

What should an end-game investment strategy look like?



Executive summary

- An end-game solution should protect the pension scheme's funding level against interest rate and inflation risks, provide steady returns above gilts and income to help pay pensions. The solution should be future proofed – suitable as a long-term self-sufficiency strategy, but also leaving the door open to a buy-out or buy-ins. It should also be straightforward for trustees to implement and to integrate into a de-risking plan/flight path.
- A long-duration credit portfolio reduces reinvestment risk, however it also increases the volatility of the assets. The reinvestment risk associated with holding a shorter-duration credit portfolio is likely to be modest as spreads are already low by historic standards.
- Shorter-maturity credit is more attractive than longer-maturity credit from a pure investment perspective.
- LDI can be blended efficiently with credit in an end-game solution if using a segregated/bespoke fund or a fully integrated pooled fund. It is less efficient to combine a credit pooled fund with an LDI pooled fund.
- Trustees can future proof their strategy by investing in reasonably liquid assets and having some (but not too much) credit market exposure.
- It is easier to integrate a self-sufficiency portfolio into a de-risking plan/flight path if the assets behave like the pension scheme's liabilities, running down over time at the same pace as the liabilities.

Key risks

The value of investments can go down as well as up as a result of market movements and changes in interest rates (and inflation expectations). Investors may get back less than the original amount invested.

Gearing is used for investment purposes to obtain, increase or reduce exposure to an asset, index or investment. The use of gearing can enhance returns to investors in a rising market, but if the market falls the losses may be greater.

Past performance should not be used as an indicator of future performance.

Introduction

Strong market growth, company contributions and revised longevity assumptions have improved the funding position of many defined benefit pension schemes over the last few years. This has put de-risking and end-game planning back on the agenda for trustees and sponsors.

For some pension schemes this will mean planning towards a buy-out or establishing a rolling programme of buy-ins. For others, it will mean working towards a long-term position of “self-sufficiency”. Many trustees and sponsors will want to keep their options open, reducing risk in their investments when it’s affordable to do so, but keeping the option open to buy-out at some point in the future.

End-game investment strategies used to be straightforward – invest all or most of the pension scheme’s assets in gilts to match the liabilities, and maybe have a small allocation in return-seeking assets to provide a cushion against non-investment risks such as longevity risk. However, the last two years have seen a big bang in innovation, but also complexity in end-game strategy design. Many trustees will have heard about “Cashflow Driven Investment” (CDI) as one example.

This paper seeks to cut through the complexity and provide a clear steer to trustees and sponsors on what an end-game investment strategy should look like. This is based on BMO Global Asset Management’s 10 + years’ experience providing end-game solutions to defined benefit pension schemes.

This paper is split into three parts.

Part 1: Risk management – page 4

- Balancing short-term and long-term funding risks.
- Integrating LDI with credit to protect against interest rate and inflation risks

Part 2: Steady growth – page 7

- The investment case for investing in shorter-duration corporate bonds in an end-game portfolio

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- Leaving the door open to buy-out
- Considerations when investing in illiquid assets
- Establishing an end-game solution as part of a de-risking plan/flight path

Our discussion will be based on the following objectives for an end-game solution

1. Protect the funding level against interest rate and inflation risks.
2. Steady returns over gilts to reduce the cost of paying benefits or to help close the gap to buy-out.
3. Provide income to help pay pensions.
4. The solution should be future proofed – suitable to leave in place for the long term as a self-sufficiency solution, but also leave the door open to a buy-out or buy-ins if the trustees’/sponsors’ plans change.
5. The solution should be straightforward for trustees to implement and integrate into a de-risking plan/flight path.

At the end of this paper we will outline a solution to achieve these objectives.

Is this Cashflow Driven Investing (CDI)?

CDI typically combines credit assets and LDI to deliver cashflows to match the benefit payments that are due to be paid from the pension scheme. The points we will discuss in this paper are highly relevant to pension schemes considering CDI.

The strategy we will outline at the end of this paper will have features in common with CDI solutions readers may have seen. This is because it is designed to achieve many of the same objectives – in particular, income, risk management and steady growth. However, there may also be some differences. For example, one area of debate we will address in detail is if it is desirable to invest in longer-duration rather than shorter-duration corporate bonds to achieve the objectives of a well-funded pension scheme.

Part 1: Risk management

Balancing short-term and long-term funding risks

An end-game investment strategy will usually aim to reduce investment risk as much as it is affordable to do so to minimise the reliance on the pension scheme sponsor's covenant. This can mean two things:

- 1) Minimising the short-term volatility of the funding level. This is to reduce the chances of falling back into deficit, triggering sponsor contributions. It also reduces the risk to members' benefits in the event of a sponsor default.
- 2) Minimising the risk of not having sufficient assets to pay benefits over the long-term. For example, if long-term returns are less than expected, a deficit may emerge over time, eventually leading to the sponsor needing to plug the gap.

It is possible to manage some long-term and short-term investment risks at the same time. LDI enables pension schemes to manage short-term funding level volatility due to day-to-day movements in long-dated gilt yields. Also, as long-dated instruments, LDI assets enable schemes to lock in a yield to partially meet the cost of paying pensions over the long term. Similarly, LDI assets can minimise short-term funding level volatility due to changes in inflation expectations, as well as the long-term impact of actual inflation being higher than expected.

However, this is not the case with all investment risks - in particular credit risk.

It is common for pension schemes to hold corporate bonds in their self-sufficiency portfolio to earn a higher return than gilts. The value of a short-duration corporate bond portfolio will be impacted less by changing credit spreads than a long-duration portfolio. This means the funding level will fall by less if spreads widen.

However, if the spreads available in the market gradually fall over time, the amount of interest that would be earned each time the bonds are reinvested will also fall. This may eventually lead to a funding shortfall.

On the other hand, the value of long-duration corporate bonds will be impacted more by changing spreads than short-duration corporate bonds. The negative impact of spread widening will be

felt more acutely if the scheme holds a portfolio of long-duration corporate bonds compared to what would happen if it held shorter-duration bonds. (For illustration, if spreads widen by 1% the value of a 10-year duration portfolio will fall by around 10%. A four-year duration portfolio will fall by around 4%).

