Investing for Self Sufficiency - Objectives and Strategies

CUE new thinking for self sufficiency

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Agenda and speakers

Endgame Portfolios and Role of Credit

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Paul is responsible for leading global research in investment strategy, outcome-oriented investing, risk management and asset-liability modelling. He works closely with teams not just at LGIM but also across the Legal & General Group. Paul joined LGIM in 2015 from J.P. Morgan Asset Management where he was European Head of the Strategy Group. Prior to that, he was a Professor of Actuarial Science at the University of Kent, where he continues to hold a chair. As well as holding a PhD in Economics from the University of Bristol, Paul is a Fellow of the Institute and Faculty of Actuaries, of the Chartered Institute for Securities and Investment, and of the Royal Statistical Society. He is also a chartered enterprise risk actuary and a CFA charterholder.

Putting Theory into Practice

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Graham was appointed Head of Matching Solutions in March 2015. He has particular expertise in risk management, derivatives, insurance investment and project management. His main focus is on the management of a range of pooled funds and bespoke client portfolios for DB and DC pension scheme clients. Graham joined LGIM in 2007, originally working in the Derivative Trade Support team and moving to the Solutions Group in 2009. He is a graduate of the University of Southampton where he obtained an honours degree in management and accounting.

Endgame Portfolios and Role of Credit

Paul Sweeting

CUE new thinking for self sufficiency

Key points

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Executive summary

Pension schemes are maturing and there is an increasing focus on the endgame. Because most pension schemes are closed not only to new members but also to future accrual, this endgame involves either transferring the assets and liabilities to a third party, usually an insurance company (buy-out), or running them off (self-sufficiency).

The purpose of this paper is to set out a framework for designing endgame investment portfolios for schemes aiming for self-sufficiency. There are three key findings:

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Head of Research

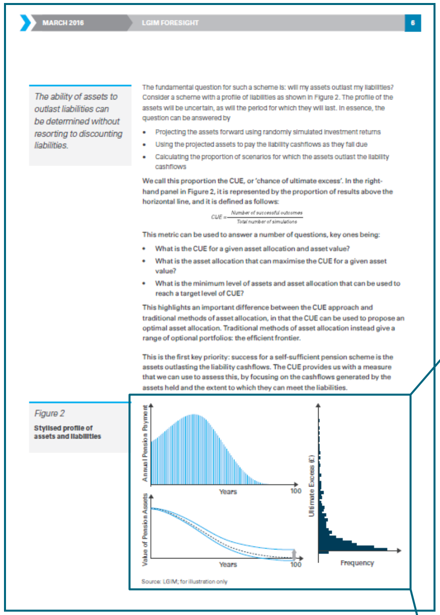
First, we find that schemes focused on self-sufficiency need to rethink how to measure success. We believe that **success for a self-sufficient pension scheme is the assets outlasting the liability cashflows**. To quantify the chances of this happening, we introduce a new measure – the chance of ultimate excess or 'CUE'. This is the likelihood that a scheme's assets will outlast its liabilities. The CUE measure can be used to compare various self-sufficient investment portfolios to determine the most CUE-maximising one for a particular scheme. To measure the CUE, we need to focus on the cashflows generated by the assets held and the extent to which they can meet the liabilities, rather than looking just at the market values of those assets.

Second, using the CUE framework we find that corporate bonds are very efficient for endgame portfolios focused on self-sufficiency. All high quality bonds promise stable cashflows, but corporate bonds have an advantage over government bonds for long-term investors. A short-term investor is at risk of loss if credit spreads widen. This can happen even if there is no fundamental change in the creditworthiness of the bond. However, **a long-term investor who is less concerned with short-term volatility ought to be less concerned with spread changes, and thus able to 'pocket' a long-term investor premium.**

Third, we find that for a self-sufficiency strategy the ongoing evaluation of the solvency of a scheme needs to be grounded in the CUE metric and how that changes over time: **continuous monitoring is important**. However, changes in credit spreads on corporate bond holdings which are not attributable to changes in the creditworthiness of the bonds won't change the CUE. This is because the anticipated cashflows from those corporate bonds have not changed and, all else equal, the solvency of the scheme has not changed either. This CUE framework for measuring solvency can be reconciled with the current mark-to-market world by deriving a liability discount rate consistent with the level of funding and the desired probability of success.

