10 years ago.<sup>13</sup> But there are still issues we need to resolve to get a clear picture given that non-banks are operating across many markets and jurisdictions, and to ensure we measure the right things to understand the risks from leverage.

Measuring aggregate leverage in hedge funds, for example, misses the point that some trades, like bond-futures basis, use very high levels of leverage whereas others (such as long-short equity or credit) do not. As the Financial Policy Committee of the Bank of England set out in its 2018 assessment of the risks from leverage in the non-bank financial system,<sup>14</sup> using gross to net asset value does not give a good indication of the *risks* from leverage. For that, we need to understand potential liquidity demands and potential losses.<sup>15</sup>

Nor might it be as simple as it looks to measure the market impact of the unwinding of these strategies. We might, for example, expect that the cheapest to deliver bond in a futures contract will be more liquid than other instruments so it may be that changes in relative pricing rather than in absolute prices might give a better read. And we know that some traders hold bonds other than the cheapest to deliver for extra yield, and these might be the first bonds to be offloaded when funds exit the trade.

We do not yet have all the answers to such questions. But it is important from a financial stability perspective that we find them.

If the expected level of market liquidity relies on high levels of leverage - and if the dynamics of leveraged non-bank activity mean that liquidity providers become liquidity demanders in highly volatile conditions - then we need to look at whether we have got the balance right between increased market efficiency in business as usual conditions and resilience under severe but plausible stress.

This is not to say that there will be a single explanation of the 'dash for cash' and that we will find it in the amplification dynamics of leveraged non-banks. Leveraged non-banks do not operate in isolation. Their activity is interconnected with many parts of the market-based finance system, linking to banks, other non-banks and financial market infrastructure.

As I have said, many factors were at play in the March episode. We need to look at all of the links in the liquidity chains that connect market participants.

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<sup>13</sup> We have better data on hedge funds through regulatory reporting e.g. the SEC's Form PF in the US and AIFMD reporting in the UK and EU. And we have more granular transaction data on many markets, e.g. via MIFID II, Sterling Money Market data and EMIR trade repository data on derivatives.

<sup>14</sup> See "The FPC's assessment of the risks from leverage in the non-bank financial system", [Bank of England November 2018 Financial Stability Report](#), in particular Box 6

<sup>15</sup> See the "[Bank of England's response to the IOSCO consultation report on the use of leverage by investment funds](#)".

The FSB, which was itself one of the key reforms of the great financial crisis, is the natural home for such work, given the cross-jurisdiction nature of many non-bank activities and the range of regulatory authorities and central banks involved.

And, I am pleased to say that such a comprehensive, 'holistic' analysis is precisely what the FSB has undertaken and is due to be delivered to the G20 summit later this month.

As well as outlining how the non-bank financial intermediation sector fared in March, the FSB's review will set out a comprehensive work plan of specific and cross-cutting issues that need further attention at the international level, including identifying areas where policy changes may be needed.

I do not want to anticipate that report. But I did want to finish by briefly giving a view on two of the links in the chain that appear to have had the greatest relevance to the leveraged non-banks supplying market liquidity, namely bank dealers and CCP margin calls.

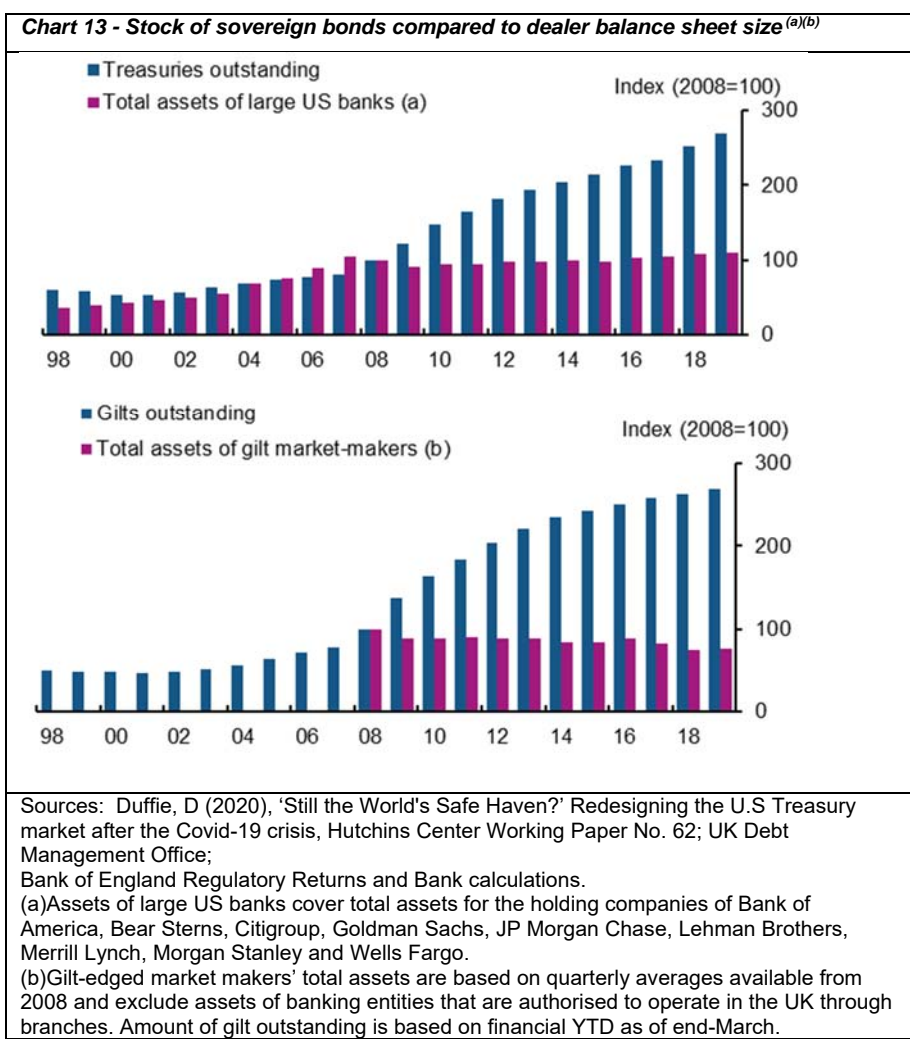
I said at the outset that one of the features of the Covid stress has been the resilience of the banking system – particularly the global banks at the centre of the system. One cannot over-estimate the importance of this – one only has to imagine what might have resulted from the combination of the Covid shock and a banking crisis.