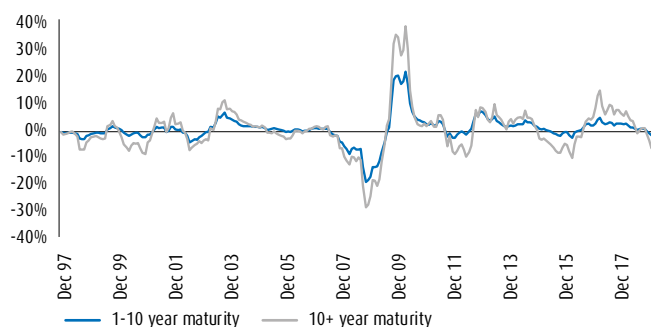
However, all else being equal, a portfolio of long-duration corporate bonds will have a more certain long-term return if held to maturity than a portfolio of short-duration bonds. This is because the portfolio of long-duration bonds will need to be reinvested less often.

This can present trustees with a dilemma: minimise long-term risk by investing in long-duration corporate bonds and accept a more volatile funding level, or hold shorter-duration bonds to reduce funding level volatility and accept greater long-term risk due to reinvestment risk?

Long-duration vs. short-duration bonds: how much more volatility?

The chart below shows the rolling annual excess return¹ over US government bonds of 1-10 year maturity and 10+ year maturity US corporate bonds since 1997.

Rolling annual excess returns of 1-10 year maturity and 10+ year maturity US corporate bonds



Source: Bloomberg, BofAML US Corporate index (1-10 year and 10+ year maturities). Based on monthly data. As at 31-Mar-19. For illustrative purposes only.

Past performance should not be seen as an indication of future performance.

¹ We show excess returns as we assume that any overseas interest rate exposure in the corporate bonds in the end-game solution would be hedged out. This would be replaced with sterling interest rate exposure to hedge the pension scheme's liabilities. In fact, even with a sterling portfolio the pension scheme should be indifferent to the interest rate exposure in the corporate bonds. This is because the LDI strategy would make up the difference to the liabilities, irrespective of the duration of the underlying corporate bonds.

The historic excess returns of the longer-duration index have been around twice as volatile as the shorter-duration index. The largest annual loss (during the financial crisis) of the longer-duration index was nearly 10% more than the shorter-duration index.

The spreads on longer-duration bonds are generally higher than shorter-duration bonds at present. However, as will be discussed in Part 2, inefficiencies in the market for longer-duration corporate bonds mean that the additional spread may not compensate for the higher volatility of these bonds. Historically, the volatility adjusted excess returns of longer-duration bonds have been far lower than shorter-duration bonds.

In theory, it is possible to mitigate the impact of spreads widening by explicitly linking the pension scheme's technical provisions discount rate to the yield on the assets the pension scheme owns. This means that if spreads do widen and the corporate bonds fall in value, the discount rate will also increase. The liabilities would then decrease, resulting in a funding level that is unchanged overall.

This approach comes with a large health warning. While this may lead to more certainty over sponsor contributions, it does not protect members in the event of a sponsor default. There is still likely to be a deficit on a self-sufficiency or buy-out valuation basis. This approach should therefore only be contemplated by trustees with a high degree of confidence in the strength of their sponsor's covenant.

Long-duration vs. short-duration bonds: assessing the impact of reinvestment risk on long-term funding outcomes

We can quantify the impact of reinvestment risk by considering how much of an excess or shortfall a pension scheme would have if, after 20 years, returns have been higher or lower than expected.

The table below shows the results of forward-looking modelling where we allow credit spreads to vary over time, based on their historic volatility. The table shows the excess or shortfall after 20 years, compared to the asset value at the outset, at a range of percentiles.

	Excess/shortfall after 20 years (% of pension scheme's assets at outset)
95 th percentile	5.3%
75 th percentile	2.0%
50 th percentile	-
25 th percentile	-1.8%
5 th percentile	-3.8%

Source: BMO Global Asset Management, for illustration only. Based on a stochastic model that looks at the outcome of 3,000 simulations for credit spreads over a 20-year period. As at 31 March 2018. For illustrative purposes only.

The model assumes that the pension scheme has exactly enough corporate bonds to pay the next 20 years' pensions, if credit spreads remain at the current level – around 1%.

The corporate bonds have a four-year duration, so will need to

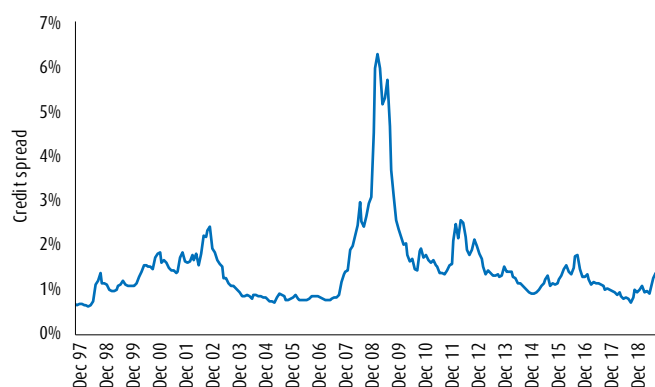
be reinvested several times over the 20-year period. If spreads are narrower at the point of reinvestment, then a shortfall will emerge. If spreads are higher, then there will be a surplus.

The central scenario (50th percentile) is that spreads are unchanged, which means that there would be no surplus or deficit at the end of 20 years under this scenario.

As an example, there is a one in 20 chance (5th percentile) that there will be a shortfall of 3.8% or more compared to the asset value at the outset. There is a one in 20 chance (95th percentile) of an excess of 5.3% or more. We have included more background on the modelling in an appendix. Figures for illustrative purposes only, as at 31 March 2018.

Note the asymmetry of these figures. This is because spreads are already relatively low by historic standards, as shown in the chart below. Also, spreads should always remain positive, as it should be more expensive for companies to borrow than governments.

Credit spreads on US corporate bonds



Source: Bloomberg, BofAML. Government OAS for 1-10 year US corporate bond index shown. As at 31-Mar-19.

The model we have used is conservative. The 5th percentile broadly corresponds to a scenario where spreads narrow to 0.1% over the 20-year period. This is significantly lower than the lowest spread seen in the market over the last 20 years, which is around 0.5%. Even so, if spreads narrow from 1% to 0.1%, the resulting shortfall would only be 3.8% of the initial asset value.

The pension scheme could reduce this reinvestment risk further by investing in a longer-duration corporate bond portfolio, e.g. with a 10-year duration. In this case, if spreads narrow to 0.1% our modelling indicates that the shortfall would be 2.0% of the initial asset value rather than 3.8%.

However, as discussed above, this is not a free lunch. Increasing the duration of the corporate bond portfolio increases how sensitive its value is to spreads widening or narrowing and therefore potential funding level volatility.

