

Risks from leverage: how did a small corner of the pensions industry threaten financial stability? – speech by Sarah Breeden

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Speech

On the afternoon of 28 September, I found myself in a rather unusual position: having to explain to journalists why a part of the pensions industry, unheard of to most of their readers, had posed such a large threat to financial stability that it warranted intervention in the gilt market from the Bank of England.

Financial markets globally had been volatile for months. But in the days leading up to that fateful Wednesday and following the announcement of the Government's growth plan on 23 September, long-dated gilt yields in particular had moved with extraordinary and unprecedented scale and speed.

Now volatility itself does not warrant Bank of England intervention. Indeed, it's essential that market prices are allowed to adjust to changes in their fundamental determinants efficiently and without distortion.

However, some liability-driven investment (LDI) funds were creating an amplification mechanism in the long-end of the gilt market through which price falls had the potential to trigger forced selling and thereby become self-reinforcing. Such a self-reinforcing price spiral would have resulted in even more severely disrupted gilt market functioning. And that would in turn have led to an excessive and sudden tightening of financing conditions for households and businesses.

In response to this threat, the Bank of England intervened on financial stability grounds. But what led to that intervention?

The root cause is simple – and indeed is one we have seen in other contexts too – poorly managed leverage.

So today I'll set out how leverage outside the banking sector can create risks to financial stability, starting with that small corner of the pensions market. And then I'll set out what needs to be done - by participants, by their regulators and by financial stability authorities - if we are to ensure those risks to financial stability are reduced.

How did a small corner of the pensions industry threaten financial stability?

Many UK DB pension schemes have been in deficit, meaning their liabilities – their commitments to pay out to pensioners in the future – exceed the assets they hold. DB pension schemes invest in long-term bonds to hedge the interest rate and inflation risk that arises from these long-term liabilities. But that doesn't help them to close their deficit. To

do that, they invest in 'growth assets', such as equities, to get extra return to grow the value of their assets. An LDI strategy delivers this, using leveraged gilt funds to allow schemes both to maintain material hedges and to invest in growth assets. Of course that leverage needs to be well managed.

The rise in yields in late September – 130 basis points in the 30-year nominal yield in just a few days – caused a significant fall in the net asset value of these leveraged LDI funds, meaning their leverage increased significantly. And that created a need urgently to delever to prevent insolvency and to meet increasing margin calls.

The funds held liquidity buffers for this purpose. But as those liquidity buffers were exhausted, the funds needed either to sell gilts into an illiquid market or to ask their DB pension scheme investors to provide additional cash to rebalance the fund. Since persistently higher interest rates would in fact boost the funding position of DB pension schemes¹, they generally had the incentive to provide funds. But their resources could take time to mobilise.

The issue was particularly acute for one small corner of the LDI industry – pooled funds. In these funds, which make up around 10-15% of the LDI market, a pot of assets is managed for a large number of pension fund clients who have limited liability in the face of losses. The speed and scale of the moves in yields far outpaced the ability of the large number of pooled funds' smaller investors to provide new funds who were typically given a week, in some cases two, to rebalance their positions. Limited liability also meant that these pooled fund investors might choose not to provide support. And so pooled LDI funds became forced sellers of gilts at a rate that would not have been absorbed in normal gilt trading conditions, never mind in the conditions that prevailed during the stressed period.

Other LDI funds, with segregated mandates, were more easily able to raise funds from their individual pension scheme clients. However, given their scale, at 85-90% of the market, some of these funds were also contributing to selling pressure, making the task at hand for pooled LDI funds even harder. And of course if the pooled funds had defaulted, the large quantity of gilts held as collateral by those that had lent to the funds would potentially be sold on the market too.

With the gilt market unable to absorb such forced sales, yields would have been pushed even higher, making the scale of the selling need even larger still. This is the self-reinforcing spiral that the Bank intervened to prevent.

¹ As an illustration, the Pension Protection Fund's [PPF 7800](#) index suggests that, between end-2021 and end-September 2022 – a period in which interest rates rose substantially – the liabilities of UK DB schemes fell by 36% (from £1,689bn to £1,076bn), whereas their assets fell by only 20% (from £1,818bn to £1,451bn), leaving their net assets nearly three times higher.

