Liability Driven Investment and Financial Stability

Presentation to the 2nd European Actuarial Day

By Malcolm Kemp

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About the speaker: Malcolm Kemp

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Agenda

- Background
- How authorities reacted in late Sept and early Oct 2022
- Features creating specific fragilities
- Pooled LDI funds
- Broader implications

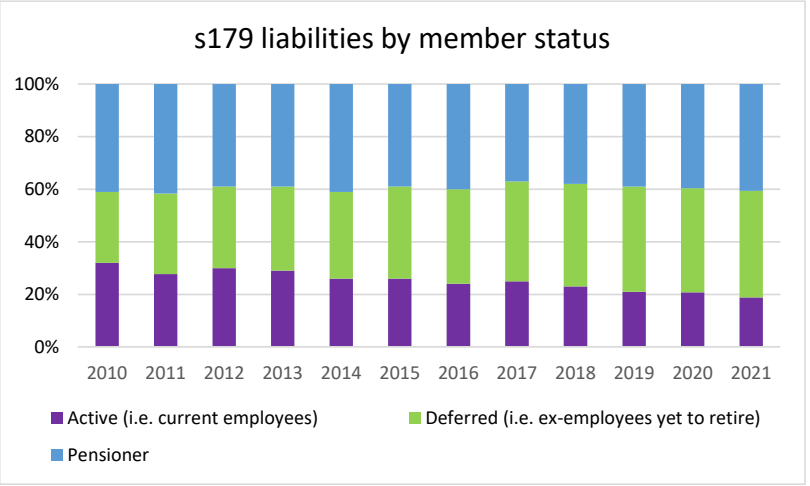
UK Defined Benefit pension schemes: stylised history

- Most (accrued) UK occupational pension provision is Defined Benefit
  - Even though most DB schemes are now closed to new entrants and in many cases also to new accrual and at end 2019 Defined Contribution (DC) members (22.4m) outnumbered funded DB and hybrid scheme members (18.3m)
- At end 2021, typically (still) in deficit on a “buy-out” basis but close to balanced on a “funding” valuation basis

	c. 3 decades ago	c. End Dec 2021
Liability profile	Relatively immature, active members a reasonably high proportion of liabilities	Mature, mostly pensions or deferred pensions liabilities
Investment strategy	High proportion in equities and other real assets	More bond-like and less return seeking assets
Funding level (on “funding basis”, i.e., assuming some outperformance from return seeking assets)	Typically, in surplus (source: author recollection)	Average c. 103% (Source: PwC, 4 Jul 2022)

UK DB pension scheme liabilities: stylised description

- Active member liabilities typically linked to member's salary at retirement (or earlier employment cessation)
  - Historically viewed as best matched by "real" assets such as equities and inflation-linked government debt (ILGs) (or by future contributions into scheme)
- Pensioner and deferred pensioner liabilities typically involve mixture of long-term fixed and inflation-linked pension payments
  - Best matched mostly* by a suitable mixture of (long dated) fixed interest government debt (gilts) and ILGs



Source: UK Pension Protection Fund Purple Book 2021 (Fig 4.4)

N.B. By best "matched" we mean following an investment strategy offering most certainty of delivering a desired type of cash flow.

**Typically, pensioner and deferred pensioner liabilities include floors and ceilings on annual inflation uplifts, i.e., option-like elements only practically matchable using derivatives*

Impact of maturing liability profile

- Now little link between scheme and Human Resource benefits of offering DB pension provision to current employees
  - A “legacy” problem, involving a “journey” towards buy-out of the liabilities with an insurer (unless scheme seen as a cheap source of corporate funding)
  - But sponsors typically want to defer buy-out while it likely involves a large up-front additional payment from them
- Liability Driven Investment (LDI)
  - Developed 10 – 20 years ago, now very widely adopted in UK
  - Invest “mostly” in assets that match liabilities somehow
  - Retain some return-seeking assets to help make eventual buy-out more palatable to sponsors