Long-duration vs. short-duration bonds: conclusions

It is possible to reduce reinvestment risk, and therefore the range of long-term funding outcomes for a pension scheme by investing in long-duration corporate bonds. However, this is also

likely to introduce a lot of short-term funding level volatility, which may be unpalatable to trustees.

Furthermore, spreads are already low by historic standards and should always remain positive. This limits the reinvestment risk associated with holding shorter-duration credit.

Finally, as we shall see in Part 2, there are several good investment reasons to favour short-duration over long-duration corporate bonds.

Integrating LDI with credit

In an end-game solution, it is common for pension schemes to offset a high proportion of the interest rate and inflation risk in their liabilities to protect their funding level. Irrespective of whether the pension scheme invests in short or long-duration credit, there will be a large amount of interest rate risk associated with longer-dated pension payments not covered by the corporate bonds.

Pension schemes will also need to offset the inflation risk in their liabilities, as this will not be covered by the corporate bond portfolio.

Therefore, if trustees wish to minimise interest rate and inflation risk in their liabilities, whilst also holding corporate bonds to generate additional returns, they will need to hold some additional liability hedging assets. These will need to be leveraged to some extent if the pension scheme is to hedge all its interest rate and inflation risk.

Many trustees will be familiar with these LDI strategies and most of the principles are the same for an end-game solution. However, there are some special considerations.

Firstly, the LDI solution will need to account for interest rate exposure in the corporate bonds to avoid doubling up (over hedging). This becomes more important the higher the allocation to sterling corporate bonds and the longer the duration.

The LDI manager can usually analyse the corporate bond portfolio to understand its sterling interest rate exposure and adjust the hedge accordingly. An accurate adjustment is usually possible in segregated/bespoke fund solutions.

If credit and LDI are combined in a single pooled fund, then a more accurate adjustment is possible when these are part of a

single portfolio, rather than a fund of funds solution that holds a credit fund and LDI funds.

Secondly, trustees should consider the rebalancing of their LDI portfolio. As LDI positions rise and fall in value, collateral is passed from and to the counterparties of the LDI assets. This means that the leverage of the positions falls as LDI positions rise in value – as collateral has been received. As the LDI positions fall in value the leverage will increase – as collateral has been paid. Eventually, the leverage of the LDI strategy will require rebalancing back to target.

If interest rates rise significantly, this will mean selling non-LDI assets to top up the LDI portfolio. In an end-game solution this may well mean selling corporate bonds.

In benign market conditions this will not cause a material return drag. Although the transaction costs of selling corporate bonds can be high in percentage terms (between 0% and 0.4% is typical in “normal” markets), rebalancing will be infrequent, and we will only be selling a proportion of the portfolio. However, in stressed market conditions transaction costs can be multiples of the figures above, or it may not be possible to trade at all. The amount of credit that needs to be sold may also be higher. It is therefore prudent to put in place a mechanism to minimise the need to be a forced seller of credit.

One way to achieve this is to use the cashflows generated from the corporate bonds – coupons and maturity proceeds – to bring the LDI portfolio back to target leverage in advance of the point when a forced selling of credit would be required. Again, this is straightforward in a segregated/bespoke fund approach or a fully integrated pooled fund. It is harder or impossible to operate if combining a credit pooled fund with LDI pooled funds.

Part 1 summary

- While extending the duration of the credit portfolio reduces reinvestment risk, it also increases the volatility of the assets.
- The reinvestment risk associated with holding a shorter-duration credit portfolio is likely to be modest as spreads are already low by historic standards and should always remain positive.
- LDI can be blended efficiently with credit in an end-game solution if using a segregated/bespoke fund or a fully integrated pooled fund. It is less efficient to combine a credit pooled fund with LDI pooled funds.

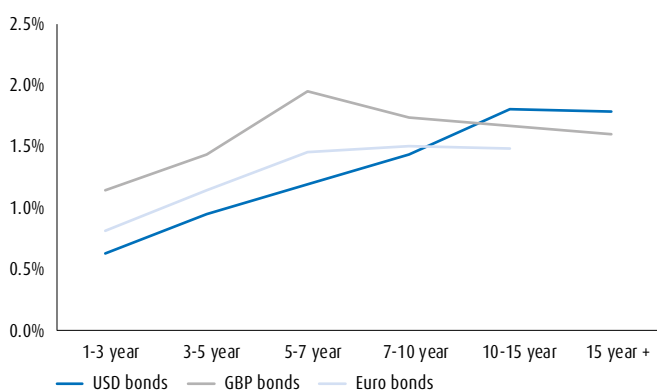
Part 2: Steady growth

In Part 1 we discussed the pros and cons of investing in longer-duration credit compared to shorter-duration credit from a risk management perspective. In Part 2 we will focus on the investment case for shorter-duration credit.

One reason for favouring shorter-duration credit is that there are more price insensitive investors in longer-duration credit. For example, life insurance companies hold a significant proportion of the corporate bond market for regulatory reasons. As an example, US life insurance companies acquired c.35% of new US corporate bond issues in the 10y+ maturity bucket in 2017 (source Barclays). Globally, pension schemes also remain significant buyers of long-duration credit for liability matching purposes, especially in markets where LDI techniques are less prevalent.

This demand is partly reflected in the spreads that can be earned on longer-duration bonds compared to shorter-duration bonds. Intuitively, investors should expect a higher spread on longer-duration corporate bonds to compensate for their greater sensitivity to spread widening (as discussed in Part 1). However, as shown in the chart below, this is not always the case. This is particularly evident in the sterling market, but there is also a tapering off of spreads at longer maturities in the USD and Euro markets.

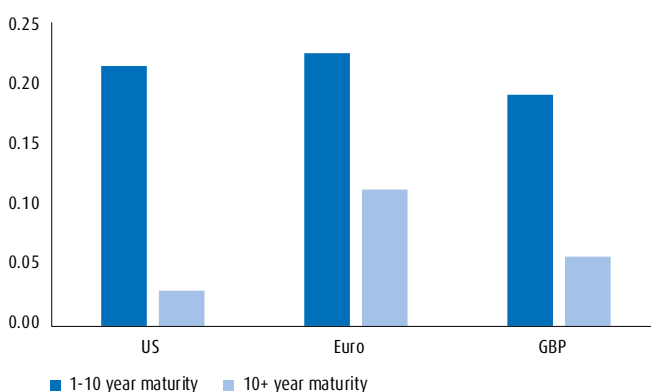
Credit spreads at different maturities for GBP, USD and Euro corporate bonds



Source: Bloomberg, BofAML Corporate Bond indices as at 31-Mar-19. (Govt OAS shown). Note – final data point for Euro spreads is the 10+ year index. For illustrative purposes only.

