Index Insights | Fixed Income

Pensioned off? A chance to fill G7 DB pension deficits and implications for the choice of discount curves

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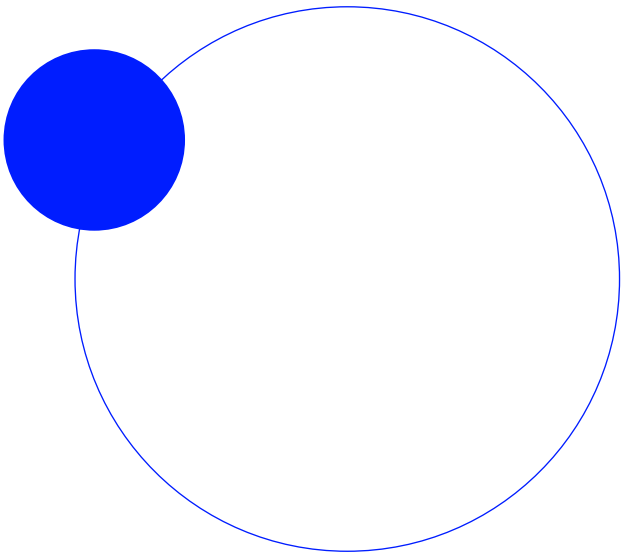
Executive Summary and Key Points

- The new regime of higher bond yields has transformed pension funding for defined benefit (DB) schemes in the G7, due to reduced lability valuations
- Even though credit spreads are close to 10 yr lows, high absolute yields have increased discount rates sharply and pushed a large share of DB schemes in the US and UK particularly into funding surpluses…
- ….these are the first surpluses since before the GFC for many schemes
- Choice of discount rate and curves for pension schemes is a key issue, both for accounting and regulatory purposes
- Stronger funding positions, and a more flexible approach from some regulators, is allowing DB schemes to diversify asset holdings, and also driving more substantial liability driven investment (LDI) flows
- The range of approaches suggests different metrics and discount rates for pension liabilities are appropriate for different purposes, whether that be to assess scheme funding or to stress test liabilities, over and above strict regulatory requirements
- The expanded suite of the FTSE Pension Liability index family now offers coverage across a variety of rating buckets and credit sectors to better reflect pension liability-driven investments



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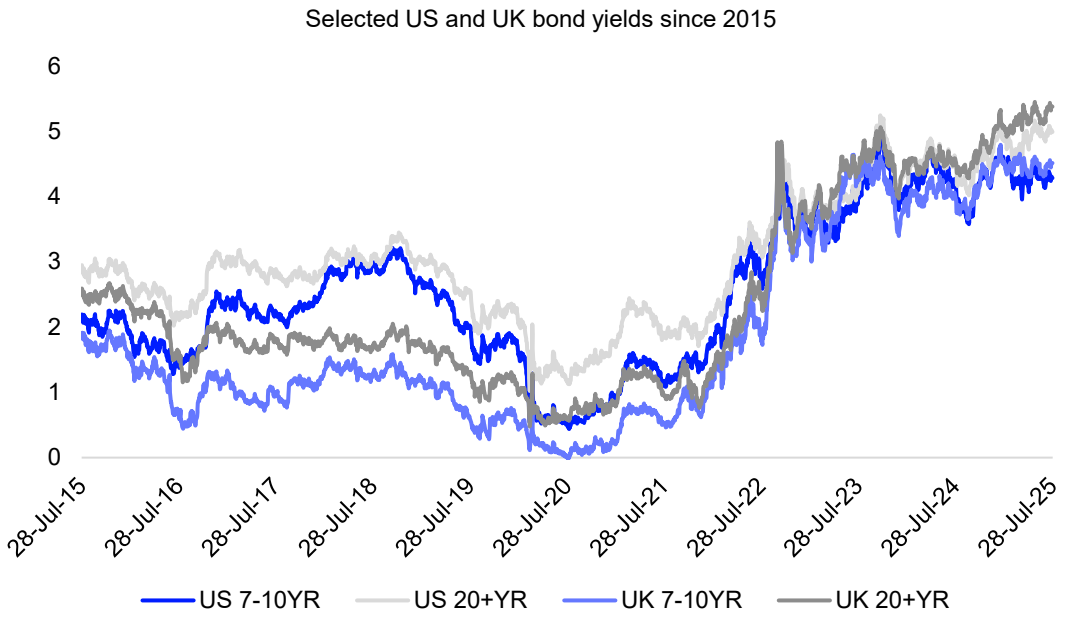
After a prolonged period of zero, or near zero interest rates (ZIRP), from the Global Financial Crisis in 2008-09 to Covid in 2020-21, a higher interest rate cycle has developed in much of the G7 economies since 2022, as shown in Chart 1. This new interest rate regime has been characterised by nominal government bond yields in the 3-5% region, as the Chart shows.