Average asset allocations

Year	Equities	Bonds	Property	Cash and deposits	Insurance policies	Hedge funds*	Annuities *	Misc
2006	61.1%	28.3%	4.3%	2.3%	0.9%	n/a	n/a	3.1%
2011	41.1%	40.1%	4.4%	4.1%	1.6%	2.4%	n/a	6.3%
2012	38.5%	43.2%	4.9%	5.1%	0.2%	4.5%	n/a	3.6%
2013	35.1%	44.8%	4.7%	6.7%	0.1%	5.2%	n/a	3.5%
2014	35.0%	44.1%	4.6%	6.1%	0.1%	5.8%	n/a	4.3%
2015	33.0%	47.7%	4.9%	3.5%	0.1%	6.1%	n/a	4.7%
2016	30.3%	51.3%	4.8%	3.0%	0.1%	6.6%	2.1%	1.7%
2017	29.0%	55.7%	5.3%	-0.9%	0.1%	6.7%	3.3%	0.8%
2018	27.0%	59.0%	4.8%	-2.5%	0.1%	7.0%	3.4%	1.2%
2019	24.0%	62.8%	5.0%	-4.4%	0.3%	7.4%	4.0%	1.0%
2020	20.4%	69.2%	4.9%	-7.2%	0.1%	6.8%	5.0%	0.8%
2021	19.0%	72.0%	4.7%	-9.5%	0.1%	6.1%	6.6%	0.9%

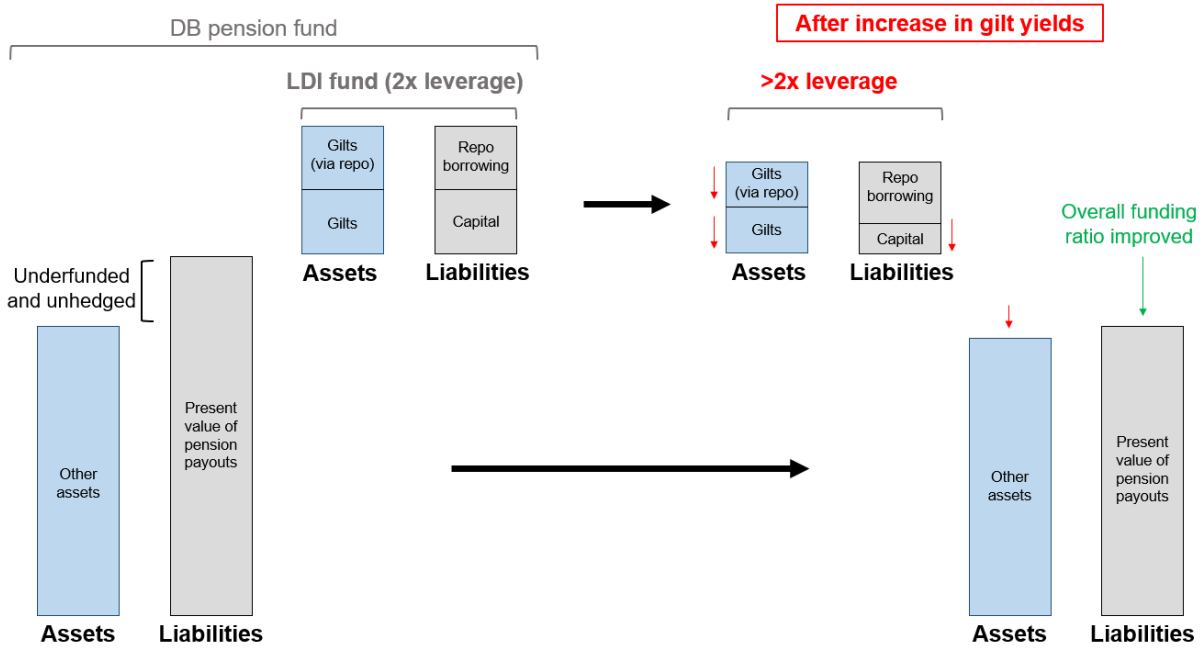
Source: UK Pension Protection Fund Purple Book 2021 (Fig 7.2) Weighted average asset allocation in total assets. Purple book notes that "*The weighted average proportion of assets held in cash and deposits being negative represents a number of large schemes with significant negative cash holdings which are likely to be related to investments such as swaps and repurchase agreements*". Fig 7.4 includes split of bonds (2021): 24.6% govt fixed, 28.2% corp fixed, 47.2% index-linked. Fig 7.5 includes split of equities (2021): 11.6% UK quoted, 68.3% Overseas quoted, 20.1% unquoted/private (corresponding for 2011: 38.0%, 57.2% and 4.8%)

There are many ways of interpreting / implementing “LDI”