As shown below, the historic risk adjusted returns of longer-duration credit have been much lower than shorter-duration credit. The chart below shows the ratio of the annualised excess return to volatility of sub 10-year and over 10-year maturity US, Euro and GBP corporate bonds. The numbers refer to the excess returns over government bonds.

Average ratio of excess returns to volatility for shorter and longer-maturity corporate bonds

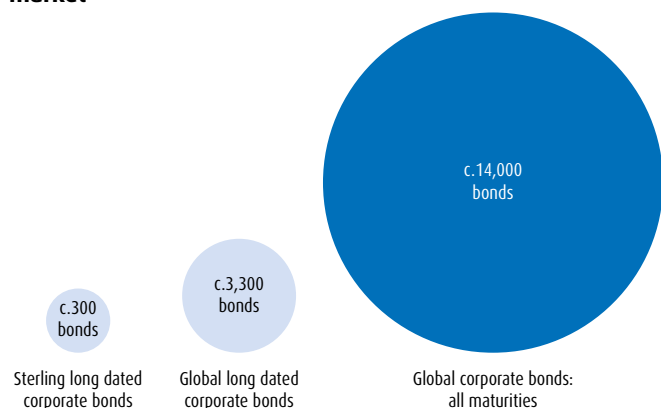


Source: BMO Global Asset Management, based on BofAML/Bloomberg data. Ratio of annualised excess returns vs. government bonds to volatility for US, Euro and GBP corporate bond indices. 31-Jan-97 to 31-Mar-19. For illustrative purposes only.

As always, past performance should not be used as an indication of future performance.

Holding a portfolio of very long-duration corporate bonds can also reduce the ability to create an attractive and well diversified portfolio. This is simply because there are fewer bonds to choose from. Sector concentration also becomes an issue at longer maturities, particularly in the sterling market, which has a high weight to utilities at long-durations.

Number of issues for different parts of the corporate bond market



Source: Bloomberg. Based on BofAML Indices as at 31-Mar-19. 10+ year GBP corporate bond index, 10+ year global corporate bonds index and all maturities global corporate bond index. For illustrative purposes only.

Finally, if the aim is to hold long-dated corporate bonds to reduce reinvestment risk, we should aim to buy bonds that we are confident of being able to hold to maturity. A low turnover approach is attractive in that it can avoid unnecessary transaction costs. However, how much confidence should we have in a view on a company 10, 15 or 20 years into the future?

One response is to only invest in the very highest rated companies, as the default risk of these should remain low, even over the long term. However, many of the best investment opportunities are for slightly lower-rated companies, such as those in the cross-over space where investment grade meets high yield (BBB and BB rated bonds²).

Cross-over stocks benefit from market anomalies that a benchmark unconstrained bond manager can exploit to earn much more attractive risk-adjusted returns than if investing in the highest rated bonds only³. However cross-over bonds may be less suitable for a long-duration, buy and hold portfolio, because the manager may want to have greater freedom to sell a bond before maturity if a company's fortune changes.

Part 2 Summary

- There are more price insensitive buyers of long-duration credit. This is reflected in credit spreads. It may also be a reason for the much lower historic volatility adjusted excess returns of long-duration credit compared to shorter-duration credit.
- A long-duration, low turnover/buy-and-hold approach can mean only investing in the highest rated companies. However, many of the best investment opportunities are for corporate bonds in the cross-over part of the market.

² BBB is the lowest Investment Grade credit rating. BB is the highest high yield credit rating.

³ Investment grade only active investors or index tracking investors may be compelled to sell bonds that have been downgraded to high yield. This can lead to BB bonds being undervalued, creating opportunities for investors that are able to invest in these. Investment grade only investors may also be reluctant to hold BBB stocks for fear of being a forced seller of these if they are downgraded. Regulatory pressures – for example the solvency capital requirements of insurance companies that holder lower rated bonds – can also lead to mispricing of cross-over stocks. These anomalies may partly explain the higher volatility adjusted excess returns that have been seen in cross-over bonds compared to higher rated bonds. For example, 1-10 year US BBB-BB bonds have had volatility adjusted excess returns of 0.23 compared to 0.16 for AAA-A bonds (source: BMO Global Asset Management, based on BofAML/Bloomberg data. 31 Jan 1997 to 31 March 2018).

Comparing credit to other return-seeking assets in an end-game portfolio

Suppose we expect to earn 1% a year more investing in credit compared to gilts, but 4% a year more investing in equities. We could, in theory, invest one quarter of the amount in equities to achieve the same excess return at the total portfolio level.

Of course, equities are expected to be more volatile than credit over the long term, however as we are investing a smaller amount in equities, the overall risk of the two strategies should be broadly comparable. This begs the question – are there any features of corporate bonds which make them particularly appealing to an end-game portfolio?

One feature of corporate bonds that may make them more attractive is their pattern of returns. If held to maturity, a single corporate bond will deliver its yield, but no higher. However, there is the risk of a default, in which case the investor loses their investment (net of any recovered assets). This creates a return profile that is very “fat tailed” – in most situations the return will just be the yield, however occasionally there will be a large loss. Although equity returns are also often said to be fat tailed, this has been more pronounced at the individual stock level and market level for corporate bonds.

Which is preferable for an end-game portfolio – a portfolio with lots of volatility day-to-day, but smaller losses in extreme market events, or a portfolio with less volatility day-to-day, but larger losses in extreme market events?

The answer may depend on your view of covenant risk. Arguably, a deficit for a self-sufficiency portfolio is only an issue if it coincides with a sponsor default, assuming the funding level remains above 100% on a technical provisions basis (so no new contributions are triggered).

One might take the view that with the equity portfolio there is more chance of a deficit coinciding with a sponsor default, simply because the pension scheme would be in deficit more often due to the higher day-to-day volatility. On the other hand, it could be that a sponsor default is more likely to coincide with the extreme stress event that leads to the large loss in the credit portfolio.

There will be additional considerations for pension schemes wishing to leave the door open to buy-out at some point in the future. Because of the pattern of credit returns, the pension scheme may be less likely to be in deficit when it enters buy-out than a scheme with a scaled equity portfolio. The credit allocation may also give a better hedge of buy-out prices. We return to this point in Part 3.