Chart 1: US and UK bond yields

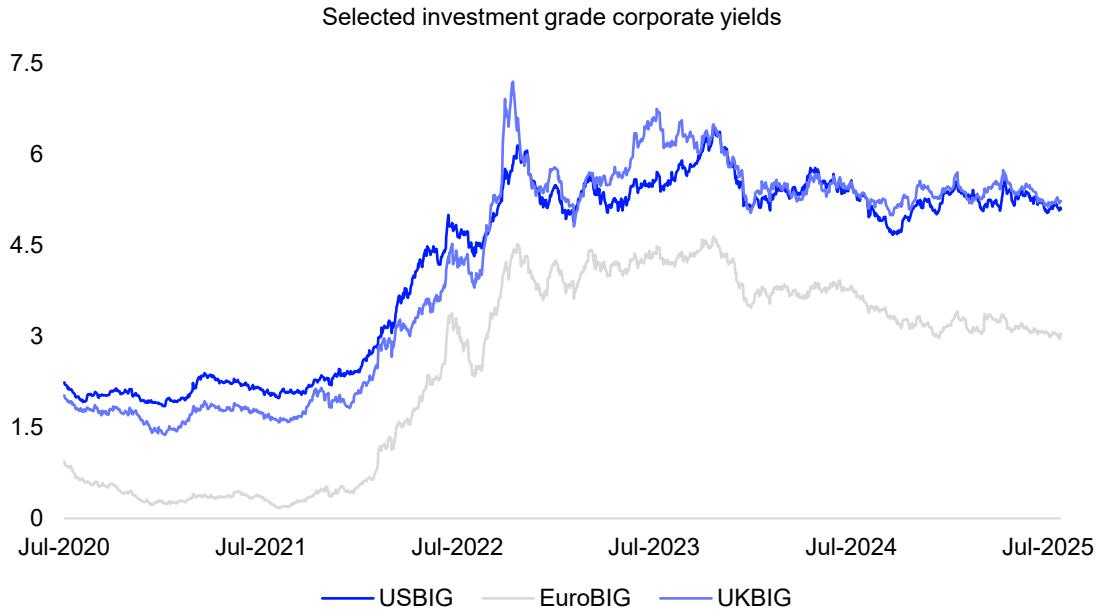


Source: FTSE Russell data to July 28, 2025.

A higher rate regime means higher discount rates for pension fund liabilities…

One of the key consequences of the new world of higher rates and bond yields is higher discount rates applied to the future liabilities of pension funds and insurance companies, reducing the size of these liabilities. Partly reflecting regulation, discount rates vary for G7 pension schemes, with some pension funds obliged to use govt bond yields as discount rates, and some able to use corporate bond yields. But even though credit spreads are near 10 yr lows, absolute yields on credit are still well above pre-Covid levels, as Chart 2 shows.

Chart 2: Yields on IG credits in US, Eurozone and UK



Source: FTSE Russell data to end-July 2025.

….and a favourable combination of higher rates and equity values developed since 2022

Clearly, the estimated funding position of pension schemes can change over time owing to several factors including financial markets, actuarial assumptions about investment returns and longevity, variation in the number of defined benefit (DB) or defined contribution (DC) schemes, and sponsoring employers' special contributions. A favourable combination of higher discount rates on liabilities and stronger equity markets has arisen since 2022 – even allowing for the fact that higher rates and bond yields also affect the value of those assets held as bonds, so there is an offsetting impact on the net funding position.

Such a combination of higher rates and rising equity and risk asset values was more typical in the "Goldilocks" regime, before the GFC in 2008, and overall, has significantly improved the net funding position of pension funds in several G7 economies. Indeed, this is the polar opposite of the period after the GFC, when 10 year govt bond yields collapsed to lows below 1%, and equity market valuations moved sharply lower at times.