The Bank's 13 day and £19.3 billion intervention was made on financial stability grounds. It was the first example of us acting to deliver our financial stability objective through a temporary, targeted intervention in the gilt market.

But let me emphasise: the asset purchases were a means to an end. They were designed to create the right conditions in the right part of the gilt market for long enough so that the LDI funds could build resilience so that their leverage would be well managed once the asset purchases had ceased and should gilt market instability return.²

What does this episode remind us about the risks from non-bank leverage?

Leverage is an integral part of the economy. It allows households to borrow to buy houses and smooth consumption. It allows companies to invest in projects or to smooth cashflows. It allows banks to finance these activities.

In the non-bank financial system, leverage is used: to facilitate trading; to invest in companies and infrastructure; and to arbitrage price discrepancies and so improve the efficiency of financial markets.³

Leverage is created in different ways. Its most obvious form is to borrow money to buy assets – 'financial leverage'. But it arises also through 'synthetic leverage' using derivative instruments. This allows users to adjust risk profiles through a relatively small initial outlay, with future gains or losses contingent on changes in underlying market prices. Those future gains and losses create financial obligations – a form of contingent 'hidden' leverage if you like.

It's clear that leverage is a key function provided by the financial system in support of a thriving and productive economy. But it comes with inherent risks that need to be managed.

A common factor across all the uses of leverage I have just described is that it can increase the exposure of the leverage taker to underlying risk factors – whether that be house prices, earnings, interest rates, currencies or asset prices. It follows therefore that leverage can amplify shocks to each of these risk factors. And in a stress, that can lead both to sudden spikes in demand for liquidity – either to support the financing of leveraged positions or as de-leveraging leads to forced sales – and a corresponding contraction in liquidity supply, with potentially systemic consequences.

² See [Thirteen days in October: how central bank balance sheets can support monetary and financial stability – speech by Andrew Hauser](#)

³ See [The impact of leveraged investors on market liquidity and financial stability – speech by Jon Cunliffe](#)

Leverage is of course not the only cause of systemic vulnerability in the non-bank system – as we have seen with liquidity mismatch driving run dynamics in money market funds (MMFs) and open-ended funds (OEFs) during the dash for cash.⁴ But it is important where any form of leverage is core to a non-bank's business and trading strategy. Indeed what happened to LDI funds is just the latest example of poorly managed non-bank leverage throwing a large rock into the pool of financial stability. From Long Term Capital Management in 1998; to the 2007 run on the repo market; to hedge fund behaviour in the 2020 dash for cash; and the failure of Archegos in 2021.

These episodes highlight the need to take into account the potential amplifying effect of poorly managed leverage, and to pay attention to non-banks' behaviours which, particularly when aggregated, could lead to the emergence of systemic risk.

I see systemic risk from leverage in the non-bank system arising through two different channels of contagion:

- to markets – both those non-banks invest in and those they borrow from;
- to counterparties – who either provide cash, or take the other side of instruments that are used to provide synthetic leverage.

To the extent that these markets and counterparties are important for the functioning of the financial system and for the real economy, problems transmitted can have adverse consequences for economic growth and financial stability.

The market channel

Let's start with the market channel. Here excessive or poorly-managed leverage increases the potential for forced asset sales in the face of shocks, with adverse implications for market functioning and so the real economy.

Feedback loops and amplification mechanisms can arise in two ways – through unexpected liquidity strains (most obviously as a result of margin increases) or through large, concentrated positions.

I'll cover liquidity strains first.

Banks and CCPs typically require their counterparties to place collateral, in the form of margin or haircuts, to protect against counterparty risk. And sharp changes in asset prices, high volatility or correlated shocks affect the amount of counterparty risk to which they are exposed.

⁴ See [Taking our second chance to make MMFs more resilient - speech by Andrew Bailey](#)

As market prices change and as risk rises, the bank or CCP can request more collateral. (Variation margin to reflect the change in market prices; and higher initial margin to reflect greater risk in a given position.) And meeting those collateral demands creates liquidity risk for the leveraged institution that needs to be managed.