Part 3: Future proofing the strategy

In Part 3, we consider how pension schemes can ensure their end-game solution is future proofed. We will cover:

- To what extent a self-sufficiency solution can also hedge the cost of buy-out/buy-in should the trustees' or sponsor's objective change, and what is the best investment strategy to achieve this.
- Considerations when adding illiquid assets to the end-game portfolio.
- How a pension scheme can establish an end-game solution as part of a de-risking plan/flight path.

We will conclude this section by describing an end-game investment strategy that draws together the various points discussed in this paper.

Hedging the cost of a buy-out

The cost of a buy-out will depend on a combination of:

- 1) The returns the insurance company expects to earn on the assets that it will hold in order to meet the benefit payments being bought-out.
- 2) Other pricing factors such as competitive positioning and supply and demand.

It is not possible to hedge 2) however it is, at least in theory, possible to hedge 1). However, constructing a hedge for 1) is not straightforward in practice.

An insurance company will generally invest in a combination of gilts and/or swaps to hedge the interest rate and inflation risk in the pensions it is taking on. Alongside this, it will invest in a range of credit type instruments for additional yield. In theory, if a pension scheme also invests in gilts/swaps and the right credit instruments, it should be able to hedge the investment component of buy-out pricing reasonably accurately. The challenge is identifying which credit assets to invest in.

A key point is that buy-out pricing is more likely to reflect the investment strategy backing the insurance company's new

business, rather than the investment strategy covering the insurer's whole book. Increasingly, insurers are casting their net wider in the search for higher yield and tilting to non-traditional asset classes such as equity release mortgages and infrastructure debt, as opposed to more traditional corporate bonds. This means that the strategy, and therefore impact on pricing will be very idiosyncratic:

- From provider to provider: different providers will favour and be able to source different assets;
- Over time: investment opportunities vary over time and so do regulations. A good example is equity release mortgages. These are currently popular with insurers because of the yields they offer compared to corporate bonds, however they are a new investment opportunity. The market for these products has only really grown to scale in the last few years. Furthermore, they are treated favourably under insurance company regulations⁴. For these reasons, equity release mortgages are popular with insurance companies today, but may not be in the future.

A further point is that even if an insurer backs its new business with long-dated corporate bonds, it may not want to pass on the full extent of spread widening through to prices for new business, in what could be a stressed investment market. After all, higher spreads are likely to reflect a more uncertain market environment, so the insurer is likely to want to retain a buffer to cover the risk of higher defaults.

This means that:

- It is not straightforward to construct an investment strategy that is a robust match across multiple providers and;
- If the aim is to match buy-out prices, holding some credit makes sense as insurers are likely to invest in credit type assets. In fact, this may mean only a modest allocation to shorter-duration credit, which are less sensitive to spread widening. A high allocation to long-duration credit will lead to higher asset volatility, which may not be reflected in buy-out prices.

⁴ Broadly speaking, the spread from these can be allowed for when discounting the liabilities to calculate the how much capital the insurance company needs to hold to support its business.

To future proof a pension scheme's assets against the possibility of a future buy-out or buy-in, it makes sense to have a high degree of interest rate and inflation hedging as this will mirror the approach of the buy-out provider. Holding some credit is also sensible, however this may mean a lower allocation or a shorter-duration portfolio than might have been the case a few years ago.

Considerations when adding illiquid assets to the end-game portfolio

Some trustees will wish to explore investing in alternative credit assets to increase the yield of their end-game portfolio and to increase diversification. These include infrastructure debt, real estate debt and private corporate credit. These assets can offer a higher yield than traditional corporate bonds in exchange for accepting less liquidity and the higher governance required to invest in them.

Trustees should consider how much illiquidity they can take on in their portfolio, in terms of today's cashflow needs and potential needs in the future.

On top of regular pension payments, transfers-out can lead to a high and unpredictable cashflow strain. As discussed in our paper in November 2017 on transfers-out, there are good reasons to believe that high demand for transfers-out will persist, although it is not straightforward to predict at what level.

For the reasons discussed earlier in Part 3, trustees should not assume that illiquid assets can be passed to an insurance company as part of a buy-in or buy-out arrangement. This may also place a cap on the amount of illiquidity pension schemes can take on.

Pension schemes should also consider the liquidity requirements of their LDI assets and any other derivatives in their portfolio, as discussed in Part 1.

The pricing of these assets is also important. Many of the most popular alternative credit assets have a very limited supply. They are also in high demand from insurance companies. Trustees should be comfortable that the yield on the assets they are buying is commensurate with the higher governance burden, lower flexibility and potentially higher risk of investing in these.

If trustees do wish to invest in illiquid assets, it is possible to integrate these into the end-game solution. Any interest rate or inflation exposure in these assets can be allowed for when constructing the LDI hedge.

How much cash should the end-game portfolio pay out?

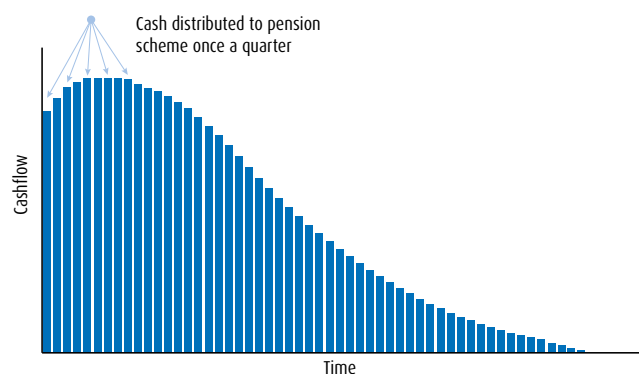
Pension schemes are increasingly cashflow negative. This has led some trustees to seek out higher income strategies to help pay pensions and to avoid the need to sell equities (or other return-seeking assets) in unfavourable market conditions.

As we shall see later, these arguments are not straightforward. However, it is still desirable for the pension scheme's assets to behave in a similar way to the liabilities over time. As cash is paid to members, the liabilities will reduce over time and the duration of the liabilities will also shorten (all else being equal). To future proof the end-game solution, the assets should behave in a similar way, paying out cash and reducing in duration at a similar pace as the liabilities. This also provides cashflow to schemes who require it to help pay pensions.

In practice, this means designing the end-game solution to pay cashflows in line with the pension scheme's expected liability cashflow profile (see below). For a relatively mature pension scheme,⁵ this will be around 3-4% of the pension scheme's assets per year.

Note that this does not have to mean explicitly cashflow matching the assets to the liabilities. Certainly, the coupon and maturity proceeds from credit assets can be used to partially meet benefit payments. However, it is likely that the pension scheme will also hold liquid, low volatility assets (such as the assets backing the LDI positions) that can be sold to meet any shortfall. This removes the need to unduly constrain the corporate bond portfolio.