- Success for a self-sufficient pension scheme is the asset outlasting the liability cash flows
- A long-term investor who is less concerned with short-term volatility ought to be less concerned with spread changes, and thus able to "pocket" a long-term investor premium
- Continuous monitoring is important

The Chance of Ultimate Excess (CUE)



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The ability of assets to outlast liabilities can be determined without resorting to discounting liabilities.

The fundamental question for such a scheme is: will my assets outlast my liabilities? Consider a scheme with a profile of liabilities as shown in Figure 2. The profile of the assets will be uncertain, as will the period for which they will last. In essence, the question can be answered by

- Projecting the assets forward using randomly simulated investment returns
- Using the projected assets to pay the liability cashflows as they fall due
- Calculating the proportion of scenarios for which the assets outlast the liability cashflows

We call this proportion the CUE, or 'chance of ultimate excess'. In the right-hand panel in Figure 2, it is represented by the proportion of results above the horizontal line, and it is defined as follows:

$$CUE = \frac{\text{Number of successful outcomes}}{\text{Total number of simulations}}$$

This metric can be used to answer a number of questions, key ones being:

- What is the CUE for a given asset allocation and asset value?
- What is the asset allocation that can maximise the CUE for a given asset value?
- What is the minimum level of assets and asset allocation that can be used to reach a target level of CUE?

This highlights an important difference between the CUE approach and traditional methods of asset allocation, in that the CUE can be used to propose an optimal asset allocation. Traditional methods of asset allocation instead give a range of optional portfolios: the efficient frontier.

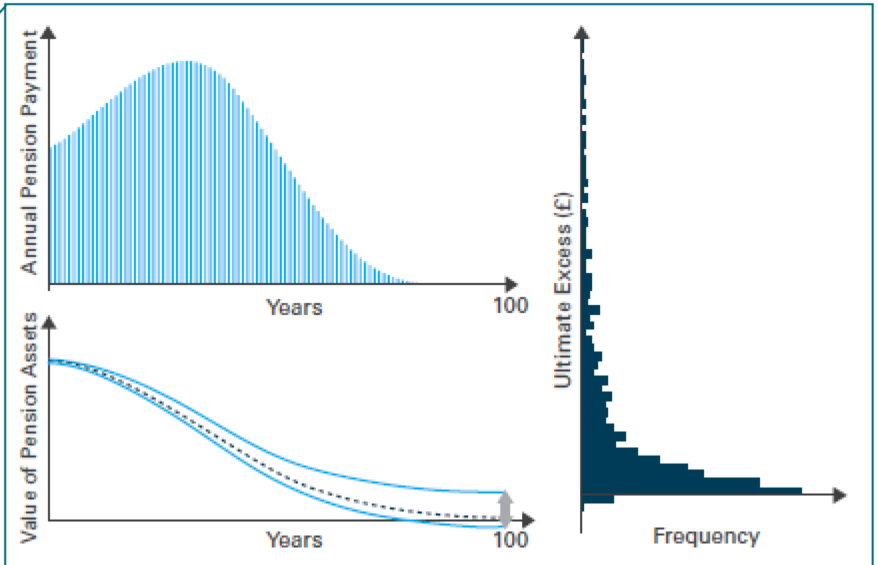
This is the first key priority: success for a self-sufficient pension scheme is the assets outlasting the liability cashflows. The CUE provides us with a measure that we can use to assess this, by focusing on the cashflows generated by the assets held and the extent to which they can meet the liabilities.

