

PENSIONS WATCH – ISSUE 17: WHAT'S BEEN HAPPENING AND WHAT'S ON THE HORIZON IN THE WORLD OF PENSIONS



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In this edition of Pensions Watch we look at the central role played by Liability Driven Investment in the risk management of defined benefit pension schemes and consider whether a new economic environment of punchy inflation numbers and rising bond yields changes anything for this crucial aspect of risk management.

The central role of risk management

Running a defined benefit (DB) pension scheme has never been easy. Indeed, pension fiduciaries have to be familiar with the laws, vagaries and interconnectivity of economics and financial markets, the intricacies of investment management, the ramifications of a continuous flow of legislation and regulation, not to mention the dark arts of actuarial science and accountancy. However, overlaying all of this is the ability to successfully manage a multitude of risks of different shapes and sizes – some highly visible and quantifiable, others less so. Indeed, successfully running a DB pension scheme has increasingly become a complex exercise in risk management. Central to this notion of risk management and critical to the success of DB scheme outcomes, certainly over the past 10 to 15 years, is running a Liability Driven Investment (LDI) portfolio. Indeed, those DB schemes which have failed to adopt a formalised LDI policy have seen their deficits spiral skywards.

The science of LDI¹

The basis on which LDI operates is very simple. As the scheme's assets are there to fund the scheme's liabilities – effectively a negative asset – the latter becomes the benchmark against which the assets should be managed. In other words, the assets and liabilities, as two sides of the same coin, must be viewed together through the same lens to maximise the likelihood that the liabilities, i.e. members' pensions in payment and those payable, will be met by the assets in full and on time. After all, constructing an asset portfolio without a clear understanding of the characteristics of the liabilities would be like a cobbler making a pair of shoes before measuring the intended recipient's feet. The chances are the shoes won't fit! That's exactly the position innumerable DB schemes found themselves in, in the early noughties, following the dot.com bust and the introduction of mark-to-market accounting,² and in the aftermath of the 2007-08 global financial crisis (GFC), as the prices of return seeking assets collapsed and the unprecedented declines in nominal and real (inflation-adjusted) bond yields began to unravel.

Getting into the weeds

Interest rate and inflation risk

For the uninitiated, let me explain. The projected liabilities of a DB scheme are analogous to the projected stream of payments from a bond or, more correctly, from a series of bonds given that each member's pension entitlement is unique (and might be taken by the member in a number of ways).³ Just like the price of a bond, the value of a DB scheme's liabilities is inversely related to changes in

¹ For a more in-depth analysis of the science of LDI and the accompanying governance considerations, please see: The Trustee Guide to Investment. Andrew Clare and Chris Wagstaff. Palgrave Macmillan. 2011. Chapters 6, 12 and 15.

² The introduction of mark-to-market accounting in November 2000 meant that DB scheme asset values were no longer actuarially smoothed on a triennial basis, to eliminate the effect of short-term asset market volatility, but valued annually at market value, thereby capturing this volatility. Simultaneously, DB liabilities were valued, or discounted by, the AA corporate bond yield, rather than the previous methodology of effectively employing the, much higher, historic rate of return from equities. Combined, these two measures, in one fell swoop, gave rise to gaping DB deficits.

³ Members can typically commute part of their pension for a cash sum, take early or late retirement and sometimes exchange their pension's index-linking for a larger initial pension (under a Pension Increase Exchange exercise).

bond yields, i.e. as yields fall, liabilities rise.⁴ They also have a defined sensitivity to *small* yield changes, akin to the *duration* of bonds,⁵ known as PV01, the present value of a one basis point – or 0.01% – change in yields.⁶ Quite simply, a PV01 of, say, £2m, means that the liability value would *fall* by £2m given a 0.01% *rise* in yields and *rise* £2m for a 0.01% *fall* in yields. This is the interest rate risk, or *rates risk*, attaching to a scheme's liabilities. Then there's the scheme's *inflation risk* which, via its IEO1 metric, measures the sensitivity of the liabilities to a 0.01% change in market expectations of inflation.⁷ Contrary to rates risk, a *rise* in inflation expectations *increases* the liability value, given the increased projected value of both pensions in payment and those to be paid. Depending on the inflation linkage of a scheme's liabilities,⁸ this inflation risk can also be sizeable, with an IEO1 often running into in the hundreds of thousands or millions of pounds.

