STATE STREET

The UK LDI Crisis

Implications for Pension Portfolios and Asset Markets

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Decomposing the Aftermath of The UK Gilt Crisis for Pension Portfolios

Assuming that certain assets are safe to hold or even leverage due to low historical volatility or correlation, followed by forced or panic selling, is the root cause of most modern-day financial crises.

While it will take months, if not years, to understand the precise causes of the gilt turmoil of 2022 in the United Kingdom, it is apparent that stress in liability-driven investment (LDI) funds was central to this crisis, even if it was not the trigger.

With fiscal policy completely reversed and gilt yields stabilising, it would be convenient to assume the worst is now over.

However, another common theme of financial crises is that, while they usually strike quickly, their aftermath lingers, impacting the behaviour of investors and regulators for years to come. In this article, we explore the impact of this crisis on the systemic risk embedded in a typical UK pension fund, measure how investor attitudes toward gilts have changed and offer some potential solutions to the liquidity challenges UK pension fund trustees, managers and custodians will face.

The Legacy of Yet Another Once-In-A-Lifetime Volatility Event

It had taken long-term gilt yields the better part of a decade to slowly decline from five percent to their lows, below one percent in 2020, driven by weaker economic growth and low inflation.

This posed its own challenges for UK pension funds and arguably sowed the seeds for what was to become a crisis. However, it was a matter of months in 2022 for this decline to reverse, a move that was especially violent in September and October. Previously, the broader macroeconomic backdrop was already unfriendly for fixed income markets. A mix of supply- and demand-driven inflation had pushed the Bank of England into its fastest tightening cycle in decades, and tumbling growth forecasts raised fears about the sustainability of government finances. Measures of gilt market liquidity were also deteriorating steadily throughout the year. It is against this backdrop of macro fragility, weak investor confidence and challenging liquidity conditions that the new UK government shocked markets with an immediate, un-costed and debt-funded fiscal stimulus program.

Long-term gilt yields rose 1.5 percent within six days, a period of unprecedented volatility that not even the worst-case scenario stress tests envisioned, triggering collateral and liquidity issues across multiple UK pension funds, especially those with LDI exposures.

At the time of writing (December 2022) the extent to which the size of these exposures, along with the data processes around them, made a bad situation for Gilts even worse is an ongoing public debate between policy makers and pension funds. It is likely there will be lessons for both sides. While these short-term stresses have now faded somewhat, along with the volatility of Gilts themselves, we would caution that the aftermath of the crisis is likely to linger, even if UK pension funds now find themselves with more favourable funding ratios.

Given the unusual nature of the macroeconomic backdrop and even more exceptional volatility in the political dynamic, it might be tempting to hope that these were one-off events never to be repeated. However, there are several reasons to be cautious:

- Even if inflation peaks in the coming months, the forecasted downturn in economic growth is only beginning, which will raise questions about medium-term fiscal sustainability.
- It remains unclear what level of short-term interest rates will bring inflation down, even in an environment of slowing growth.

- While the Bank of England has successfully resumed active gilt sales as a part of its quantitative tightening program, how well the market will absorb record gilt issuance in 2023 is yet to be known.
- It is clear that gilt liquidity is far worse today than it was at the beginning of the year. This was true before the mini-budget, was a likely contributor to the crisis itself and has worsened due to the crisis. Reflecting on this, our colleagues at **BestX®** estimate that the cost of trading long-dated gilts at the beginning of December was more than double of January's level.
- As of early December 2022, our metrics of long-term investor behaviour suggest that confidence in the gilt market is yet to fully recover, likely reflecting all four of the factors mentioned above. Finally, the coming regulatory response suggests that 2022 is certain to generate lasting change in the way UK pension fund assets are managed.

A mix of supply- and demand-driven inflation had pushed the Bank of England into its fastest tightening cycle in decades, and tumbling growth forecasts raised fears about the sustainability of government finances.

The UK pensions regulator has already issued **new guidance** to defined benefit (DB) pension scheme trustees and advisors in response to the recent events in gilt markets. Unsurprisingly, this involves improved stress tests that now acknowledge the new reality of heightened gilt volatility, along with the implications for both collateral calls and liquidity requirements. Better and faster data on exposures to market movements is no longer just an essential work flow for banks. This is a similar, albeit faster, response to what we saw following the Global Financial Crisis in 2008, which introduced a robust stress testing regime on systemically important institutions, mostly banks, along with requirements to hold higher amounts of safer (usually sovereign) bonds. However, as the UK experience demonstrated, systemic risks can lie both outside the immediate banking system and within sovereign debt markets. This follows an emerging view in the academic literature, summarised in a recent **paper** by Kristin Forbes, a former UK MPC member, and her co-authors, that tighter macroprudential regulation of banks is shifting systemic risks to the non-banking sector, including pension funds. This strand was echoed by the Bank of England's Sarah Breeden in a recent **speech** to the International Swaps and Derivatives Association and the Alternative Investment Management Association. She highlighted another common challenge observed through the history of financial crises: risks frequently shift as crises often come from different, usually unexpected, parts of the system.