Figure 2

Stylised profile of assets and liabilities

Source: LGIM; for illustration only

- **Key concept:**
  Solvency is about the chance of ultimate excess rather than present values



Source: LGIM; for illustration only

Corporate bonds vs gilts

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4. Corporate bonds and long-term investors

In finance, risk is generally thought of as being equivalent to uncertainty over the future price of an investment. As such, it might be measured by volatility, value at risk (VaR) or some other measure.

Short-term volatility does not necessarily lead to risk for an investor who can take a long-term view.

However, uncertainty over one time horizon does not necessarily lead to risk over another. Consider the price evolution of a ten-year gilt principal STRIP (Separate Trading of Registered Interest and Principal) securities, which is essentially a zero-coupon bond, as shown in Figure 5. In our example, a zero coupon government bond bought now for GBP 100 would give a guaranteed payment in ten years' time of around GBP 115. Over time, one would expect the price of this bond to change, as gilt yields changed, affecting the price for which the guaranteed payment at the end of the ten-year period could be secured. But at the end of the ten-year period, an investor knows exactly how much will be received. Therefore short-term volatility does not necessarily lead to risk for an investor who can take a long-term view.

Figure 5 also indicates that greater returns are available from corporate bonds. True, there is uncertainty over the final redemption payment that does not exist with the gilt, arising from uncertainty over the impact of downgrades and defaults. It is also important to note that this analysis is based on historical patterns of downgrade and default and is based on long-term averages rather than today's specific market conditions. Bearing this in mind, it appears from our simulations that the corporate bond would have outperformed the gilt 95% of the time. This is also consistent with our analysis of historical ratings transitions and spread levels.

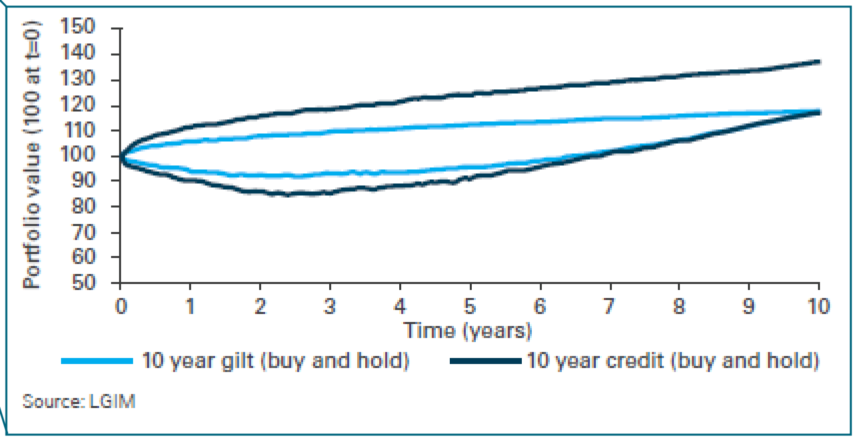
Figure 5
Simulated values (5th and 95th percentiles) of two zero coupon bonds

Source: LGIM

The availability of such a premium seems to contradict what we know about the relationship between risk and return. This is because market volatility is not the only risk there is.

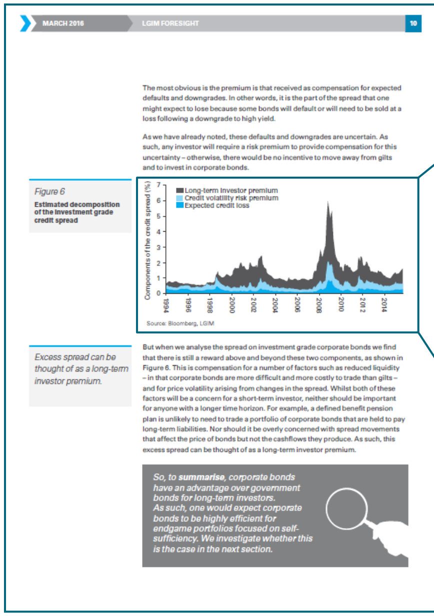
For corporate bonds, there are a number of separate risk premia, which can be thought of as components of the credit spread – that is, the difference between the yield on a corporate bond and the yield on an equivalent government bond.