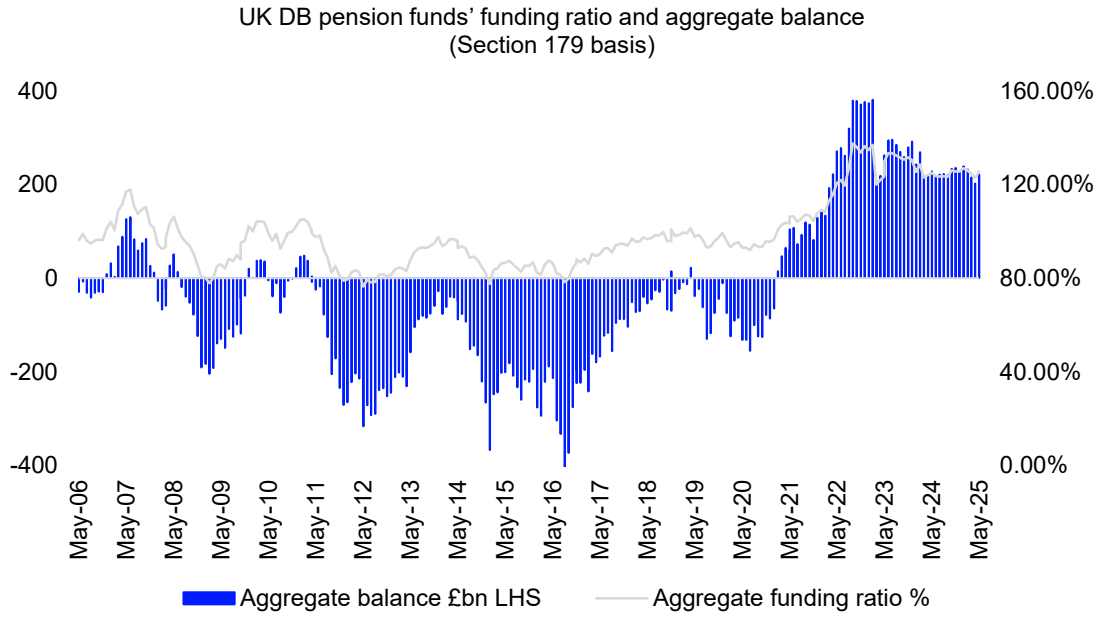
Data for the UK shows the net funding position[1] of UK defined benefit (DB) schemes, measured by the Pension Protection Fund's 7800 index, in Chart 3. The Chart shows three distinct phases[2]

– 2007-2016 – a period of deteriorating projected deficits, from a peak of 118% assets/liabilities in June 2007, when the surplus was £120bn. to a low point of 76% in May 2012 and 78% in August 2016, when the deficit reached £413 bn

– 2016 – 2021 – a period of declining projected deficits

– 2021 – 2025 – a period of projected surpluses. UK DB schemes have now moved into surplus, with the current surplus reaching 120%, exceeding the 2007 peak

Chart 3: Net funding ratio for UK Defined Benefit pension schemes since 2006



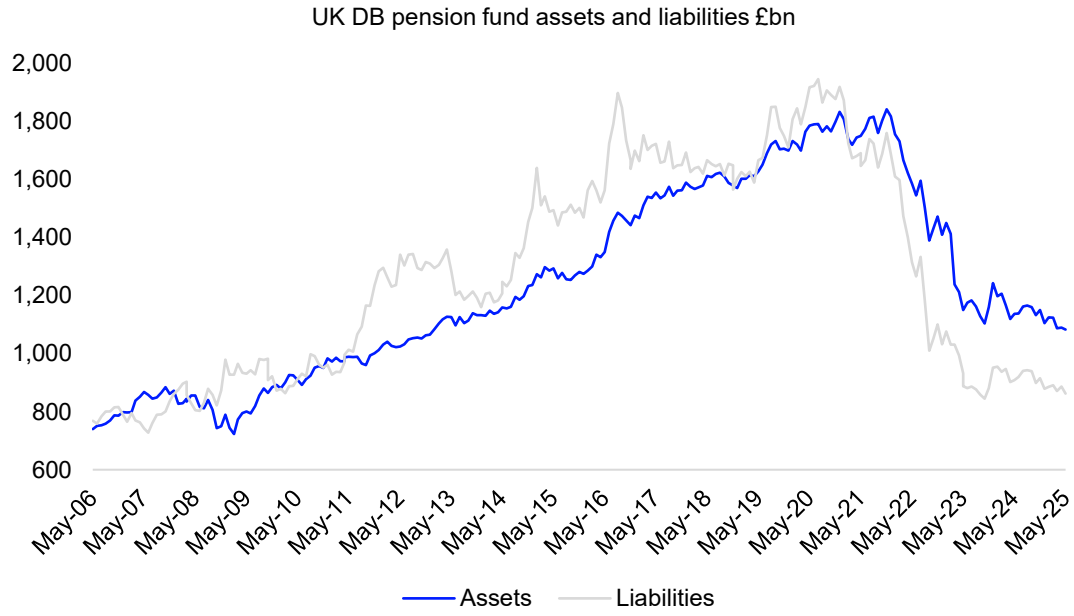
Source: UK Pension Protection Fund, May 2025.