Long-run unrewarded risks

Given the prospective size of a scheme's PV01 and IEO1, even small *declines* in interest rates and/or small *increases* in inflation expectations, if left unmanaged, can cause a DB scheme's liabilities to outpace its assets, to the detriment of its funding level and the security of member benefits. Indeed, these risks are often described as being long-run unrewarded risks in that, if removed at an acceptable price,⁹ they shouldn't have a material impact on the scheme's expected, or target, investment return over the long term.¹⁰ In other words, unlike potentially rewarded risks from return seeking assets, there is no definable risk premium for keeping these unrewarded risks on a scheme's balance sheet. In so doing, the scheme's risk budget is potentially freed up to accommodate greater exposure to potentially rewarded risks, i.e. to return seeking assets, such as equities and real assets, to improve the scheme's funding position in the long run. In this respect, LDI is both a risk management exercise and a risk reallocation exercise.

Hedging instruments

In managing, or even mitigating, this unrewarded risk, a well run LDI approach should match all or an agreed percentage (more on this agreed percentage shortly) of the PV01 and IEO1 sensitivities of the liabilities with equivalent bonds or bond-type assets (and it is usually a mix of both), i.e. mirroring the sensitivity of these liabilities to changes in interest rates and/or to inflation expectations. While LDI bond assets principally comprise gilts, index-linked gilts¹¹ and, to a lesser extent, other G7 sovereign bonds and investment grade corporate bonds, bond-type assets overwhelmingly comprise interest rate and (break even)¹² inflation swaps,¹³ and to a lesser degree gilt total return swaps (gilt TRS)¹⁴ and semi-illiquid secure income assets (SIAs). However, SIAs – typically real assets with secure long-term cash flows, often with an implicit or explicit inflation linkage – are increasingly employed in LDI portfolios.¹⁵

Bond or swaps or a combination of each?

Interest rate swaps, in particular, come into their own in matching very long dated, e.g. 50 year, liabilities, given that there are very few gilts and index-linked gilts that have a sufficiently long duration to perform this role.¹⁶ Additionally, swaps, being synthetic financial instruments, or derivatives, which overlay the scheme's asset portfolio, rather than requiring the initial capital outlay of a bond, can potentially accommodate larger allocations to potentially rewarded return seeking assets. However, this characteristic is limited by the need to hold sufficient (typically low yielding) collateral assets, variously in cash, gilts and investment grade bonds,¹⁷ to meet counterparty calls on the scheme in the event of

⁴ So, if £100 is payable in one year's time and the one year market yield is 1.5%, then the value of that liability today is $£100/1.015 = £98.52$, i.e. if £98.52 is invested today at 1.5%, it will be worth £100 in a year's time. However, if the one year market yield falls to 1%, then the value of that £100 liability today increases to $£100/1.01 = £99.01$.

⁵ Given the convex (curvy slope, or non-linear) inverse relationship between bond yields and bond prices/liability values, bond duration/liability PV01 numbers change, often markedly, with material yield rises and falls, especially in today's ultra low yield environment, where the curvy slope relationship is at its steepest.

⁶ The PV01 of a scheme's liabilities is periodically calculated by the scheme's investment consultant, to gauge the liabilities' sensitivity to yield changes and whether the scheme's liability proxy and LDI portfolio remain appropriately aligned.

⁷ Ditto IEO1 for changes in market-derived expectations of inflation.