- At one extreme a strategy that just invests in suitably matching gilts can be viewed as “liability driven” and hence an example of “LDI”
- But:
  - Investing just in gilts would largely exclude return-seeking assets, so likely wouldn’t help with eventual aim of improving buy-out funding level
  - Amounts involved are sizeable:
    - £1.86tn assets, £1.80tn liabilities on a “funding” basis as at Dec 2021 (Source: PwC)
    - C.f. £2.1tn total nominal amount of outstanding UK govt debt end Dec 2021 (including inflation uplift for index-linked gilts, source UK DMO), only £0.61tn long dated fixed
    - C.f. Between 2009 and 2021 BoE bought £0.9 tn of govt. bonds (quantitative easing)
    - Hence DB pension schemes dominate investor base for long-dated gilts
- Schemes viewed by, e.g., government as a ready source of “patient capital”

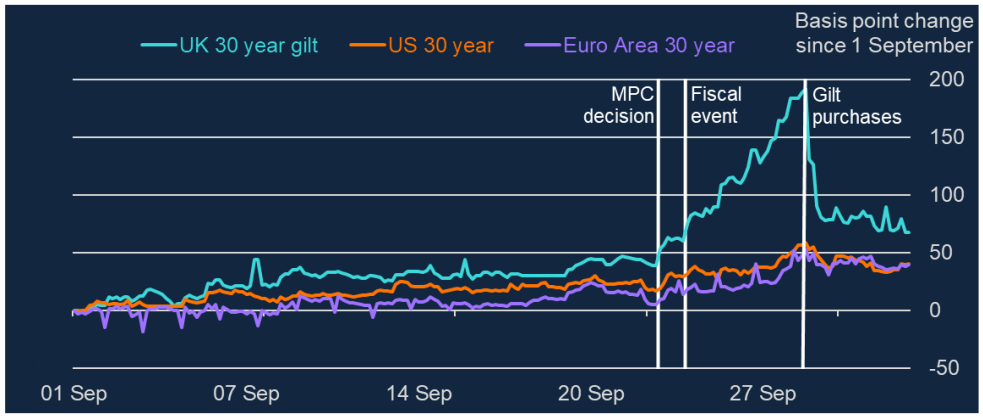
Typical LDI strategies

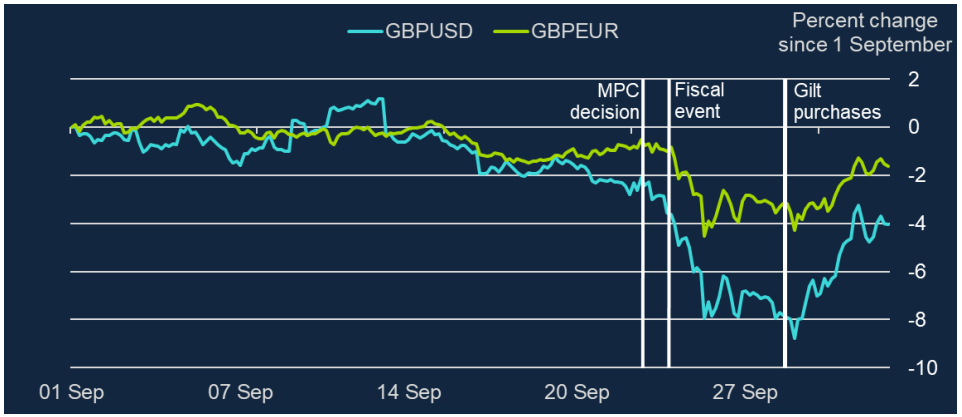
- More typically:
  - "LDI strategies enable DB pension funds to use leverage (i.e. to borrow) to increase their exposure to long-term gilts, while also holding riskier and higher-yielding assets such as equities in order to boost their returns. The LDI funds maintain a cushion between the value of their assets and liabilities, intended to absorb any losses on the gilts. If losses exceed this cushion, the DB pension fund investor is asked to provide additional funds to increase it, a process known as rebalancing. This can be a more difficult process for pooled LDI funds, in part because they manage investment from a large number of small and medium sized DB pension funds."