The underlying performance of the assets and liabilities in these pension schemes shows the twin impact of higher rates in depressing asset valuations on the one hand, via higher yields on govt. and corporate bond holdings, whilst reducing liabilities on the other.

This is shown in Chart 4, where the decline in liabilities is faster than assets since 2021, with asset values cushioned by the outperformance of equities versus gilts, nominal and real (though note that figures from March 2023 are not directly comparable with earlier data).

[1] The PPF defines the net funding position as the sum of scheme assets less the sum of scheme liabilities.
[2] Please note Section 179 valuations of UK DB pension funds use a range of longer dated index linked and nominal gilt yields to discount future liabilities.

Chart 4: Assets and liabilities of UK DB pension schemes



Source: UK Pension Protection fund, May 2025.

Composition of UK DB pension scheme assets shows diversification even if gilts dominate

The wide range of assets held by UK DB pension schemes, and the changes in the composition of these assets since 2006 can be seen in Table 1, even if conventional gilts dominate holdings. The proportion of assets held in equities has declined from over 60% in 2006 to only 15.5% in 2024, with the proportion in other investments now nearly matching equities, as Table 1 shows. Also note that the category “bonds” includes other investments whose characteristics resemble bonds, such as LDI. Negative weights in cash and deposits relate to investments such as swaps and repurchase agreements held as part of LDI strategies.

Table 1: Weighted average asset allocation of UK DB pension schemes in total assets

Year	Equities	Bonds	Other investments	Of which- Cash and deposits	Property	Annuities	Diversified growth funds	Absolute returns	Insurance * policies	Hedge* funds	Misc.
2006	61.1	28.3	10.6	2.3	4.3	–	–	–	0.9	–	3.1
2011	41.1	40.1	18.8	4.1	4.4	–	–	–	1.6	2.4	6.3
2016	30.3	51.3	18.4	3.0	4.8	2.1	–	–	0.1	6.6	1.7
2017	29.0	55.7	15.3	-0.9	5.3	3.3	–	–	0.1	6.7	0.8
2018	27.0	59.0	14.0	-2.5	4.8	3.4	–	–	0.1	7.0	1.2
2019	24.0	62.8	13.2	-4.4	5.0	4.0	–	–	0.3	7.4	1.0
2020	20.4	69.2	10.4	-7.2	4.9	5.0	–	–	0.1	6.8	0.8
2021	19.0	72.0	9.1	-9.5	4.7	6.6	–	–	0.1	6.1	0.9
2022	19.5	71.6	8.9	-8.8	4.6	6.8	–	–	0.1	5.2	1.0
2023**	18.8	66.5	14.7	-3.3	5.3	7.3	1.5	3.0	–	–	0.9
2024	15.5	69.8	14.7	-5.4	5.9	9.7	1.0	2.6	–	–	0.9

* Categories Insurance policies and hedge funds were discontinued in 2023 and became two new categories, Diversified growth funds and absolute returns.

** A new roll-forward methodology was implemented by the PPF in 2023, but weighted allocations are still comparable.

Source: UK Pension Protection Fund, Purple Book 2024.

