Investment Spotlight is designed to help trustees of mid-sized pension schemes understand key investment areas that impact their scheme. This issue focuses on liability driven investment, one of a number of solutions aimed at aligning the sensitivity of the value of a defined benefit pension scheme’s assets and liabilities following changes in interest rates and/or inflation expectations.

What is liability driven investment?
Liability driven investment (commonly referred to simply as ‘LDI’) generally uses derivative instruments to reduce the impact on a scheme’s funding level due to changes in interest rates and/or inflation expectations. The mitigation of such risks has become increasingly common due to the impact their volatility has on a scheme’s funding level by providing greater certainty in terms of future funding requirements. Addressing these risks is more widespread following the development of both bespoke and pooled solutions over the past decade.

Valuing Defined Benefit Pension Scheme Liabilities
The value placed on a defined benefit pension scheme’s estimated cash outflows is calculated by the Scheme Actuary at each actuarial valuation. The value varies over time based on past experience and a number of different financial and demographic assumptions. The main financial assumptions include:

- discount rate(s) – which is/are generally linked to long-term interest rates available on UK government bonds (widely known as ‘gilts’)
- inflation assumptions such as RPI and CPI – which reflect long-term expected inflation as measured by the difference in yields between fixed and index-linked gilts

This issue is a natural continuation from a previous issue of our Investment Spotlight: Duration.
If all other assumptions are unchanged, the value placed on the estimated cash outflows will:
• decrease if the discount rate(s) increase
• increase if the inflation assumption(s) increase

**Duration**

Duration is a key concept associated with LDI and has been discussed in our document entitled “Investment Spotlight: Duration”.

A duration mismatch arises when a pension scheme’s assets have a different (usually shorter) duration than its liabilities — this is what LDI aims to address. Whilst bespoke LDI strategies are widely available, the focus of this Spotlight is on pooled LDI funds that are more suited to small/mid-sized schemes.

**Pooled LDI Funds**

In order to suit a variety of schemes, each with their own individual liabilities, investment managers offer a range of pooled LDI funds, each with different maturity dates and therefore, different durations. A scheme can choose which fund (or funds) to invest in and may choose to invest across a number of the different LDI pooled funds to replicate the profile of its estimated cash outflow.

LDI pooled funds provide flexibility for pension schemes with a choice of options to hedge interest rate risk, inflation risk, or both (referred to as ‘real’ in practice). An example of a representative pooled LDI fund range is illustrated in Figure 3.

LDI pooled funds are generally named with reference to a year (or range of years, in this example) and the type of hedge it aims to achieve:
• the ‘2036 - 2040 Fixed Fund’, for example, will pay a series of fixed payments to the scheme in the years 2036 through to 2040, in exchange for a series of payments from the scheme that is linked to LIBOR* over the period, and therefore provides a hedge against changes in interest rates over the period up to 2040.

*LIBOR, the London inter-bank offered rate, is the interest rate at which banks lend to each other.
• the ‘Inflation Funds’ make a payment in the maturity years that is linked to the rate of inflation (RPI), in exchange for a series of annual payments that are fixed at the outset, and therefore provides a hedge against changes in RPI over the period under consideration.

• the ‘Real Funds’ make a payment in the maturity years that is ‘real’ (it retains its real value and is not eroded by inflation), in exchange for a payment that is linked to LIBOR, and therefore provides a hedge against both changes in interest rates and inflation (RPI).

Leveraged Pooled LDI Funds

The development of leveraged pooled LDI funds was specifically to address the desire for schemes to reduce their duration mismatching without the requirement to allocate the majority of their assets to a LDI strategy, thus allowing a scheme to retain allocations to assets seeking long-term growth, such as equities, property etc.

When LDI pooled funds were first developed, they were unleveraged – this means that for every £10m committed by an investor (a pension scheme in this case), the investment manager would invest the £10m in a cash/bond fund, and enter into a derivative instrument (usually a swap contract**) on a nominal amount of £10m. This then provided the scheme with a hedge against changes in interest rates, expected inflation rates or both (depending upon which hedge is chosen) on the nominal amount of £10m.

However, as the swap contract is agreed with reference to a nominal amount that does not exchange hands, it is possible to construct a leveraged LDI strategy. For example, a scheme commits £10m, which the investment manager invests in a cash/bond fund and enters into a swap contract on a nominal amount of £20m. This would represent a two-times leveraged investment and would provide the investor with a hedge against movements in interest rates, expected inflation rates or both, on the nominal amount of £20m having only committed £10m of capital.