Source: BoE (Jon Cunliffe) letter to UK Treasury Select Committee 5 Oct 2022

BoE Intervention on 28 Sep 2022





Source: BoE (Jon Cunliffe) letter to UK Treasury Select Committee 5 Oct 2022

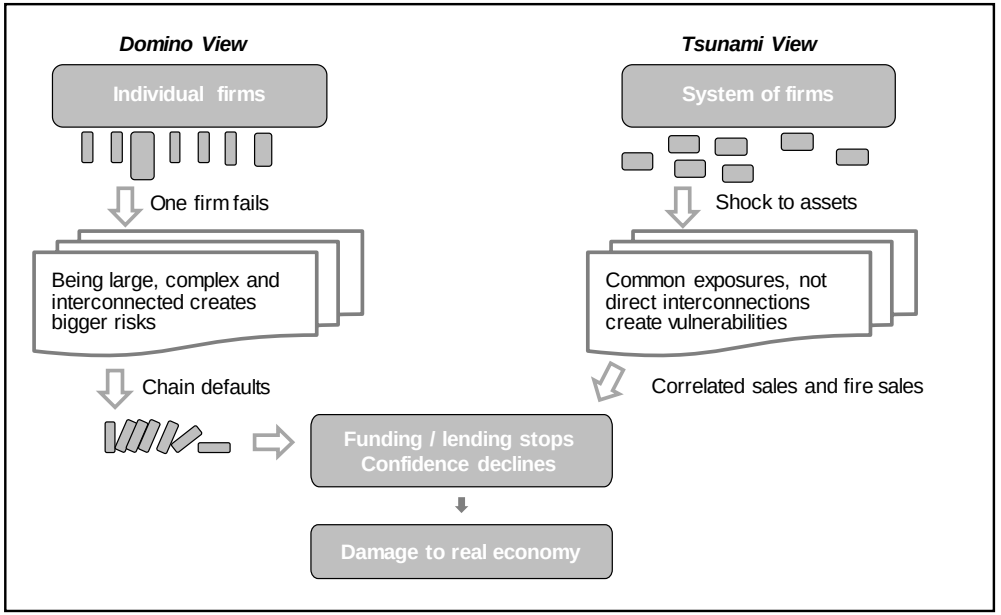
- Fiscal event caused large movement in long-dated gilt yields / prices
- On financial stability grounds, BoE reversed plan to start selling (long-dated) fixed interest gilts. Instead introduced liquidity backstop for this part of market:
  - Temporary and targeted (potentially unlimited purchases but not expected to exceed £5bn per day, actual purchases much lower).
  - Later extended backstop to include long-dated index-linked gilts
  - When backstop ended (14 Oct), was rolled into a more permanent facility

Financial stability motivation given by BoE

- Unprecedented **speed and scale of movements in gilt yields**
  - 2 daily increases of > 35 bp (biggest before then back to 2000 was 29 bp), over 4 day period > 2x largest move since 2000 (the ‘dash for cash’ in 2020)
- Rise in yields caused net asset value (NAV) of LDI (pooled) funds to fall significantly & their leverage to increase significantly, leading to margin calls
  - Funds needed to rebalance, selling gilts into an illiquid market, or ask their DB pension scheme investors to provide more capital
  - Speed and scale outpaced ability of investors to provide new capital – particularly pooled LDI funds given the large number of smaller investors involved
  - Market incapable of digesting scale of gilt sales by itself. Risk if NAV fell too far that derivative and repo positions would be closed out creating further selling pressure
  - BoE judged that **if hadn’t intervened** then many pooled LDI funds would have been left with negative net asset value, creating **self-reinforcing falls in asset prices**

Characterising this systemic risk event

- An example of a "**search for yield**" and, in some cases, liquidity transformation
  - LDI typically included return-seeking assets to help with journey towards buy-out, rather than matching merely with more reliable gilts
  - Some return-seeking assets were less liquid
- An example of a "**combined**" model of possible systemic risk, as per Kemp (2017)? Involved both:
  - A somewhat hidden tsunami-like vulnerability (at end 2021, total hedging with LDI funds covered around £1.4tn of liabilities for UK pension schemes, source: FT 28 Oct 2022)
  - A domino-like interconnected element impacting long-dated gilt market, mediated by potential derivative/repo margin calls



Source: Nematrian. Adapted from IMF (2016). Global Financial Stability Report, April 2016, Chapter 3: The Insurance Sector - Trends and Systemic Risk Implications. International Monetary Fund