- Much of the short-term risk in corporate bonds comes from spread volatility
- A long-term investor can ride through this – and take the premium for this risk



Source: LGIM

Components of the credit spread



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The most obvious is the premium is that received as compensation for expected defaults and downgrades. In other words, it is the part of the spread that one might expect to lose because some bonds will default or will need to be sold at a loss following a downgrade to high yield.

As we have already noted, these defaults and downgrades are uncertain. As such, any investor will require a risk premium to provide compensation for this uncertainty – otherwise, there would be no incentive to move away from gilts and to invest in corporate bonds.

Figure 6

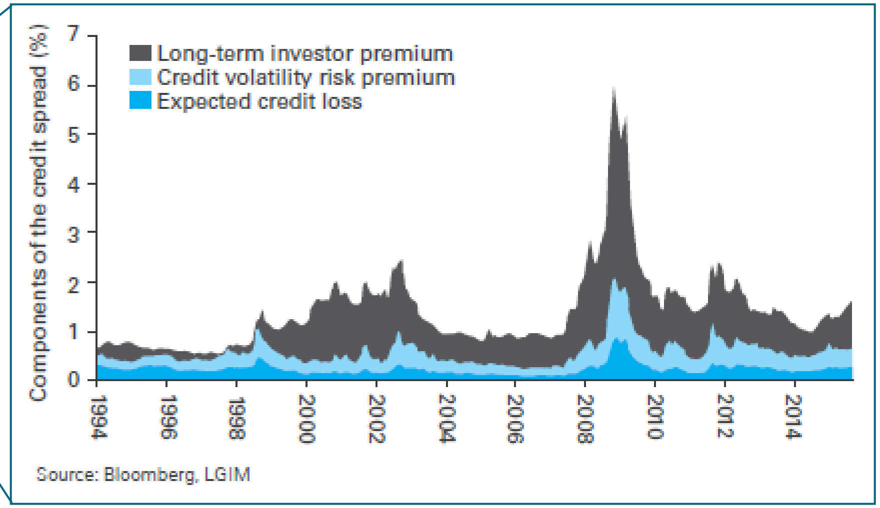
Estimated decomposition of the investment grade credit spread

Source: Bloomberg, LGIM

Excess spread can be thought of as a long-term investor premium.

But when we analyse the spread on investment grade corporate bonds we find that there is still a reward above and beyond these two components, as shown in Figure 6. This is compensation for a number of factors such as reduced liquidity – in that corporate bonds are more difficult and more costly to trade than gilts – and for price volatility arising from changes in the spread. Whilst both of these factors will be a concern for a short-term investor, neither should be important for anyone with a longer time horizon. For example, a defined benefit pension plan is unlikely to need to trade a portfolio of corporate bonds that are held to pay long-term liabilities. Nor should it be overly concerned with spread movements that affect the price of bonds but not the cashflows they produce. As such, this excess spread can be thought of as a long-term investor premium.