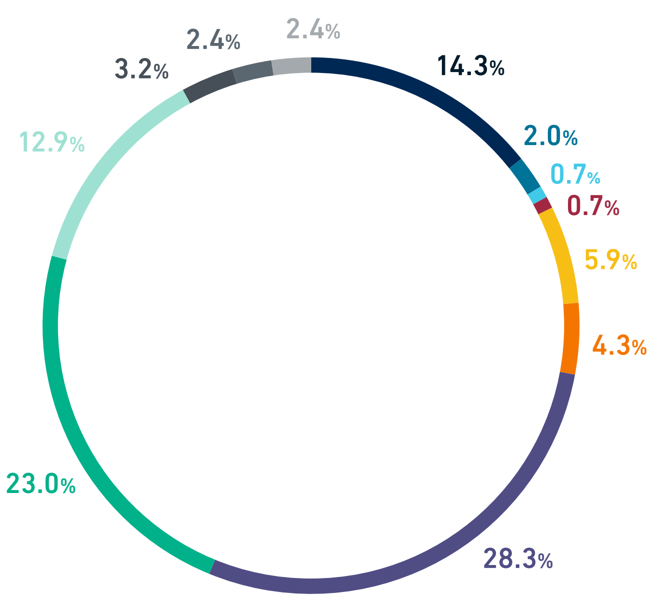
Capturing the Symptoms of Systemic Risk in Portfolios for the Next Crisis

To help meet this challenge, since the financial crisis, we have proposed taking a unique approach to measuring systemic risk across portfolios.

This approach focuses not on the underlying causes of a crisis, but instead looking for symptoms of crisis conditions. We found that when a large part of the variance of portfolio returns can be explained by a few factors, it is fragile and prone to shock.

Below, we demonstrate how this measure would have acted as an early warning for the systemic risk inherent in the UK fixed income holdings of a typical UK pension fund, the asset allocation of which is illustrated in Figure 1.

Figure 1: Portfolio Composition, UK Pension Fund



Asset Class	Weight*	Proxy Index
Developed Market Equity	14.3%	MSCI ACWI
Emerging Market Equity	2.0%	MSCI EM
Small Cap Equity	0.7%	MSCI Small Cap
Low Volatility Equity	0.7%	MSCI Low Vol
Emerging Market debt	5.9%	JPM EMBI Global Diversified
High Yield	4.3%	Bloomberg Global High Yield
Dom. Corp. Bond	28.3%	ICE BofA Sterling Corporate Index
Dom. index-linked govt. bonds	23.0%	ICE BofA All Maturity UK Gilt Inflation-Linked Government Index
Dom. fixed-interest govt. bonds	12.9%	ICE BofA UK Gilt Index
Non-dom. corp. bonds	3.2%	Bloomberg Global Aggregate - Corporate
UK Property	2.4%	S&P UK PROPERTY
Cash	2.4%	JPM Cash United Kingdom 1 Month Index

Source: Mercer European Asset Allocation Insights 2021, State Street Global Markets.

* Weights re-normalised for asset classes with available benchmark data.

To construct our measure of portfolio fragility[1], we apply a principal components analysis of the daily returns of each asset class within the pension fund's portfolio. We then measure the proportion of portfolio variation that is explained by the two most important risk factors (i.e., principal components) as a measure of fragility. High levels of portfolio fragility indicate that unexpected shocks are likely to propagate quickly and broadly through the portfolio, potentially leading to significant drawdowns. Low levels of fragility indicate that the asset classes within the portfolio are loosely linked and may be robust to shocks.

As illustrated in Figure 2A, our metrics show that the portfolio fragility of the typical UK pension fund started to rise in April 2022, before the deeper crisis eventually struck later in the year. This warned that the portfolio of a typical UK pension fund became less robust to potential drawdowns, which were subsequently realised when the root causes of the crisis – the collateral and liquidity conditions generated by the LDI funds in October took hold.