This more widespread collateralisation of derivatives has been an essential part of the package of reforms to address fault-lines exposed in the Global Financial Crisis. Initial margin requirements are vital to limit cascading counterparty credit risks, as I will cover later.

But more widespread collateralisation has increased the sensitivity of liquid-asset demand to market volatility. And, if market participants are not prepared for such calls, their actions to raise cash can squeeze liquidity in already stressed markets, further amplifying shocks.

So whilst greatly reducing counterparty credit risks, with important systemic benefits, collateralisation may also increase systemic liquidity risks.

This dynamic was at play in the 'dash for cash' in March 2020, where hedge funds with highly leveraged positions in US Treasury cash-futures basis trades, were one source of the boost in demand for liquidity.⁵ When markets turned against them, these investors unwound their positions, selling US Treasuries at scale, contributing to a short but extreme period of illiquidity in these usually safe and liquid markets. That added to dysfunction and necessitated unprecedented central bank intervention.^{6 7 8 9}

The behaviour of financial intermediaries can also matter when a stress hits too - since what can seem rational behaviour for an individual firm has the potential to cause negative second-round effects when aggregated across the market as a whole. For example, low initial margins and haircuts in normal times can result in significant margin increases when a stress hits. If these occur market-wide, it can lead to a reduction in market activity, damage market functioning, and potentially amplify market moves at a time of stress.

The second mechanism is via large, concentrated exposures, which can exacerbate the impact of liquidity strains and so amplify the impact of deleveraging on markets in the event of a shock. It can be seen in events in the gilt market I described earlier.

⁵ See ['The role of non-bank financial intermediaries in the 'dash for cash' in sterling markets', Bank of England Financial Stability Paper, number 47.](#)

⁶ See ['Seven Moments in Spring: Covid-19, financial markets and the Bank of England's balance sheet operations'](#) – speech by Andrew Hauser

⁷ See ['Sizing hedge funds' Treasury market activities and holdings'](#),

⁸ See ['Hedge Funds and the Treasury Cash-Futures Disconnect'](#)

⁹ See ['Leverage and margin spirals in fixed income markets during the Covid-19 crisis'](#)

The concentrated and correlated nature of pooled LDI funds' exposures meant that their forced selling behaviour represented a sudden and profound shift in supply-demand dynamics.

Indeed the self-reinforcing spiral it led to meant that around £200 billion of pooled LDI funds¹⁰ threatened the £1.4 trillion traded gilt market, which itself acts as the foundation of the UK financial system, underlying around £2 trillion of lending to the real economy through wider credit markets.¹¹

As such, it was a timely reminder that large concentrated exposures and correlated behaviours can strain market functioning so much that financial stability can be threatened.

The counterparty channel

Now let's turn to the counterparty channel – where leverage increases the risk of an entity's default and so brings losses for their counterparties, threatening the resilience of systemically important firms and so the real economy.

Margins are at the core of bank and CCP toolkits for managing these counterparty risks. They are essential to stop cascading counterparty losses around the system broadly.

But margins will only be adequate if counterparty credit risks can themselves be adequately assessed. And assessing the risk of a leveraged institution can be challenging – perhaps because its exposures are in the form of synthetic or “hidden” leverage or because its exposures are more concentrated or correlated than the counterparty is able to understand.

In the case of Archegos, for example, individual counterparties were not sighted on the total size of the firms' sizeable and concentrated swap positions, meaning they had imperfect information on which to manage counterparty credit risk.

In fact, when margin was called as prices moved against Archegos in March 2021, the firm was forced to liquidate its concentrated positions, further amplifying adverse price movements, through the market channel I just described. The end result was that Archegos could not meet all of its margin calls, and its default left its bank-affiliated prime brokers sharing around \$10 billion in counterparty credit losses.