Paying cashflows in line with a liability profile



Source: BMO Global Asset Management, for illustration only.

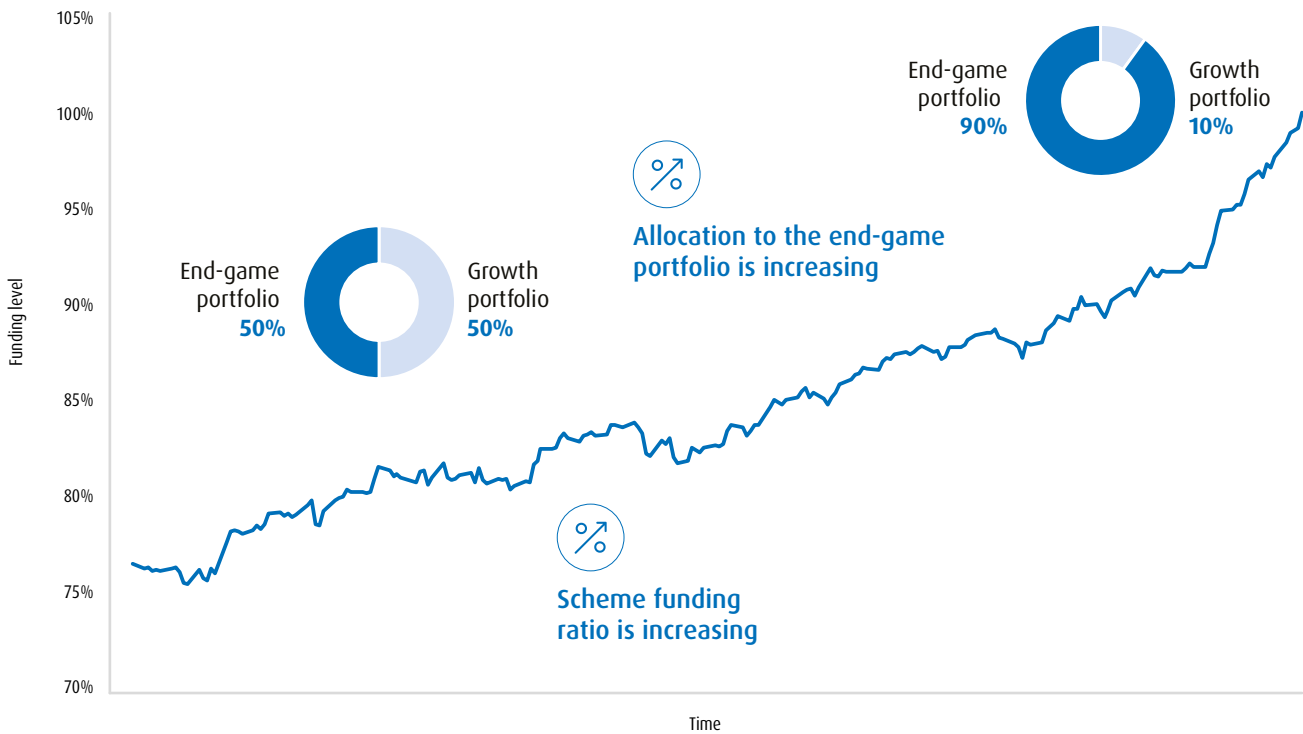
Establishing an end-game solution as part of a de-risking plan/flight path

Despite recent funding level improvements, most UK pension schemes will not be able to move all their assets to an end-game solution. Most will still require the higher expected return of other assets such as equities to close the funding gap to a full self-sufficiency position.

Many pension schemes will, however, have a de-risking/flight path strategy to gradually increase their allocation to lower risk assets as their funding level improves. It is possible to integrate an end-game portfolio into this flight path by gradually increasing the allocation over time. The following chart demonstrates this.

⁵ E.g. with duration of 16-17 years.

Increasing the allocation to the end-game portfolio as the scheme's funding level improves



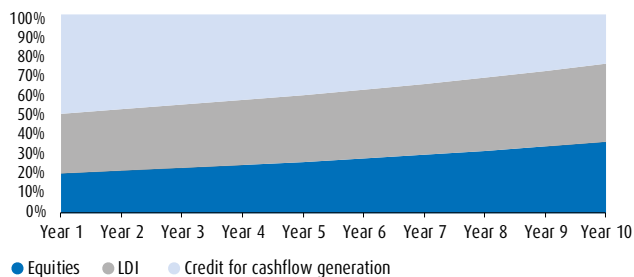
Source: BMO Global Asset Management, for illustration only

When planning their flight path, it is necessary to consider how the income paid from the assets will affect the asset allocation. If a pension scheme is paying a high amount of income from a sub-section of the assets this will skew the asset allocation over time. This is illustrated in the example below.

The pension scheme has initially allocated 50% of its assets to corporate bonds in order to generate cashflow. This allows the scheme to entirely meet its benefit payments. The remaining assets have been invested in equities and an LDI strategy to hedge interest rate and inflation risk.

	Allocation at the start
Equities	20%
LDI	30%
Credit for cashflow generation	50%
Total	100%

Allocation over time (no rebalancing)



Source: BMO Global Asset Management, for illustration only.

After 10 years, the equity allocation has increased from 20% to 36% and the credit allocation has decreased to 25%. This is simply because the credit assets have been falling in value faster than the other assets, due to the high level of cashflow paid from the credit portfolio.

The pension scheme could rebalance the allocation over time, however is this materially different to selling equities to partially fund benefit payments?

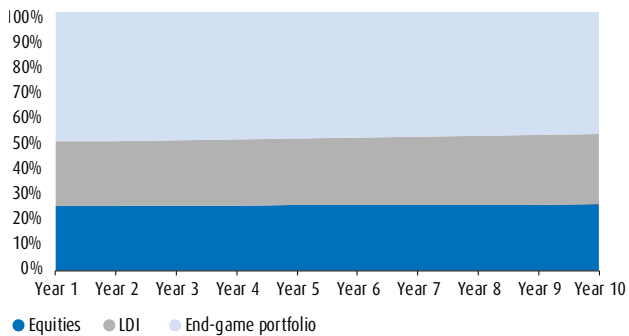
This highlights a challenge with strategies that use highly cashflow generative assets to avoid having to sell other assets in unfavourable markets. If the cashflows paid cause these assets to fall in value faster than the other assets, then the portfolio will eventually need to be rebalanced. This means selling the other assets at some point in the future.