⁸ Before April 1997 there was no general obligation on DB schemes to increase pensions in payment (although there was a requirement on schemes that were contracted out of SERPS to provide indexation capped at 3% on rights accrued from 1988). Despite this, many schemes did *voluntarily* apply some form of inflation protection to pensions in payment and many applied Limited Price Indexation (LPI) retrospectively to service before 1997. However, there are statutory minimum requirements on DB schemes to: index pensions in payment in line with inflation, capped at 5% for benefits accruing from service between April 1997 and April 2005 (LPI 0.5) and at 2.5% for benefits accruing from April 2005 (LPI 0.2.5) and revalue the deferred pensions of early leavers in line with inflation capped at 5%, and at 2.5% for rights accrued on or after 6 April 2009. There is nothing to prevent schemes from making more generous arrangements through their scheme rules. In 2012, the measure of prices used for setting the statutory minimum increase each year switched from the Retail Prices Index (RPI) to the Consumer Prices Index (CPI). However, many schemes had RPI hardwired in their rules.

⁹ What constitutes an acceptable price is subjective. Some schemes set specific nominal or real yield trigger points, often based on historic nominal or real yield levels, before increasing their LDI hedging.

¹⁰ As the Bank of England, the UK's operationally independent Monetary Authority, is mandated by the UK Government to keep the rate of Consumer Price Inflation (CPI) at 2% in the medium-term, this anchor means that inflation, interest rates and bond yields will tend to cycle around a stable level over time. Although movements in these variables will cause DB scheme liabilities to periodically rise and fall, assuming these risks over the long-term will be of no obvious benefit to the scheme. By contrast, assuming so-called rewarded risks, such as the equity risk premium attaching to equities, should benefit the scheme over the long-term.

¹¹ Launched in 1981, index-linked gilts are generally issued with very long-term redemption dates and link the ultimate capital redemption value and semi-annual interest payments to the RPI, albeit with a short time lag. However, from 2030 this (statistically flawed) RPI linkage will be replaced by the, less generous (but statistically superior), Consumer Price Index including housing costs (CPIH).

¹² Break even inflation is the market-derived rate of inflation that results from subtracting the nominal yield of a conventional fixed interest bond of a particular maturity from the real yield of an index-linked bond of the same maturity. So, if the former has a nominal yield of 1% and the latter a real yield of -3%, then the break even inflation rate is 4%. If a bond investor expects this rate of inflation to prevail over the term of each bond, then they should be indifferent between which of the two bonds they invest in.

¹³ Swaps are over the counter (OTC) derivatives, so are not traded on a regulated exchange. Instead their terms are negotiated by market standard (ISDA) documentation between two counterparties – in this case an investment bank and a pension scheme. Daily movements in the resulting contracts are settled via daily transfers from the counterparties' respective collateral pools.

¹⁴ A gilt TRS is an OTC derivative, similar to a swap, but which pays both the capital and income return from a specific gilt and has a relatively short term to maturity.

¹⁵ SIAs include long lease real estate, social housing, social infrastructure debt and ground rents.

¹⁶ For example, in November 2021, only £1.1bn was raised from the sale of an ultra long dated index-linked gilt maturing in 2073 (with a record-low real yield of -2.3883%, meaning investors will receive a return 2.3883% below the prevailing rate of retail price inflation). To put this into context, collectively UK DB liabilities are estimated by the Pensions Protection Fund (on its s.179 valuation basis) to be almost £1.7 trillion (£1,700 billion). See: The Purple Book 2021. The Pension Protection Fund, December 2021, p.7.

¹⁷ What constitutes acceptable collateral between the counterparties is documented in a Credit Support Annex (CSA).

rising yields and/or heightened inflation expectations. The size of this collateral pool, or more correctly the, so-called, rates and inflation *headroom* the collateral pool provides, will depend upon both the size of the PV01s and IEO1s being hedged and the extent to which the scheme wishes to be protected against a potential rise in yields and/or inflation expectations beyond the norm, without having to realise return seeking assets at short notice. However, the continually changing relative value of swaps and bonds of different maturities, as measured by the, so-called, z-spread,¹⁸ adds yet another dimension to the desired gilt/swap split.