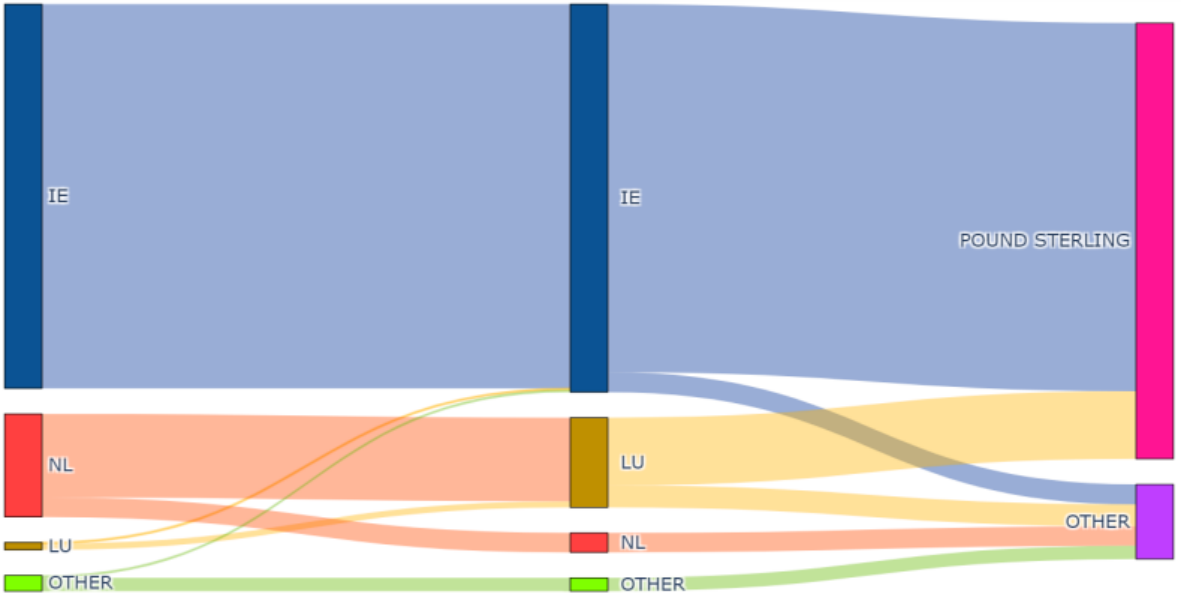
Pooled funds

- (Leveraged) LDI **pooled funds** exhibit extra risks versus a corresponding directly implemented (segregated) LDI strategy
  - BoE justification draws heavily on specific risks from pooled LDI funds
  - Including **risk of forced position unwind if NAV fell below zero creating selling spiral**
- Pooled LDI funds used by UK DB pension schemes were largely **not based in UK**
  - Recognised in BoE (Jon Cunliffe) letter to UK Treasury Select Committee 5 Oct 2022
  - And in FT 28 Oct 2022 “Offshore fund centres tighten oversight after UK’s LDI crisis”

European Systemic Risk Board NBFI Risk Monitor 2022

- Most LDI pooled funds used by UK pension funds were EU-denominated AIFs
  - NAV of EU LDI funds c. EUR 250bn at end 2021, mostly GBP denominated
  - Assets of pooled, UK-owned LDI funds c. EUR 230bn at end 2021
- ESRB reverse stress test analysis suggests abrupt rise in interest rates of 144 bp would exhaust a median LDI fund's cash and MMF resources
  - 41bp for cash only

Links between domiciles of LDI AIF managers, AIFs and AIF base currency



Source: ESRB (2023) EU Non-bank Financial Intermediation Risk Monitor 2022 No 8 / June 2023 (ultimately AIFMD data).

Notes: The first column represents the AIF manager domicile, the second column shows the AIF domicile and the third column denotes the base currency. The width of the link between columns represents the sum of net asset values. Data are for the end of 2021

The (UK) Pensions Regulator's response (1)

- New guidance published 24 April 2023
  - Reemphasised need to review investment strategy regularly and when pension scheme's circumstances or market conditions change significantly
- To determine where LDI fits within investment strategy, trustees should consider
  - Nature of liabilities and stance on hedging
  - Expected payments relative to expected income, and confidence in ability to meet payment obligations even if LDI arrangements are put under stress
  - Expected return on investments, types and levels of risk
  - Collateral and cash call requirements of LDI arrangements and availability and liquidity of assets or other arrangements for meeting these calls
  - That there might be other players with similar positions facing similar simultaneous collateral and cash calls – **a classic financial stability conundrum**