Diversification in asset holdings increases need for expanded suite of discount curves

Although bond, and bond-type holdings dominate overall holdings, diversification away from conventional govt bond holdings alone has increased steadily since 2008, as Table 2 shows. Drilling down into the bond weightings for 2024, shows that corporate bonds have a weighting of 35%, compared with only 19.5% in conventional govt bonds, and 45.5% in index-linked govt bonds in 2008. The main trend here has been diversification away from conventional govt bonds alone since 2008, and an increase in index linked holdings, but note the proportion held in corporate credit has also increased since 2008. This diversification away from conventional govt bonds in asset holdings increases the need for an expanded suite of pension discount curves for DB schemes, beyond risk-free government yields.

Table 2: Weighted average of UK DB schemes bond holdings

Year	Government fixed interest %	Corporate bonds %	Index-linked govt bonds %
2008	33.2	32.6	33.9
2011	19.6	44.3	36.1
2016	21.9	33.7	44.4
2021	24.6	28.2	47.2
2023*	19.1	37.6	43.3
2024	19.5	35.0	45.5

* A new roll-forward methodology was implemented by the PPF in 2023, but weighted allocations are still comparable.

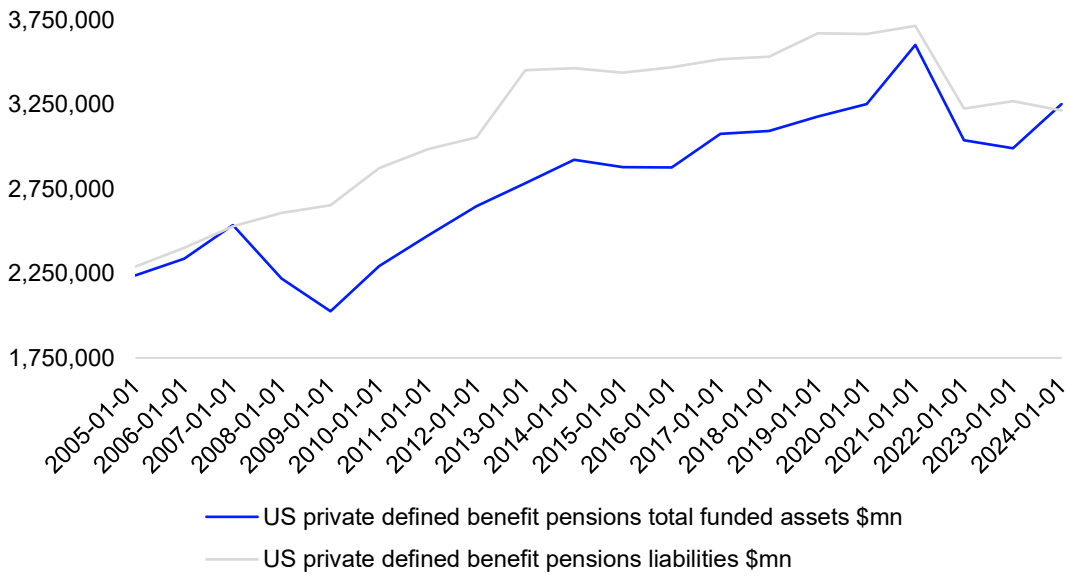
Source: UK Pension Protection Fund, Purple Book 2024.

US DB schemes show a similar transition to funding surpluses…

Turning to US DB schemes, similar results are shown on surpluses in Pension funding indices for US DB schemes, Thus the Milliman Pension funding index for the largest 100 US corporate DB schemes showed a funding surplus in fiscal year 2024, of 101%, for the first time since 2007[3] (using standardised corporate bond discount rates across the funds surveyed), as Chart 5 shows. Note how liabilities rose sharply relative to assets during the period of zero rates and very low discount rates, after the GFC. The present value (PV) of liabilities remained high until the Fed raised rates from March 2022 to July 2023, increasing bond yields and discount rates, and reducing the PV of future liabilities sharply, as the Chart illustrates (please note this is annual data so exact dates may not match to market events).

[3] Milliman 2025 Corporate Pension Funding survey, April 30, 2025.