Hedge ratios

Another key decision is the level at which a DB scheme should hedge its PV01 and IEO1 risk, or what percentage of this risk it should manage. One influential survey suggests that DB schemes are increasingly aligning their LDI *hedge ratios* with their funding ratios.¹⁹ So, if the scheme's funding ratio is 85%, then a hedge ratio that manages 85% of PV01 and IEO1 risk is targeted.²⁰ This is the same as having a target hedge ratio equal to 100% of the scheme's assets. In so doing, these schemes, which are typically well funded with strong, or tending to strong, sponsor covenants, seek to reduce the volatility of their funding level, or funding ratio, rather than the absolute value of the scheme's deficit, when faced with gyrating yields and/or inflation expectations. However, there are others who target hedge ratios greater than their funding ratio, or level of assets – some even aligning their hedge ratios with 100% of the scheme's liabilities. These schemes, which may not be particularly well funded and/or have a weak, or tending to weak, sponsor covenant, that might be at odds with the amount of investment risk being run by the scheme, seek to reduce the volatility of the absolute value of the deficit, rather than the funding ratio. Of course, there are also those with hedge ratios somewhere between 100% of assets and 100% of liabilities who, depending on whether the hedge is closer to the former or latter, principally target reducing the volatility of either the funding ratio or the absolute value of the deficit – albeit not exclusively.²¹

Governance considerations

Given the sheer amount of governance and cost entailed in successfully managing a LDI portfolio, it probably comes as no surprise that, according to investment consultant Mercer, 78% of DB schemes employ a multi-client pooled LDI fund, run by a LDI portfolio manager, rather than a bespoke arrangement, run by a portfolio manager on a segregated basis.²²

A new LDI paradigm

Against the backdrop of the inexorable decline in nominal yields and the unprecedented transition, since the GFC, from low positive to deeply negative real yields, it's perhaps unsurprising that the adoption of LDI policies among DB schemes has gained considerable momentum over the past decade or so. Indeed, the vast majority of DB schemes now have a formalised LDI policy.²³

However, DB schemes are now faced with a new and, for many pension fiduciaries, unfamiliar LDI paradigm which, given the seemingly less than transitory nature of recent inflation numbers, has led to sharply rising inflation expectations, an uptick in nominal yields and even deeper negative real yields. Of course, given that LDI is very much an exercise in risk management, rather than second guessing the market's assessment of the direction of and potential quantum of travel for rates and inflation, the obvious question to ask is, should this matter? Well, yes, albeit with a qualification.

Why does this matter?

As any DB pension scheme fiduciary will tell you, the number one priority for any DB scheme is to pay pensions in full and on time. To do so requires a number of key risks to be nailed down, of which rates and inflation risk are, or should be, at, or near, the top of the risk management agenda. Indeed, as noted earlier, those DB schemes which, over the past decade or so, have failed to successfully manage these risks, rates risk in particular, have seen their deficits spiral skywards.

¹⁸ The z-spread is the difference in the yield offered by gilts, or index-linked gilts, as compared to swaps of the same duration. A positive z-spread arises if gilts or index-linked gilts yield more than swaps of the same duration and visa versa. Analysing the z-spread between swaps and gilts/index-linked gilts allows judgements to be made on relative value opportunities.

¹⁹ See: Global Pension Risk Survey 2021/22. UK survey findings. The DB pension risk management journey. Aon Solutions UK Limited. 2021. p.26.

²⁰ Not all DB schemes have a single hedge ratio for their rates and inflation, though the percentage differences are usually minor.

²¹ According to investment consultant, Aon, 74% of DB schemes surveyed have hedge ratios above 80% of assets, with almost half of these schemes running hedge ratios greater than 100% assets. Additionally, 44% of DB schemes surveyed had increased their allocation to LDI over the past two years. Of the survey's 137 respondents, 63% had assets at or below £1bn and 37% assets of £1bn+. See: Aon Solutions UK Limited (2021). op.cit.p.26. According to BMO Global Asset Management, Q421 on Q321, UK DB schemes increased their rates hedging activity by 27% and inflation hedging by 24%. See: <https://www.bmogam.com/gb-en/institutional/news-and-insights/q4-2021-ldi-survey/>

²² See: European Asset Allocation Insights 2021. UK DB De-risking Trends. Mercer LLC. 2021. p.11. This survey of c.460 UK DB schemes, with combined assets in excess of £400bn, comprises 42% of participants with assets under £100m (2% of surveyed assets), 42% with assets between £100m and £1bn (15% of surveyed assets) and 16% with assets over £1bn (82% of surveyed assets).