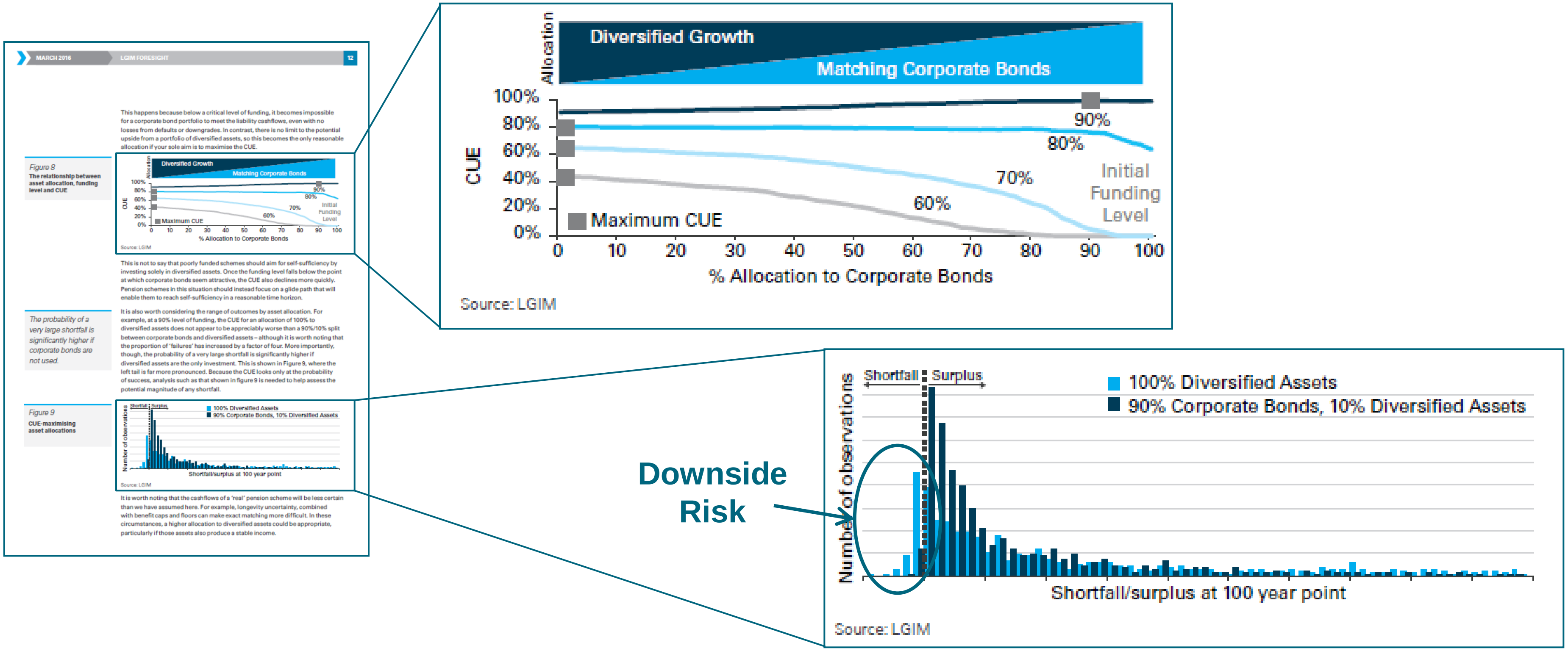
*So, to **summarise**, corporate bonds have an advantage over government bonds for long-term investors. As such, one would expect corporate bonds to be highly efficient for endgame portfolios focused on self-sufficiency. We investigate whether this is the case in the next section.*



Source: Bloomberg, LGIM

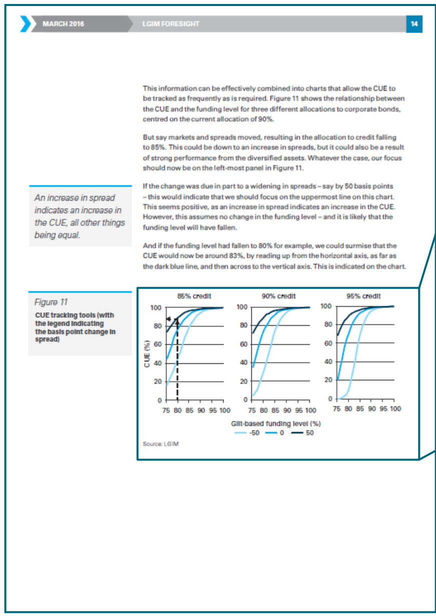
- Only some of the spread is for expected defaults and uncertainty over this risk
- The remainder of the premium is for a range of risks – liquidity, spread volatility – that are of less concern to a long-term investor