Interestingly, the methodology not only warns of systemic risk, but can identify which assets are contributing to it through the notion of centrality. An asset's centrality[2] represents its importance in explaining portfolio fragility. It reflects the combination of an asset's vulnerability to failure, its connectivity to other assets within the portfolio and the risk of the assets to which it is connected. As we detail in Figure 2C, this approach highlighted that two of the four most significant contributions to the rise in systemic risk throughout the year came primarily from the gilt market, along with corporate bonds and property. This is an indication that interest rates rather than potentially higher volatility equity risk were the main contributing factors to systemic risk for UK pension funds.

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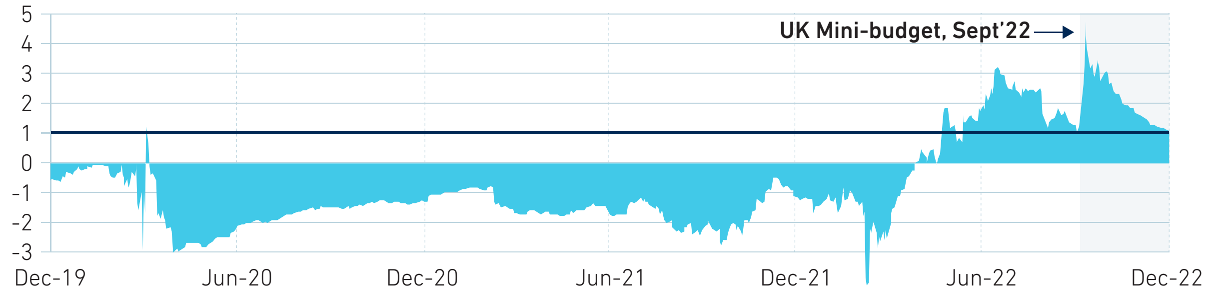
Since this methodology seeks to capture a symptom of a financial crisis rather than the specific underlying cause, we would expect it to help capture future crisis events if they were caused by different allocations within the portfolio, such as real estate, equities or otherwise.

[1] "Principal Components as a Measure of Systemic Risk" by M. Kritzman, Y. Li, S. Page and R. Rigobon. 2011. The Journal of Portfolio Management, Vol. 37, No. 4 (Summer).

[2] "Toward Determining Systemic Importance" by W. Kinlaw, M. Kritzman and D. Turkington. 2012. The Journal of Portfolio Management, Vol. 38, No. 4 (Summer).

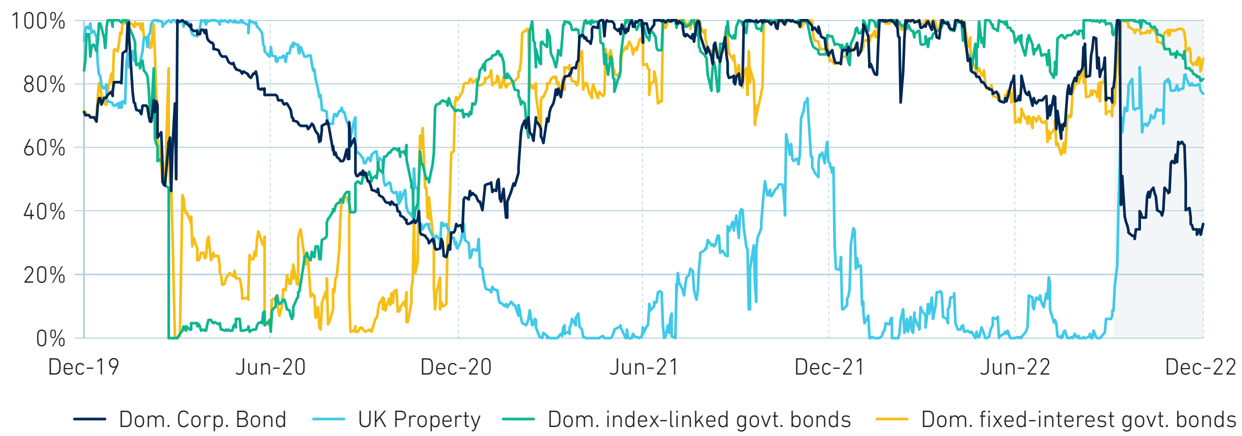
Figure 2: Portfolio fragility and asset class centrality

A. Portfolio Fragility[3]



B. Portfolio Cumulative Return

C. Asset class centrality (asset classes becoming most important highlighted)



Source: State Street Global Markets, Datastream.