The (UK) Pensions Regulator's response (2)

- Test **collateral resilience**
  - Only hold within LDI buffers assets that can reliably be sourced or converted to eligible collateral
  - Need **sufficient liquidity to manage day-today volatility** (operational buffer)
  - PLUS, **additional liquidity to provide resilience during a severe market stress** (at a minimum, IR movement of 250bp, or more if could take longer to replenish the buffer than 5 days)
- Resilience testing to take the form of **stress testing** of:
  - Impact of market stresses on LDI arrangement, overall portfolio, collateral buffer, assets earmarked to replenish buffer, other assets or derivatives (such as equity or foreign exchange) and whether any risk to ability to meet payment obligations
  - Cash call sizes (and associated transaction costs), speed of call and how well operational processes would cope with such calls including impact of any applicable dealing cycles
  - Impact on ability to respond if other schemes or parties were then facing a similar position
- And/or corresponding **reverse stress testing**

Broader implications

- The UK LDI debacle had some **idiosyncratic features** (but maybe not more so than other past financial instabilities):
  - A large DB occupational pension scheme sector, on its own specific journey (to buy-out)
  - Which might now be shorter! End Sep 2022 assets versus buy-out liabilities (£1.425tn vs £1.27tn, source PwC)
- And an **idiosyncratic catalyst** (the “fiscal event”, i.e. tax lowering plans outlined by the UK government on 23 Sep 2022)
  - But nearly all crystallised systemic risk events require some sort of trigger!
- Episode has increased policymaker and regulator desire for **improved liquidity risk management disciplines and powers**
  - As well as **other disciplines and powers inspired by macroprudential considerations**

EU Commission Solvency II Review Proposals (Sep 2021) considered "macroprudential"

Area	Summary (for insurers)
Solvency II Directive	
Own Risk and Solvency Assessment	Assess impact of plausible macroeconomic and financial market developments on insurer's own risk profile and reciprocally how its activities may affect market drivers
Prudent person principle	Factor plausible macroeconomic and financial markets' development into insurer's investment strategy
Liquidity management and planning	Develop liquidity risk indicators and monitor liquidity risk
Liquidity risk: exceptional powers	Supervisory intervention where liquidity vulnerabilities not appropriately addressed by insurer. Also possibility, in exceptional situations and as a last resort measure, to impose on individual companies or entire market temporary redemption freezes
Distributions to shareholders and other subordinated lenders	Exceptional powers to suspend or restrict such distributions before any actual breach of Solvency Capital Requirement
Insurance Recovery & Resolution Directive (IRRD) **N.B. Separation of IRRD from Solvency II Directive akin to separation of Bank Recovery & Resolution Directive (BRRD) from Capital Requirements Directive (CRD)**	
Pre-emptive recovery planning	Groups and solo firms (covering >80% of market) to draw up and submit to group supervisor pre-emptive recovery plans
Resolution authorities	Identified by Member States and rules to deal with cross-border failures
Resolution plans	Resolution authorities prepare plans (for > 70% of undertakings per Member State) envisaged to be followed if conditions for resolution are triggered
Resolution triggers	Common parameters across Member States for triggering application of resolution tools
Resolution tools and powers	Include (a) write-down / conversion of capital instruments, (b) solvency run-off, (c) sale of business, (d) bridge undertaking, (e) asset and liability separation / work-out
Safeguards, procedures etc.	Various. Resolution can implicitly alter priority status of different parties versus alternatives. Text around valuation, cross-border, third countries, company law, …

Summary

- First time Bank of England **intervened in the gilt market in pursuit of its statutory financial stability objective**
- Responding to
  - A **large and relatively ill-understood vulnerability** (arguably including search for yield and liquidity transformation elements) coupled with **derivatives mediated interconnectedness**; and
  - A politically/fiscally triggered market stress
- Many structural features of this episode are quite **UK-centric**
  - But some features probably more universal, e.g., **potential for transition away from a low interest rate / low inflation rate world to be bumpy**
  - Special role played by **pooled vehicles**, most **EU-domiciled**
  - Likely will increase the enthusiasm of authorities to **add macroprudential dimensions to Solvency II, IORP II and related texts**

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