Chart 5: US Private defined benefit pension assets and liabilities $million

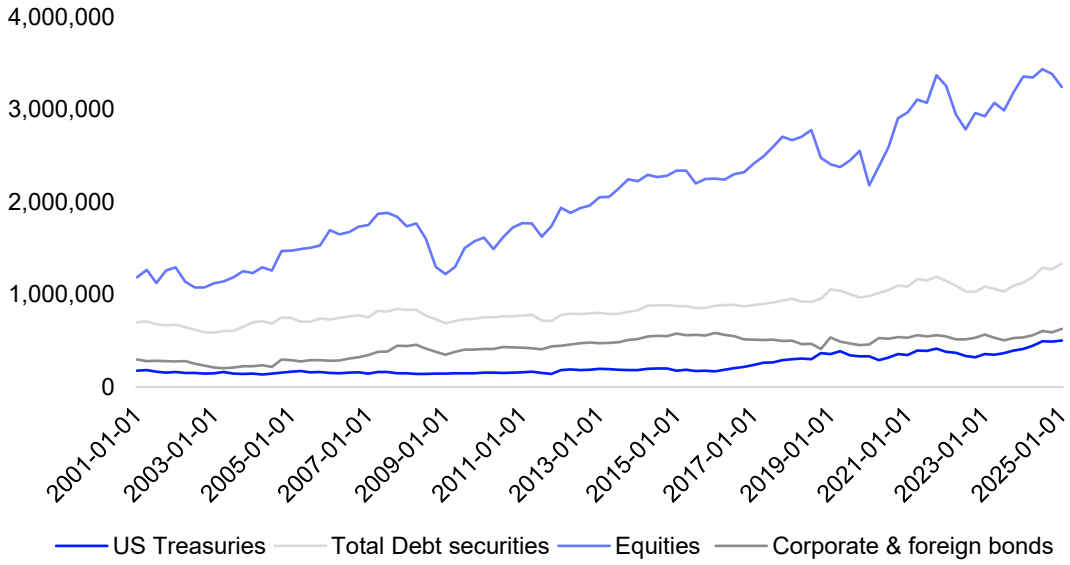


Source: US Federal Reserve (Financial Accounts Z1 of the US), June 2025.

… and evidence of diversification

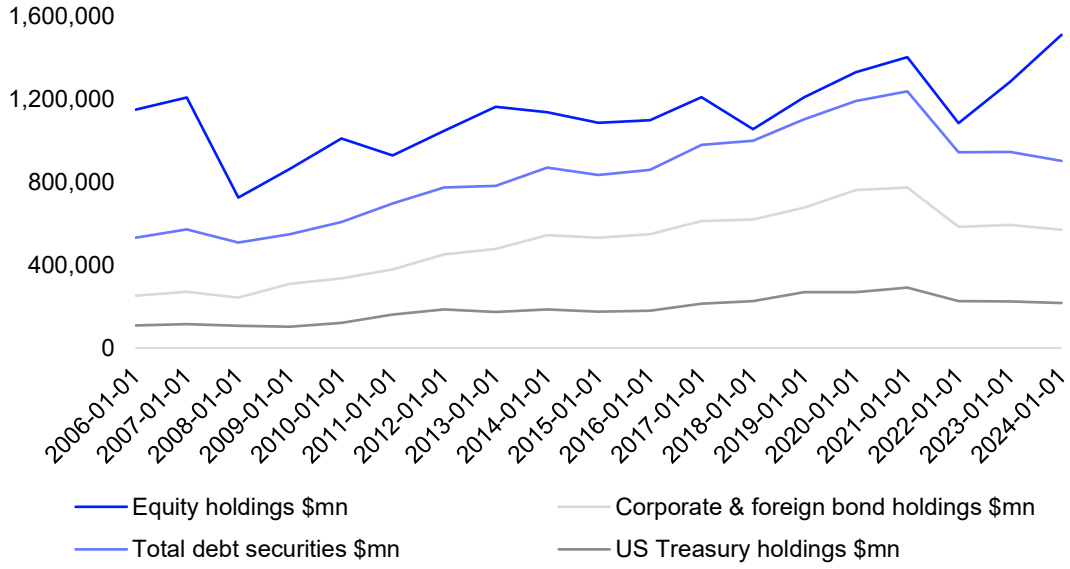
Charts 6 and 7 also show diversification in US DB scheme asset holdings, with a much smaller proportion of assets held in US Treasuries than UK schemes hold in gilts. This is the case for both private DB schemes in the US and state and local government DB schemes. Indeed, corporate and foreign bond holdings exceed those of US Treasuries in these DB schemes, as Charts 6 and 7 show, even if Treasury holdings have increased since the net funding position improved, and Treasury yields rose.