CUE-optimising portfolios



- For >90% funded (gilts basis), 90% corporates gives the best results
- Diversified fund looks good on a CUE basis, but downside risk is worse

Continuous monitoring



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This information can be effectively combined into charts that allow the CUE to be tracked as frequently as is required. Figure 11 shows the relationship between the CUE and the funding level for three different allocations to corporate bonds, centred on the current allocation of 90%.

But say markets and spreads moved, resulting in the allocation to credit falling to 85%. This could be down to an increase in spreads, but it could also be a result of strong performance from the diversified assets. Whatever the case, our focus should now be on the left-most panel in Figure 11.

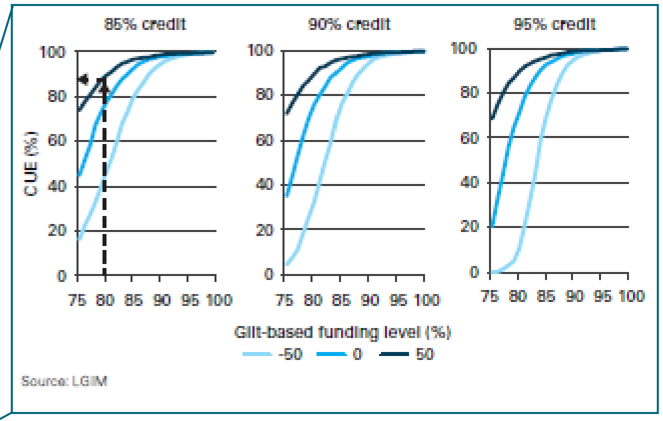
An increase in spread indicates an increase in the CUE, all other things being equal.

If the change was due in part to a widening in spreads – say by 50 basis points – this would indicate that we should focus on the uppermost line on this chart. This seems positive, as an increase in spread indicates an increase in the CUE. However, this assumes no change in the funding level – and it is likely that the funding level will have fallen.

And if the funding level had fallen to 80% for example, we could surmise that the CUE would now be around 83%, by reading up from the horizontal axis, as far as the dark blue line, and then across to the vertical axis. This is indicated on the chart.