Although with rebalancing we have more flexibility over the timing of asset sales, this places the onus on being able to successfully time the market, which trustees may or may not be comfortable with.

An alternative approach is to match the pace that the end-game portfolio runs down to the pace of the liabilities, as described in the previous section. Say if the pension scheme has allocated 50% of its assets to the end-game portfolio, around half its cashflow needs would be met by the end-game portfolio and around half would be met from gradually selling down the other assets.

This approach results in a much more stable asset allocation over time. The next chart illustrates this using the previous example, but replacing the corporate bonds with an end-game portfolio which runs down at the same pace as the liabilities.

Asset allocation over time if end-game portfolio runs down at same pace as liabilities



Source: BMO Global Asset Management, for illustration only.

It is straightforward to adapt this approach to a de-risking plan. When the allocation to the end-game portfolio is increased, the new allocation will continue to behave in the same way as the liabilities. This future proofs the strategy and there is no need to re-engineer the end-game portfolio each time the pension scheme de-risks.

Part 3 summary:

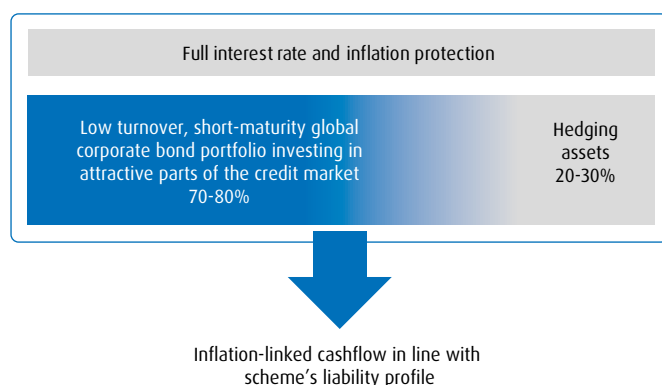
- It is possible to partially match the cost of buying-out the liabilities by holding a combination of LDI assets and credit. However, a shorter-duration credit portfolio may be more appropriate than a longer-duration credit portfolio if the pension scheme has a large allocation to credit.
- Schemes should consider their future liquidity needs when sizing their allocation to alternative credit assets. Schemes should also be aware that the supply and demand dynamics of these markets may not work in their favour.
- An end-game portfolio can be integrated into a flight path by gradually increasing the allocation over time. The end-game portfolio should run down at a similar pace to the liabilities to future proof the solution.

An end-game investment strategy

To recap, the objectives of an end-game solution are:

- Protect the funding level against interest rate and inflation risks.
- Steady returns over gilts to reduce the cost of paying benefits or to help close the gap to buy-out.
- Provide income to help pay pensions.
- Future proofed – suitable to leave in place for the long term as a self-sufficiency solution, but also leave the door open to a buy-out or buy-ins if trustees' or sponsor's plans change.
- Straightforward for trustees to implement and can be integrated into a de-risking plan/flight path.

Schemes can achieve these end-game objectives with a portfolio of short-maturity corporate bonds (e.g. with a duration of around four years), integrated with an LDI strategy to manage interest rate and inflation risk. An example is shown below:



Source: BMO Global Asset Management, for illustration only.

The benefits of this approach are:

- 1) The portfolio avoids the higher funding level volatility associated with longer-duration credit. For most pension schemes, the reinvestment risk is likely to be modest.
- 2) From a pure investment perspective, shorter-duration credit is more attractive than longer-duration credit.
- 3) The credit and LDI assets are integrated in a single portfolio, leading to a more accurate liability hedge and more efficient leverage rebalancing of the LDI portfolio.
- 4) The strategy is future proofed. The assets are liquid and the portfolio will provide a partial match to buy-out pricing.
- 5) The strategy will pay out cash at a similar pace to the liabilities, meaning it is straightforward to integrate into a de-risking plan/flight path. The strategy provides a high level of income to help pay pensions.

This strategy can be tailored to pension schemes' specific requirements using a segregated account or bespoke fund. It will also be available in a single pooled fund.

We would be delighted to discuss any of the topics raised in this paper with you in more detail and how they can be applied to your pension scheme or your clients' pension schemes. Please contact your usual BMO Global Asset Management representative for more information.

Key risks

The value of investments can go down as well as up as a result of market movements and changes in interest rates (and inflation expectations) and investors may get back less than the original amount invested.

Gearing is used for investment purposes to obtain, increase or reduce exposure to an asset, index or investment. The use of gearing can enhance returns to investors in a rising market, but if the market falls the losses may be greater.

Past performance should not be used as an indicator of future performance.

Appendices

Modelling reinvestment risk: details

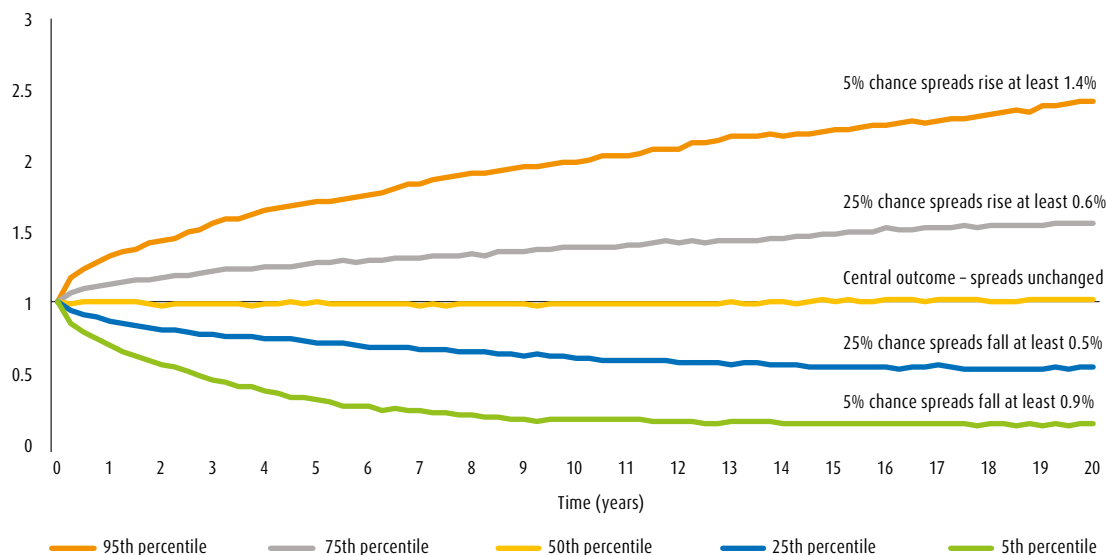
We can quantify reinvestment risk by first understanding the extent which credit spreads are likely to vary over time. Then, we can look at the impact of spreads narrowing on the ability of a pension scheme to meet benefit payments when they are due.