The use of leverage can therefore provide schemes with a higher level of protection, or hedging, with a lower level of capital. Thus, the scheme is able to retain an allocation (outside of the LDI investment) to equities, property, or other such assets seeking long-term growth. These funds are common with the leading LDI investment managers generally offering a range of funds with leverage normally between two and four times.

Swaps vs. Gilts

Prior to the credit crunch of 2008, the yield on an interest rate swap was in excess of a gilt of equivalent duration (indicated by the purple line being above zero in the following chart). This meant that schemes could more precisely hedge their liabilities by investing in swaps and obtain a pick-up in yield. However, since the credit crunch, swap yields have often been below gilt yields as the chart below shows.

This change in the market environment makesgilts more attractive than swaps from a valuation perspective from time to time and this has led to investment managers launching leveraged gilt funds as an alternative to swap based funds. Some investment managers have gone a stage further and also offer funds that have the flexibility to invest in both gilts and swaps as well as being able to switch between the various instruments in response to market conditions.

**Please refer to the section towards the end of this Spotlight entitled ‘Mechanics of LDI’ to read more about how swap contracts work.
Counterparty Risk and Collateral Management

Counterparty exposure is the risk that the other party in the agreement will default, i.e., not fulfil its obligations under the contract. This risk can be reduced by dealing with an organisation (normally an investment bank) that has a good credit rating. It is monitored by the investment manager and trades can be split between a number of different counterparties in order to reduce individual counterparty risk.

As the value of a swap will vary as market conditions vary, often on a daily basis, collateral needs to be ‘posted’ by one counterparty to the other. Collateral is a legal and valuable liquid asset that is pledged as security on the value of the contract. The main reason for entering in to collateral arrangements is to reduce credit risk. Collateral management is normally undertaken on a daily basis and consists of assets such as cash or gilts. (Prior to the credit crunch, corporate bonds were often eligible for collateral but this practice has been phased out.)

Advantages

- Reduces a scheme’s funding level volatility - providing greater certainty in relation to funding requirements.
- Exposure to interest rate and inflation risk (unlike for example, credit risk) is generally considered ‘unrewarded’, meaning that unhedged exposure to these risks is not expected to lead to higher investment returns in the long-run.
- Leveraged funds allow schemes, in particular those that are underfunded, to reduce duration mismatching without forgoing investments in assets seeking long-term growth.
- Derivative instruments can provide a greater degree of flexibility in relation to hedging long-term liabilities than ‘physical’ bond assets, such as gilts or corporate bonds.
- Such strategies help schemes to develop a clear framework for managing the assets relative to the liabilities.
- They can offer sophisticated hedging solutions to small/midsized schemes in a simple, low cost structure.
- Trustees do not need to negotiate scheme-specific contracts, thus avoiding the high up-front legal and advisory costs involved with a segregated approach.

Disadvantages

- Such concepts are new to many trustees and are complex. A result of which is that further training is often required.
- LDI strategies will never perfectly match the movement in the scheme’s liabilities.
- Implementation of a LDI strategy will incur initial transaction costs and higher ongoing management costs.
- A LDI investment is viewed as a long-term commitment and a scheme can potentially be locked into historically low yields.
- Costs involved in early termination of contracts are quite high.
- Infrequent dealing dates, such as on a quarterly basis, result in reduced flexibility if the scheme requires a disinvestment.
- If the leverage exceeds a certain level (following a significant move in interest and/or inflation rates) the LDI fund will require the scheme to place additional assets in to the cash/bond fund.

Implementation Considerations

- LDI is a very technical area of investment which requires a great deal of understanding prior to implementation.
- Trustees need to decide how much of their Scheme’s exposure to interest rates and/or inflation should be hedged at the outset, how this is to change over time and at what interest and inflation rates the hedge should be increased.
Mechanics of LDI
The investment in a LDI pooled fund is broken down into two elements:
investing in a cash (or bond) fund;
entering into one or more derivative contracts (in the example below we describe how a swap contract works).

Cash (or Bond) Fund
LDI strategies that relate to a ‘Fixed Fund’ (as set out above) invest in a fund which aims to generate a rate of return equal to LIBOR to meet its obligations under the swap contract.

In addition, should the swap develop a negative value (following a rise in interest rates) the scheme’s investment manager will post the necessary amount required as collateral.

Swap Contract:
A swap is a contractual obligation between two counterparties to exchange cash flows at some agreed point(s) in future. Normally one of the series of cash flows is based upon a fixed rate of interest (such as a fixed 3% p.a.) on a nominal amount of (say) £10m. The other series is based on a floating/variable rate (such as LIBOR) on the same nominal £10m.