[3] 1-year standardized shift of portfolio fragility level. Grey shading indicates Sep'22 UK mini-budget announcement and subsequent weeks.

Resolving Liquidity and Collateral Management Risks

Novel research techniques to capture systemic risk and measures of investor confidence in gilts are useful market intelligence for UK pension fund trustees and managers, but that does not change the fact that new regulatory guidelines will put immediate pressure on liquidity and collateral management.

The crisis has revealed that some pension funds may not have the appropriate set of monetisation and collateral transformation tools for their portfolios. The funds may also require the ability to optimise and mobilise asset inventory to be used as collateral where some collateral gets trapped in the wrong place.

This forced them to sell securities and raise liquidity to meet margin calls and buy other assets that are eligible as collateral when the market was most stressed. The period also highlighted the need to model and forecast future margin calls as a result of the volatility. However, there are existing operational tools that can help mitigate these risks. For example, repo and securities lending transactions can give clients access to the right mix of high quality liquid assets. Tri-party collateral management helps with efficiencies in asset mobilisation.

There are also product innovations in the pipeline that will enable UK pension funds and their investment managers to access new and diversified sources of liquidity. Further, there are tools to model margin calls and stress test portfolios to external market events.

Even before the crisis demonstrated the criticality of liquidity, market participants had long-pushed for an active peer-to-peer model in repo and securities lending, providing opportunities for lenders of cash and securities to meet borrowers without bank intermediation. The off-balance sheet nature of this ask, along with questions of scale and network size suggests that some custodians are in a strong unconflicted position to meet the requirements and our peer-to-peer repo offering is a holistic solution that resolves these challenges.

Accessing Non-Bank Liquidity

Our peer-to-peer repo programme seeks to facilitate overnight and term repo trading between buy-side counterparties (including traditional and non-traditional asset managers, asset owners, insurers, corporates, real estate investment trusts and sovereign wealth funds).

This provides access to alternative sources of liquidity; to borrow cash or source securities, such as gilts, from a wide range of market participants. This fosters new trading relationships outside the constraints of traditional dealer balance sheets, where capacity can be reduced over quarter-end or year-end reporting dates, or during periods of heightened market volatility when concentrated counterparty risk becomes an issue. Like we noted earlier, as macroprudential regulation has shifted more market risk into the non-bank sector, our solution connects parts of the non-bank sector to each other from a liquidity standpoint.

For LDI portfolios specifically, this gives managers an additional tool to monetise assets, to raise cash for margin calls on derivative positions or to obtain hard-to-source securities from a wider, diversified counterparty base. Peer-to-Peer repo is also low risk. We support peer repo buyers (cash lenders) by providing a guarantee against each peer repo seller's (cash borrower) default. Upon default, we repay the full repurchase price to the cash lender (including interest). The guarantee has been reviewed by S&P, which affirmed that it is consistent with its principles for credit substitution such that the credit quality of an agreement with an unrated counterparty would be based on our credit rating as guarantor.

Effectively Managing Collateral

As the explanations and early regulatory response to the crisis demonstrate, collateral issues went hand-in-hand with liquidity challenges.

However, there are effective solutions available to combat the challenges. We, for example, offer collateral transformation trades, the lending or financing of securities such as gilts, to help cover any short positions. This enables managers to structure their portfolios strategically in differing market conditions. When utilising our services for collateral transformations, collateral is not re-hypothecated and remains segregated in a custody account in the fund's name, giving managers the ability to monetise assets and prepare for future market turbulence. We also offer effective technological tools to bring more precise, real-time data, allowing pension trustees, managers and custodians to produce products that rise to the regulatory challenges.

In short, the need to have the appropriate quality of collateral that is accessible and sufficient to support portfolio operations has rarely been greater. Through our recently enhanced Collateral+ platform, we provide analytical tools to reduce margin requirements through best execution and post-trade allocations, reduce cash buffers to mitigate heavy treasury costs and offer comprehensive risk oversight. Backed by an extensive tri-party collateral management service, clients can achieve operational efficiencies while meeting their margin requirements..

Calculating and Navigating Systemic Risks

To conclude, 2022 was a wake-up call for everyone, revealing both macroeconomic and market fragilities. Even if the worst of the crisis has now likely passed, the legacy of the regulatory response and lingering market fault lines suggests that the challenges for UK pension trustees, their managers and custodians will only grow.

To help meet these challenges, we offer a novel research approach to warn of systemic risk along with product offerings to improve managers' access to liquidity and better manage collateral.

For further information, please reach out to your relationship manager at State Street.

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