¹⁰ The Pensions Regulator has noted that as of end-2021, c. 15% of the roughly £1.4tn in UK LDI assets were in multi-investor pooled funds, which equates to roughly £200bn. Due to the volatility of gilt prices and yields, these estimates will not reflect the current position, and the rise in gilt yields in 2022 will have reduced the total amount of hedging.

¹¹ The UK corporate bond and fixed rate mortgage markets are around £2 trillion, and gilt pricing also underlies a broader set of markets beyond these.

Just as with LTCM in the late-1990s, the Archegos case highlights how financial strains on leveraged non-bank investors can transmit directly to the large banks at the core of the financial system. And it highlights again that if leveraged investors use several counterparties, overall leverage is hidden from each of them.

Banks and CCPs may therefore need to have access to more information on the risk positions and balance sheets of their leveraged counterparties if they to understand fully concentrated and hidden exposures.

A second lesson for banks' and CCPs' counterparty credit risk management from recent extraordinary events is that the past is not always a good guide for the future. And so they need to be creative in identifying stress scenarios that best illustrate their counterparties' credit risk and so the conditions under which margin calls might not be met.¹² As I will explain, that could relate to wrong way, risk, market dynamics, the behaviour of other market players, even operational details.

I think further progress on both these fronts is needed if we are to be confident the counterparty channel is fully managed.

Are these risks unique to non-banks?

I think it's helpful at this stage to ask whether these issues are unique, or if we've tackled them before in other contexts.

And with that in mind, I'll draw a very brief comparison to a market which has already been widely studied and embedded in the macroprudential toolkit: the mortgage market.

Banks manage their exposures to mortgagors, through affordability testing, leverage limits and collateral. And that's important from a financial stability perspective, given the feedback and amplification mechanisms that have been seen during stresses in the past.

For example, stress test scenarios cover house prices falling and borrowers defaulting, and so can capture the potential for amplified price moves and a self-reinforcing price dynamic, as a result of forced sales by bank lenders into a falling housing market.

Perhaps correlated falls in asset prices and leverage can create amplifying price dynamics in non-bank financial institutions as well as with households.

¹² The Bank's recent [CCP Supervisory Stress Test](#) used reverse stress testing to look well beyond historical precedent.

In addition, in our financial stability analysis of the mortgage market, we recognise that reductions in spending by highly indebted mortgage borrowers as they keep up with debt repayments can create negative spillover effects to the rest of the economy.

And perhaps in the same way, too, might forced asset sales into stressed financial markets have negative spillovers for all other users of that market. In the case of the core government bond market that could be significant.

What is being done to address risks from non-bank leverage, and where is there further progress to be made?

Having set out how leverage in non-bank financial institutions might create risks to financial stability, I'll turn now to what needs to be done if we are to ensure those risks are reduced.

Let me be clear. The onus for building resilience in the non-bank system sits first and foremost with the firms themselves.

If firms use leverage, they must be able to manage the liquidity consequences of their risk exposures. As part of this, they need to learn from the decades of experience that show how leverage and liquidity risk creates rollover risks; volatility; operational challenges in accessing liquidity; and exposures to amplification mechanisms from the wider system.

Firm stress testing and resilience must be set with reference to the system and to market dynamics and not just a firm's own atomistic actions. Indeed this is where associations such as yourselves, ISDA and AIMA, can be hugely supportive in sharing best practices and industry standards.

LDI funds have demonstrated the art of the possible here, by building resilience at speed when severe stress demonstrated the clear need for it.

Regulators worked with LDI funds during the Bank's operations to ensure greater resilience for future stresses. And in aggregate, intelligence suggests that LDI funds raised over £40 billion in funds and made over £30 billion of gilt sales during our operations, both of which have contributed to significantly lower leverage.

As a result, LDI funds report that their liquidity buffers can withstand very much larger increases in yields than before, well in excess of the previously unprecedented move in gilt yields. And so the risk of LDI fund behaviour triggering 'fire sale' dynamics in the gilt market and self-reinforcing falls in gilt prices is – for now at least – significantly reduced. It is important that it stays that way.

Others need to act too.

Banks have an important role to play in reducing risks both to themselves and to the wider system from non-bank leverage.