Chart 6: US state and local govt DB pension scheme asset holdings $million



Source: US Federal Reserve (Financial Accounts Z1 of the US), June 2025.

Chart 7: US Private DB pension schemes main asset holdings



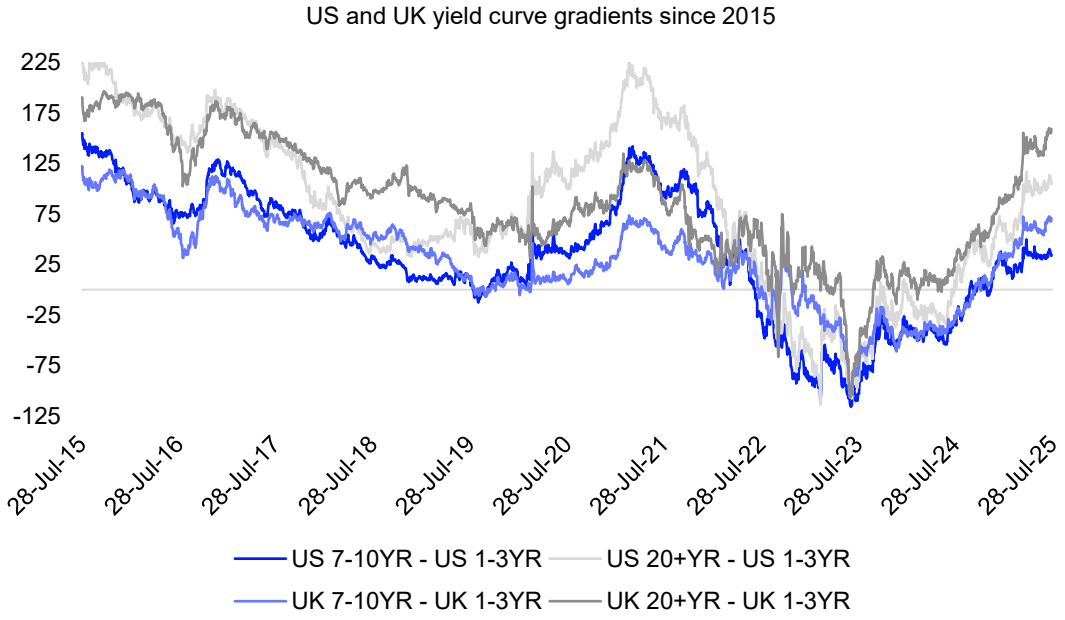
Source: US Federal Reserve (Financial Accounts Z1 of the US), June 2025.

Disinversion and steeper yield curves have also reduced future liabilities

The other important factor here is the disinversion, and normalisation of G7 yield curves. This is because the calculation of pension funding requirements means the shape of the yield curve is important in valuing future pension liabilities, as well as the level of bond yields. Ceteris paribus, a more “normal”, i.e., positively-sloped yield curve, increases discount rates and reduces future pension liabilities, since yields are higher on longer maturities and a higher discount rate is applied to future cash flows. Thus, the steepening, and normalisation of yield curves in 2024-25 has reduced future liabilities for DB pension schemes (even if depressing valuations of longer dated fixed income assets). This follows a long period of inverted govt yield curves in 2022-23, when 10 yr yields were below 2 yr yields.

Recent disinversion now means a notable yield pick-up between 2 yrs and 10 yrs, and particularly between 2 yrs and 30 yrs, where the curve has steepened more. Chart 8 shows the normalisation of yield curves, and the steepening of the curve at the long end is particularly pronounced in the UK. This also means discount rates based on 10 yr govt bonds yields, or 10 yr corporate bond yields, are higher, reducing future liabilities further even with credit spreads still near post-Covid lows.

Chart 8: Normalisation of yield curves since 2023



Source: FTSE Russell data, to July 28, 2025.

Choice of discount rate, or discount curve, is a key variable

Given how the discounting of future pension fund liabilities plays a key part in driving pension fund surpluses or deficits, the choice of discount rate, or discount curve, to be applied to DB schemes is a critical variable in this process. The literature[4] describes 4 main approaches – (1) the market-based approach, (2) the expected return approach, (3) the Day approach, and (4) the probability of ruin approach.