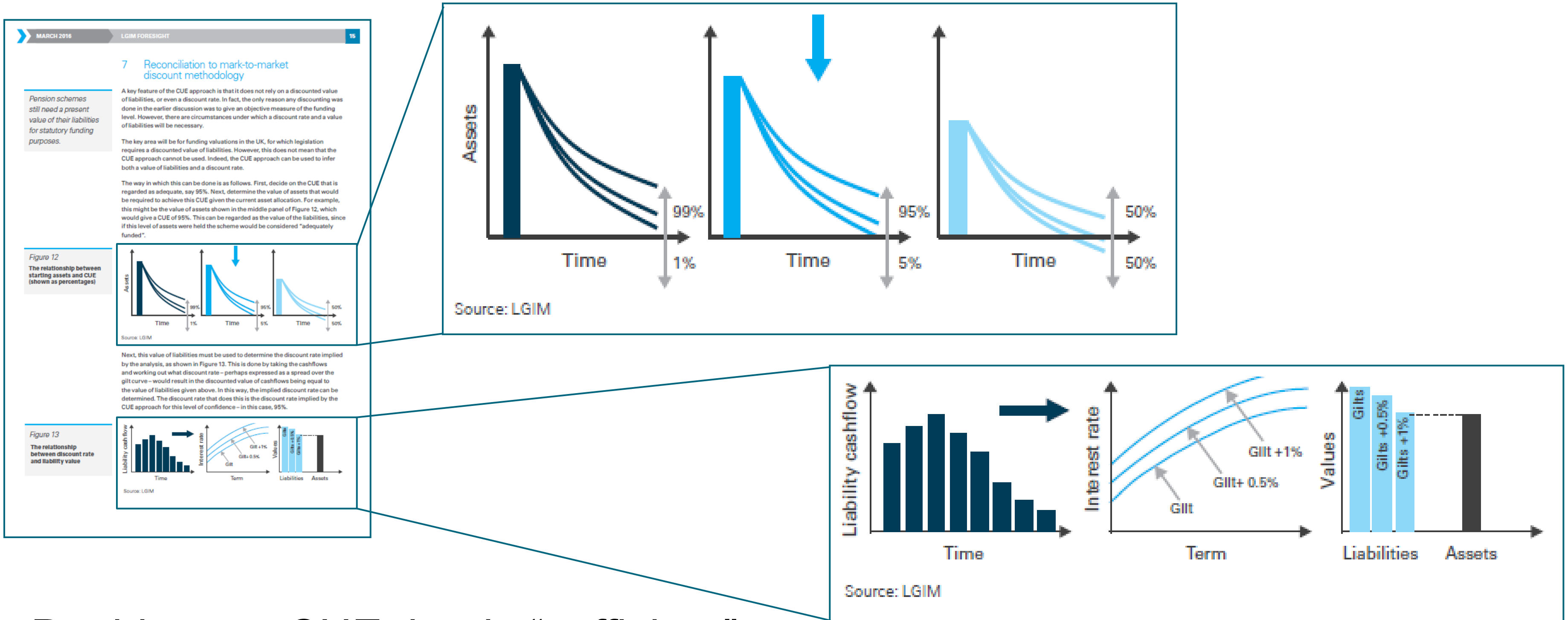
Figure 11

CUE tracking tools (with the legend indicating the basis point change in spread)



- Principle here is that sensitivities to changes in asset allocation, credit spread and funding can be calculated periodically…
- …and then used to estimate change in CUE without the need to re-do stochastic calculations

Bonus question – consistency with statutory funding objective



- Decide on a CUE that is "sufficient"
- Calculate assets needed to give this CUE
- Calculate the discount rate that sets the liabilities equal to this asset value