That starts with information. As seen with Archegos, imperfect information on overall positions leads to inadequate risk management. So a first step is for lenders to require greater transparency of hidden leverage taken by their counterparties. Prime brokers should have access to data on a fund's overall leverage, not just the portion to which they have contributed, just as banks ask household borrowers about their student loan repayments and credit card debts when issuing a mortgage.

Banks, like their non-bank clients, need also to improve their stress testing to include better understanding of market dynamics and structural shifts that might change correlations and norms.

Banks need to develop a laser like focus on wrong-way risk, where the value of collateral held as security falls in the very situation where the counterparty defaults. And to consider if attempts to realise collateral might further add to negative price dynamics.

Stress testing is also needed across sectors to understand how correlations in risk exposure can lead to correlated behaviours in stress. And stress tests need to account for institutional structures, governance and processes for liquidity management, to capture examples like the LDI event above, where DB schemes had assets available but were simply unable to get them to where they needed to be quickly enough.

Bank supervisors can play a role in limiting the risks from leverage in the non-bank system to the core financial system through strengthening of risk management practices of dealer banks and prime brokers. My supervisory colleagues are indeed taking steps to ensure this.¹³

Let me turn finally to the steps financial stability authorities are taking.

And where, unfortunately for the policy community, the challenges we face are complex, reflecting the large number and variety of institutions involved, and as the system of market-based finance is global, meaning effective reform needs to be co-ordinated across jurisdictions.

The FPC has put vulnerabilities in the non-bank financial system at the core of its work in recent years.

¹³ The Bank and the FCA have sent [Dear CEO letters](#) to firms following the default of Archegos and conducted a supervisory review of global equity finance businesses. This requires relevant firms to carry out a systematic review of the business strategy and organisation and financial risk management controls and governance. And the Bank put out a consultation on [supervisory expectations](#) for contingent leverage within banks' ICAAP assessments and new requirements of its reporting.

That has included work on the specific issues of leverage and liquidity of LDI strategies, which was assessed with a stress simulation in 2018, and which led to further close work with the Pensions Regulator and the Financial Conduct Authority¹⁴ to enhance understanding of financial stability risks, enhance monitoring and inform further work.

The vulnerabilities in market-based finance that the FPC had articulated were exposed in dramatic fashion in the ‘dash for cash’ in the early stages of the Covid pandemic.¹⁵ That gave additional momentum to this work. And there has been some progress in recent years, on the regulation and monitoring of the non-bank sector¹⁶, particularly relating to liquidity mismatches in MMFs and OEFs.¹⁷

The international community has made less progress in addressing the risks from non-bank leverage.

The international nature of leveraged investors requires a firm response by the global regulatory community to assess those risks and develop policy solutions. And the UK’s recent experience is a timely reminder of the risks here. So in the final minutes I will zone in on the actions relevant to this issue.

Let’s start with transparency, where it is vital that regulatory authorities have sight of leverage building up in the system, and what that means for resilience.

That requires better regulatory disclosures for non-banks and investment in monitoring capabilities.

The Bank has access to transaction-level data from regulatory datasets¹⁸ which we use to monitor the build-up of systemic risks stemming from leverage in the non-bank system. We also run surveys that provide information on exposures to hedge funds.

But these provide only a partial view of portfolio leverage: either because they do not provide a link between borrowing and investment activities; or because we only see part of

¹⁴ TPR regulates pension schemes; the FCA regulates LDI managers.

¹⁵ See [Building Financial Market Resilience: From diagnosis to prescription – speech by Jon Hall](#)

¹⁶ This progress has been led by the FSB, with the involvement of international standard setting bodies. The FSB has set out its [analysis](#) of non-bank risks and a programme of work last year and is due to report on next steps soon. Through the work of the Financial Policy Committee and the Bank more widely (including Governors’ participation in the FSB), as well as the FCA, the UK has been actively engaging with this programme.

¹⁷ For example, see the FSB’s [publication](#) of a framework on MMF resilience in 2021, and subsequent [UK Discussion paper](#). On OEFs, we strongly support global policy actions to increase resilience, and look forward to the upcoming FSB proposals to address vulnerabilities arising from liquidity mismatch.