²³ According to Mercer, over 75% of schemes with assets up to £100m or £1bn+ of assets have LDI mandates, while almost 90% of those schemes in the £100m-£1bn assets range have a LDI policy. That said, there is less appetite among very small schemes to hedge rates and inflation risks owing to governance issues and those public sector funded schemes with strong sponsor covenants that remain open to new members. See: Mercer LLC (2021). op.cit.p.10.

However, when faced with a rising yield environment, the temptation might be to take off, or at least dramatically reduce a scheme's hedge ratio, so that a lower value can be assigned to the scheme's, now unhedged, liabilities. This would, in turn, cut the deficit and bolster the funding ratio. Alas, this is missing the point of risk management. In short, what if rising inflation expectations and yields prove short lived and these metrics return to their former values? This is the qualification.

That said, consideration should be given to the asymmetric effect of rising yields on a scheme's funding ratio and deficit, depending on the level of hedge ratio employed. Let me explain. Taking the performance of the scheme's return seeking assets out of the equation, a rising nominal yield environment for a 100% assets-level hedge results in a stable funding ratio but a reduced deficit, whereas for a 100% liabilities hedge, the deficit should remain the same but the funding ratio will fall. Given this asymmetric trade off, pension fiduciaries might consider – funding level, sponsor strength and the level of investment risk being run notwithstanding – trimming a 100%+ assets hedge ratio closer to a 100% assets-level hedge.²⁴ Of course, the opposite applies when yields are falling.

Equally, the rates and inflation sensitivities of the hedging assets should be regularly assessed to ensure they're still performing their matching function, given how dramatically these sensitivities can change with gyrating yields and inflation expectations in today's low yield environment. Additionally, it pays to keep a beady eye on the rates and inflation headroom afforded by the scheme's collateral pool. After all, the actions of central banks, especially when inflation expectations are rising,²⁵ can often blindside markets and materially impact yields to a greater degree than expected.²⁶

To finish where we started, running a DB scheme has never been easy – nowhere more so than in ensuring a scheme's rates and inflation risk is being managed appropriately. However, there is an additional consideration, which adds a degree of complexity to LDI policies for the sheer number of DB schemes that are now cashflow negative.²⁷ And that is ensuring sufficient liquidity is made available to meet pensions in payment over the short- to medium-term without overly relying on regular disinvestments from return seeking assets – the very same assets that ultimately seek to plug deficits and pay pension increases. However, while quite a long and governance-intensive list, by getting all of the inputs to a LDI policy right, DB schemes should be well on their way to meeting the number one priority of paying benefits in full and on time.

²⁴ For example, take a DB scheme with £100 of liabilities, £80 of assets – both with a duration of 20 years (or a 20% sensitivity to a 1% change in yields) – and a funding ratio of 80%. If market yields rise by 1%, then for a 100% assets-level hedge, the funding ratio remains at 80% (liabilities at £80, assets at £64) but the deficit falls to £16. For a 100% liabilities-level hedge (where the hedging assets have implied gearing of 1.25 times, i.e. for £80 of assets to achieve £100 of hedging), the deficit remains at £20 (liabilities at £80, assets at £60) but the funding ratio falls to 75%. **Please note: this is not investment advice.**

²⁵ In 2022, central banks are widely expected to move from the ultra accommodative monetary policies set at emergency levels since early in the pandemic, to those that recognise a normalisation of the economic backdrop – i.e. being less dependent on quantitative easing and which address the risks of allowing inflation expectations to become anchored at elevated levels.

²⁶ For instance, the US Federal Reserve's interest rate hikes over the course of 1994 surprised investors in terms of their timing and magnitude, causing the yield on 10-year Treasuries to rise by, a then, unprecedented, 2.2% over the year.

²⁷ 76% of UK DB schemes are now cashflow negative, i.e. with more cash being paid out than coming in, with almost all DB schemes expected to be in this position in 10 years time. See: Mercer LLC (2021). op.cit.p.6.

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