The chart below illustrates the potential range of outcomes for credit spreads. We have started the chart at 1%, which broadly reflects the spreads available in the market at the time of writing. We have defined the central outcome as spreads being

unchanged and looked at the potential range of spreads over the next 20 years at different percentiles⁶.

Note that the upside outcomes (orange and grey lines) are greater in magnitude than the downside outcomes (blue and green lines). This reflects the fact that spreads are already close to post financial crisis lows and that that spreads should always remain positive (i.e. it will remain more expensive for companies to borrow than governments).

Potential range of credit spreads over next 20 years at different percentiles

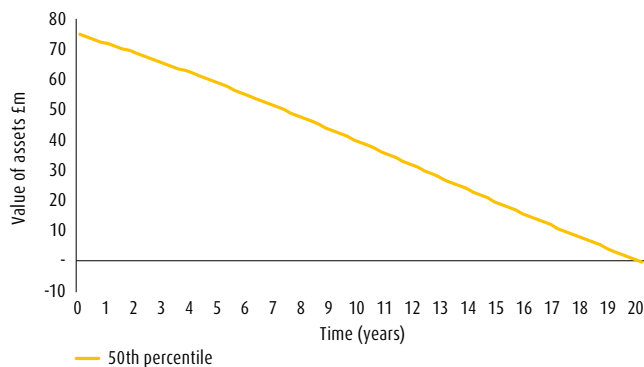


Source: BMO Global Asset Management, for illustration only.

We can translate the above range of outcomes into outcomes for a pension scheme by assuming first that the pension scheme has exactly enough corporate bonds to meet 20 years' worth of benefit payments, if those corporate bonds earn a spread of 1% a year (central scenario). This means that the assets set aside to meet those benefit payments will fall to exactly zero if our central scenario happens in practice - i.e. no surplus or deficit after 20 years. This is illustrated in the next chart.

⁶ The chart is based on 3,000 simulated outcomes. As an example, the 5th percentile (green) line means there is a 5% chance spreads will be narrower than this level.

Value of assets assuming they earn exactly 1% for 20 years and benefit are paid as expected (£75m pension scheme shown for illustration)

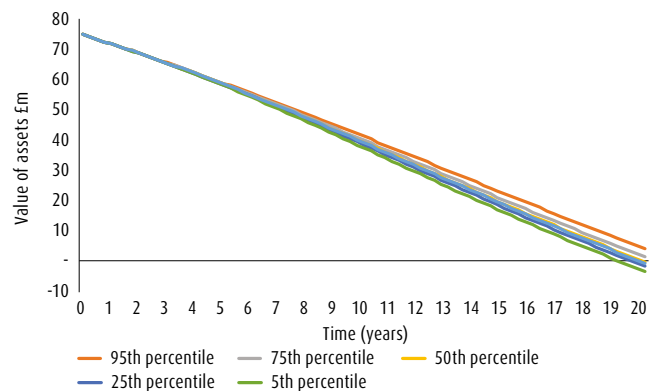


Source: BMO Global Asset Management, for illustrative purposes only.

We then calculate the surplus or deficit at the end of 20 years if the spread earned is higher or lower than 1% over the period, in line with the possible range of credit spreads shown in the chart on the previous page.

In extreme, a perfectly cashflow-matched portfolio would not be affected at all by changing spreads, as the portfolio would simply earn 1% for the whole period. However, a portfolio with a shorter-duration will be reinvested several times during the 20-year period at the prevailing market rate. This results in a range of outcomes after 20 years.

Range of outcomes for a corporate bond portfolio with 4-year duration, assuming initial assets of £75m



	Excess/shortfall, % of initial assets
95 th percentile	5.3%
75 th percentile	2.0%
50 th percentile	-
25 th percentile	-1.8%
5 th percentile	-3.8%

Source: BMO Global Asset Management for illustration only. Note that using this method there will always be a 50% chance of surplus and 50% chance of a deficit, as we are assuming a 50/50 chance than spreads will be above or below 1%. For illustrative purposes only.

Jargon buster

Buy-out/buy-in: Under a buy-out the pension scheme passes all its assets and liabilities to an insurance company. Under a buy-in the pension scheme buys insurance contracts to meet a proportion of its liabilities (usually pensioners). Unlike a buy-out, with a buy-in the trustees retain responsibility for members' benefits being paid as promised.

Cashflow Driven Investment (CDI): Definitions of CDI vary, but broadly a CDI strategy will combine credit assets and LDI assets to minimise funding level risk whilst providing cash to pay pensions.

Cashflow matching: Constructing a portfolio of assets that generates cashflows that match the timing and size of the benefit payments from the pension scheme.

Cashflow negative: When the benefits paid from a pension scheme exceed the income generated from the assets and the contributions received from the sponsor/members.

Sponsor covenant: Willingness and ability of the pension scheme's sponsoring employer to support the scheme financially.

Credit spread: The yield earned on a bond above what could be earned on a government bond with the same maturity

Cross-over bonds: Corporate bonds that have either the lowest rated investment grade credit rating (BBB) or the highest high yield credit rating (BB).

Duration: Can be thought of as the weighted average time to payment of the cashflows from a bond or the benefit payments from a pension scheme. Equivalently, a measure of how sensitive a bond or the liabilities are to changes in interest rates and inflation. A higher duration will mean a greater sensitivity.

Flight Path: A funding and investment plan to reach self-sufficiency or buy-out. Investment risk is reduced over time either in response to increases in the funding level or improved market conditions.

Liability Driven Investment (LDI): A collection of strategies which seek to offset interest and inflation risk in the pension scheme's liabilities. The aim is to make the assets move more in line with the liabilities.

Liquidity: How easy/expensive it is to sell an asset.

Self-sufficiency: When a pension scheme is sufficiently funded to be largely independent of the fortunes of its corporate sponsor. For a pension scheme to be self-sufficient, investment risk needs to be small as, otherwise, the sponsor may need to be called upon again to meet deficits that emerge because of investment losses.

Swaps: A swap is a contract between two counterparties, e.g. a pension scheme and a bank, to exchange a series of cash flows according to a pre-agreed arrangement. Examples often used in LDI include interest rate swaps and inflation swaps.

Contact us

Institutional business



+44 (0)20 7011 4444



institutional.enquiries@bmogam.com



bmogam.com

Telephone calls may be recorded.

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