This crisis is not yet over, of course. But I am pretty sure that, absent the strengthening of the banking system carried out over the last 10 years, systemic banks would have found it very difficult, if not impossible, to withstand the force and speed of the shock we experienced last spring.

It may be that this has resulted in reduced dealer ability to provide liquidity and funding in stress, though I suspect banks' risk aversion and the sheer scale of market-based finance liquidity demands have played at least as important a role. As **Chart 13** shows, the amount of sovereign bonds outstanding continues to increase but intermediary balance sheets do not. We do, of course, need to look at dealer activity during the March episode.<sup>16</sup> But we cannot expect to improve the resilience of market liquidity under stress by weakening the resilience of the core banking system.

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<sup>16</sup> See, for example, [Duffie \(2020\)](#), "Still the world's safe haven?"



We need to look at margin calls through a similar lens. The margining reforms, for both cleared and non-centrally-cleared instruments, of the past ten years have been designed to prevent widespread counterparty credit risk emerging under stressed conditions.

Regular exchange of variation margin, which is driven mechanically by changes in asset prices, is a key part of risk management by market participants in derivatives markets. And initial margin protects all the members of clearing houses from the failure of one or more of their number given that losses are mutualised once initial margin is exhausted.

Again we need to look at how margin operated during the dash for cash. Did margin call reflect, as it was intended to do, movements in asset price and increases in risk? Or was it greater than might have been expected for the volatility experienced in March? An important aspect of that question is whether market participants had the information they needed to be able to anticipate and prepare the impact of margin calls in a severe but plausible stress.

But we also need to look at whether market participants actually factored such an impact into their trading and investment strategies. And, if they did, whether they were able to turn the supposedly liquid assets they held against these risks into cash when needed.

This last point not only brings us back to the issue of market liquidity in core markets but also raises the question of the role of central banks as the ultimate providers of liquidity to the system.

An overarching question is whether, in light of the growth of market-based finance relative to dealer intermediation capacity, central banks have the right tools to ensure they can continue to meet their objectives for both monetary and financial stability in an effective and efficient way.

Following on from that, in which markets and securities, and when, should central banks stand ready to provide backstop support for liquidity in stress? Should they be clearer about the principles that might guide such interventions? And, crucially, how can the potential risks and costs of interventions in markets — financial and moral hazard — best be reduced, through appropriate pricing and accompanying regulatory requirements?

The Bank of England supports further work on these issues by central banks alongside the work underway in the FSB to review the resilience of market-based finance.<sup>17</sup> However, central bank intervention cannot be a substitute for reforms that mitigate the vulnerabilities in financial markets that give rise to liquidity stresses in the first place.

And to the extent that such vulnerabilities arise from market activity that aids liquidity in good times but is fragile and damages liquidity in stress, we have, as I have said, to assess whether we have got the balance right between efficiency in the short term and resilience through time.

This is not a new question for those of us in the financial stability trade. We faced a very similar question in relation to banks after the global financial crisis ten years ago. To be sure, the answers on market liquidity will not be the same. Market-based finance and banking are very different. The right balance and the way of achieving it may well lie in a different place.

But we cannot ignore the events we saw last March, even if the primary cause lay outside the financial system. And wherever the answers lie, we should learn the lessons of those events to ensure that they are not repeated.

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<sup>17</sup> See Bank of England [August 2020 Financial Stability Report](#) and [Financial Policy Summary and Record - October 2020](#).