The market-based approach focuses on valuation of future liabilities of DB schemes

The broad market approach from financial economics is to use a discount rate from a bond of comparable risk and duration to the fund's liabilities. So, if the liabilities of the fund are risk-free, a risk-free yield should be used. The general approach here is to base the discount rate on the returns on a portfolio of assets that perfectly matches the pension fund's liabilities, and not the performance of the scheme's actual assets. Variations on this scheme suggest a higher discount rate like a corporate bond yield, to reflect higher risks on liabilities. This allows for the possibility expected payments are smaller than promised payments, and can allow a better match to scheme assets. Also note that corporate bond rates are used by regulators of both US and UK private sector DB schemes to assess overall funding ratios.

The market-based approach assesses discount rates independently of the scheme's investment assets, and does not present a dynamic, and integrated asset/liability approach. A criticism of using narrow discount rates, like a gilt or Treasury yield, plus a margin of say 50bp, to value liabilities is that they create higher volatility in the valuation of liabilities and that they may overstate liabilities. Chart 4 above shows this for UK DB schemes.

There may also be a disincentive for schemes to diversify assets, and to confine holdings to a narrow pool of assets, and leverage holdings in conventional govt bonds to meet increased liabilities. It could be argued this lay behind the disruptive gilt market sell-off in 2022, which required UK pension regulations to be tightened on the use of derivatives. For regulators too, the choice of discount rate has to build in the possibility of both future funding shortfalls, and the benefits of diversification in the choice of assets.

[4] See "Determining Discount Rates Required to Fund Defined Benefit Plans", Turner, Godinez-Olivares, McCarthy, Carmen Boado-Penas, Society of Actuaries, 2017.

The expected return approach addresses the funding issue more directly

In contrast, the expected return approach bases the choice of discount rate on the expected returns of the scheme's assets, to determine the assets required now to finance future scheme liabilities, with a given probability. So this approach addresses more directly the funding issue DB schemes face, rather than the valuation of liabilities, like the market-based approach. It is also closer to the use of a dynamic discount rate (DDR), basing the choice of discount rate on the yield of the assets held by the scheme to meet future cash flows, rather than a mechanical risk-free yield, plus a margin to reflect "normal" credit spreads.

The Day approach highlights the uncertainty of future liabilities

Both Day[5] (2004) and Jong[6] (2008) stress the uncertain nature of future pension liabilities, including wage growth, and the lack of instruments available, or market incompleteness, to hedge these liabilities. This suggests using a discount rate for future, uncertain liabilities, that is even lower than the risk-free rate, effectively requiring sponsors to provide a cushion of assets against the possibility of future funding shortfalls.

The probability of ruin, or stochastic funding parameter approach

Given the risk additional funding contributions may be required, the so-called "probability of ruin" approach addresses the issue directly, and the risk contractual obligations to pension participants concerning their future benefits will not be honoured[7]. It does this by looking at both the riskiness of assets and liabilities in DB schemes, and then assessing what discount rate is needed to ensure funding requirements are met with a given probability. Perhaps unsurprisingly, this stochastic funding parameter approach selects a discount rate that is less than the expected rate of return on assets but greater than the risk free rate, with the discount being greater the higher the percentage of the portfolio invested in equity and the longer the duration of the assets.

[5] Day (2004)
[6] Jong (2008)
[7] See "Determining Discount Rates Required to Fund Defined Benefit Plans", Turner, Godinez-Olivares, McCarthy, Carmen Boado-Penas, Society of Actuaries, 2017.

Appropriate discount curve varies but flexibility to access a range of PDCs becoming key

The range of approaches suggests different metrics and discount rates for pension liabilities are appropriate for different purposes, whether that be to assess scheme funding or to stress test liabilities, over and above strict regulatory requirements. These may include target funding cushions. In addition, some regulators, like the UK Pensions Regulator, are moving to a more flexible approach, reflecting the volatility of funding levels that has arisen in recent years when using a fixed formula, based on risk-free govt bond yields.

Recent market developments and the normalisation of yield curves also gives DB schemes an opportunity to de-risk portfolios, while funding positions are favourable. It is unsurprising that there has been an increase in LDI flows in recent months as a result, as schemes seek insurance against a repeat of the funding deficits that arose after the GFC and Covid shocks.

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