¹⁸ Specifically, the European Market Infrastructure Regulation (EMIR), Sterling Money Market Daily data (SMMD) collection, and [MiFID II](#).

the portfolio due to non-banks' multi-jurisdictional presence; or because the data are simply not sufficient to assess the risk of leverage.¹⁹

Given the global nature of non-bank business models, it is essential that transparency and data availability are enhanced through international efforts, and that authorities have the right metrics to assess the risks of leverage.²⁰ It is encouraging to see progress being made, for example by the SEC.²¹

Beyond improving transparency, regulators will need to consider how best to ensure leverage is well managed. These could, for example, include broad market-wide measures such as market regulations to ensure excessive leverage is better controlled by market pricing and margins.

Some international work is underway. The BCBS-CPMI-IO스코 margin group has published its final report on margin practices.²² The report recommends policy work in six areas²³ – including increasing the transparency and predictability of margin calls, evaluating their responsiveness to stress, and enhancing liquidity preparedness by clearing members and non-banks. As part of the 'next steps', there is already work underway evaluating the responsiveness of cleared and uncleared margin models.

Finally, there are important questions about the role of central bank balance sheets.

In a number of recent events, central banks have had to intervene in size, using public money, to remove the threats to financial stability. Providing backstop liquidity insurance when tail risks to financial stability crystallise is a core part of central banks' job. And the FPC has discussed the importance of examining whether central banks should have facilities to provide liquidity to a wider set of financial market participants in stress.

But central banks cannot be a substitute for the primary obligation of market participants to manage their own risk, or for internationally co-ordinated reforms that enhance the resilience of the non-bank financial sector.

For that reason, such facilities must be carefully targeted on the financial stability vulnerability at hand, and designed in ways that incentivise the right private sector

¹⁹ To assess the risk of leverage we need balance sheet metrics (e.g. notional) as well as risk and liquidity measures. (see NBF1 leverage deep dive, [November 2018 FSR](#))

²⁰ The Bank highlighted the need for developing consistent leverage metrics in its public [response to IOSCO report](#) on leverage.

²¹ See [SEC Proposes to Enhance Private Fund Reporting](#)

²² See [Review of margining practices](#)

²³ The 6 areas for policy work are: increasing transparency in centrally cleared markets; enhancing liquidity preparedness of market participants; identifying data gaps in regulatory reporting; streamlining variation margin processes in centrally and non-centrally cleared markets; evaluating the responsiveness of both centrally cleared and non-centrally cleared initial margin models to stress.

behaviours, including reducing incentives for excessive risk taking in the future.²⁴ My colleagues in our Markets area have been considering these issues,²⁵ including with colleagues internationally²⁶ – and a number of these principles were implemented in our LDI interventions.

Conclusion

Events of recent weeks, months and years have once again reminded us of the systemic risks posed by poorly-managed leverage in the non-bank financial system.

All too often excessive risk taking alongside improper liquidity risk management has threatened conditions in the real economy - an issue that feels especially pertinent in the current environment of high volatility and tightening financial conditions.

Lessons must be learned from these episodes, most importantly by non-banks themselves, but also by: their counterparties; market infrastructure; their regulators; bank supervisors; central banks; and the global regulatory community as we continue our global efforts to ensure the resilience of the system of market-based finance.

Transparency is an important first step. That enables the necessary next step of ensuring non-banks' positions and interlinkages with the rest of the financial system can be comprehensively stress tested and understood in a system-wide manner.

Non-banks themselves can use that understanding to increase their resilience and liquidity preparedness. Dealer banks and prime brokers equipped with better data on clients' overall leverage and positions can strengthen their risk management. Given the need for a macroprudential perspective, our journey to better resilience of market-based finance must not end there.

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²⁴ See [Financial Policy Summary and Record – October 2020](#)

²⁵ See [From Lender of Last Resort to Market Maker of Last Resort via the dash for cash](#)

²⁶ See [Market Dysfunction and Central Bank Tools](#)