At the start of the swap contract its value to each of the counterparties is theoretically £0. The initial value of the expected floating interest rate payments the scheme makes is equal to the expected value of the fixed (3% p.a. for example) payments the investment bank is anticipated to pay over the contracts’ lifetime.

Over time the value of the contract to each counterparty will vary depending on the movement in the floating interest rate (LIBOR). If the floating rate increases the swap will have a negative value for the counterparty that is due to make payments based on it, in this case the pension scheme, as they will pay more than expected at the outset (and vice versa).

Most interest rate swap contracts have LIBOR as the reference to determine the floating rate (which fluctuates daily based on market conditions).

Schemes generally enter into an interest rate swap that pays an amount based on the floating rate and receive an amount based on the fixed rate of interest, as illustrated below.

Over a swap’s lifetime it can become valuable to one of the counterparties, for example, if the floating rate decreases, the payments the Scheme will make will be less than the amounts that were expected to be paid over time when the contract was put in place. The swap contract will therefore be worth more to the Scheme than the initial value of £0. Note: the value of the contract is likely to vary over time and can move from having a positive to negative value (and vice versa).

In such a scenario there is a risk that the counterparty fails to honour the agreement and defaults. In order to minimise the losses that would occur following a default, the counterparty for whom the swap has a negative value (the investment bank in the above example) will be required to deposit collateral in order to cover the negative value of the swap. This process known as collateralisation takes place on a regular basis (often daily) and is typically in the form of cash or gilts.

Source: Buck Consultants. For illustration purposes only.
Glossary

Clearing house: A financial institution whose aim is (amongst others) to reduce the risk of participants in a transaction failing to meet its financial obligations.

Collateral: The legal transfer of assets between one party (counterparty) and the other as cover for the exposure on derivative contracts. The process of transferring collateral from one counterparty to another is known as collateral management. Under a swap contract, the counterparty to whom the swap is “out-of-the-money” will transfer collateral to the counterparty to whom the swap is “in-the-money”. This is to mitigate the risk of loss as a result of a default.

Counterparty: A participant in a swap, or other, derivative contract. There will usually be two counterparties to a swap contract.

Counterparty risk: The risk to each party within a swap contract that one of the counterparties will not be in a position to meet its contractual obligations – addressed by both parties posting collateral.

Duration: The average term of the value of the assets and liabilities and is used as a measure of sensitivity to changes in interest rates. The longer the duration of a pension schemes’ liabilities, the more sensitive the liabilities are to changes in interest rates.”Duration matching” of assets and liabilities is a key concept in LDI strategies since it allows trustees to reduce the impact of interest and/or inflation rate changes on their scheme.

Duration mismatch: Arises when a scheme’s assets have a different duration to its liabilities. Usually, a scheme’s liabilities have a longer duration than the assets held to meet those liabilities. In this situation, if interest rates fall then a scheme’s liabilities will increase by more than the assets. This is likely to reduce the scheme’s funding level.

Interest rate swap: An agreement between two counterparties to exchange a floating stream (typically calculated using LIBOR) of interest payments for a fixed stream.

Inflation swap: Used to exchange a fixed amount for a floating amount linked to inflation.

Leverage: Creating economic exposure to an investment of greater value than that of the underlying capital employed.

London Inter-Bank Offered Rate (“LIBOR”). The interest rate at which banks lend to each other.

Swaps: Contractual agreements between two parties (counterparties), whereby the parties “swap” their future cash flows with each other. There are many types of swaps but the two main swap contracts most commonly used by pension schemes are interest rate and inflation swaps.

Unrewarded risk: Is present when interest rates and inflation are viewed as being two sources of risk for a pension scheme that a scheme is not explicitly rewarded for taking. These risks arise due to the nature of a pension scheme’s liabilities as opposed to being a decision to take risk in the expectation of enhanced returns (as would be the case with assets such as equities or corporate bonds).

Advisory note
Past investment performance is no indicator of future performance. The sterling value of overseas assets in a fund may rise and fall as a result of exchange rate fluctuations. The value of investments and the income from them may fall as well as rise and will be affected by changes in financial conditions. The views expressed in this document are general and not specific to your circumstances.

About Us
Buck Consultants at Xerox is a leading advisor to mid-sized pension schemes across Europe and North America. We have been providing impartial, trusted advice free from conflicts of interest since 1975 and have a wealth of experience. Our innovative approach to asset allocation is supported by extensive manager research undertaken on a global platform.

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