Putting Theory into Practice

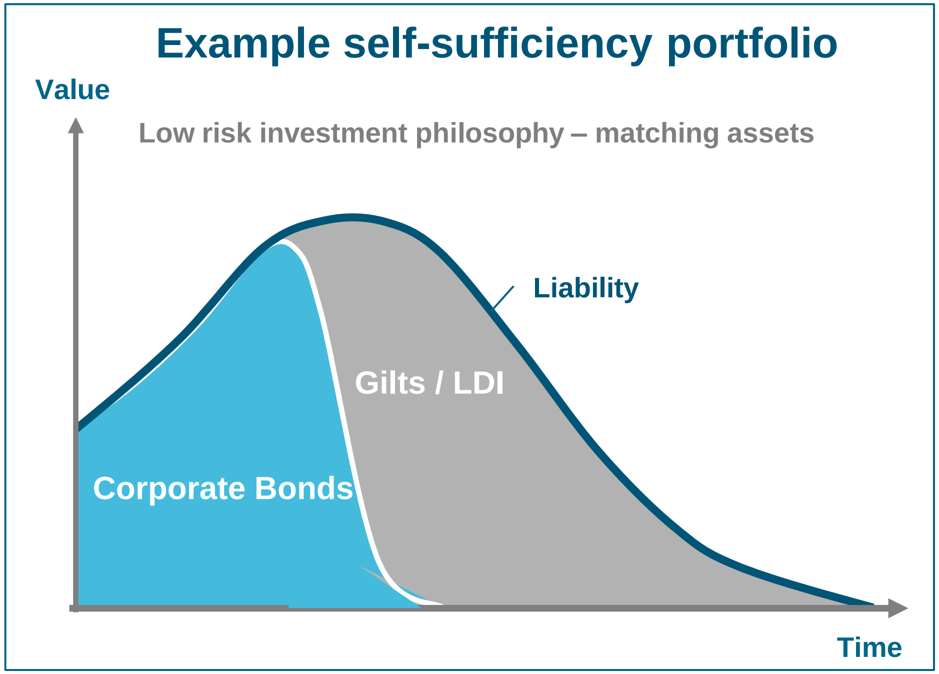
Graham Moles

CUE new thinking for self sufficiency

Future-proofing a credit allocation

Cashflow matching can reduce future costs

- 50% of FTSE 350 DB schemes are cashflow negative or soon will be*
- Opportunity cost of realising cash
- Prepare for the endgame by investing in liability-aware credit



Source: LGIM. Charts are for illustrative purposes only
*Hymans Robertson, FTSE 350 Pension Analysis report 2015

Building a portfolio to cashflow match

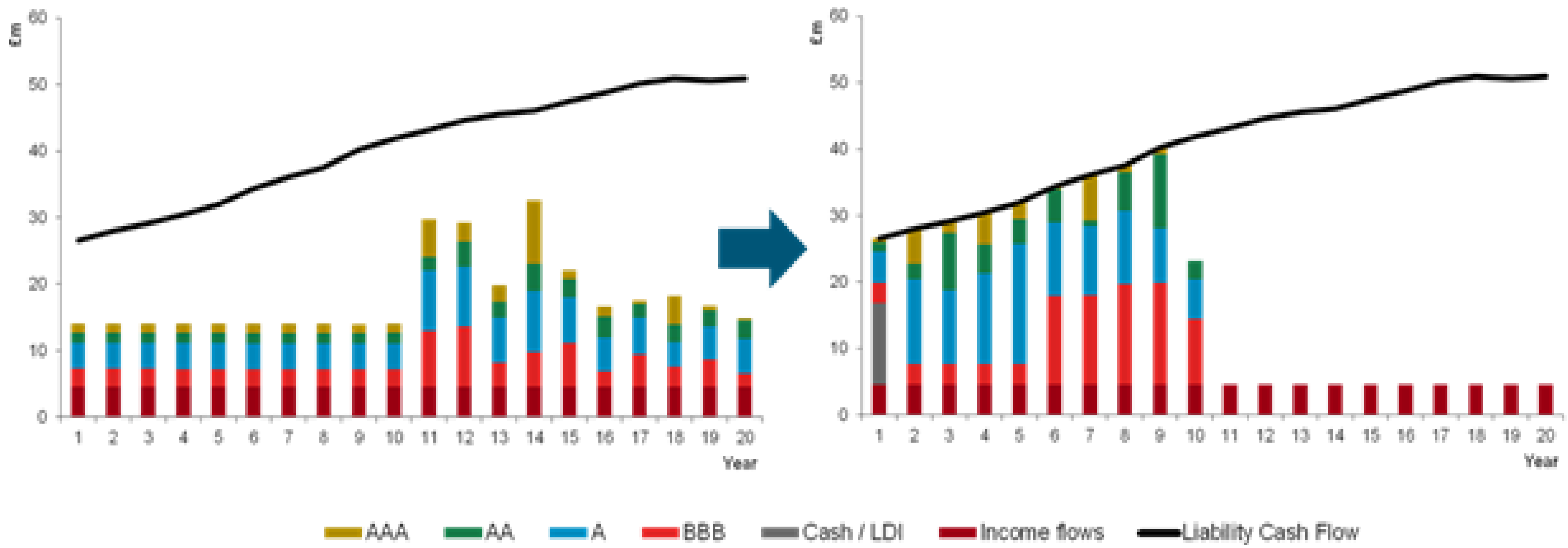
Illustrative schematic

Initial cashflow profile

a) Unmatched cashflows, and
b) Cashflows automatically reinvested by fund

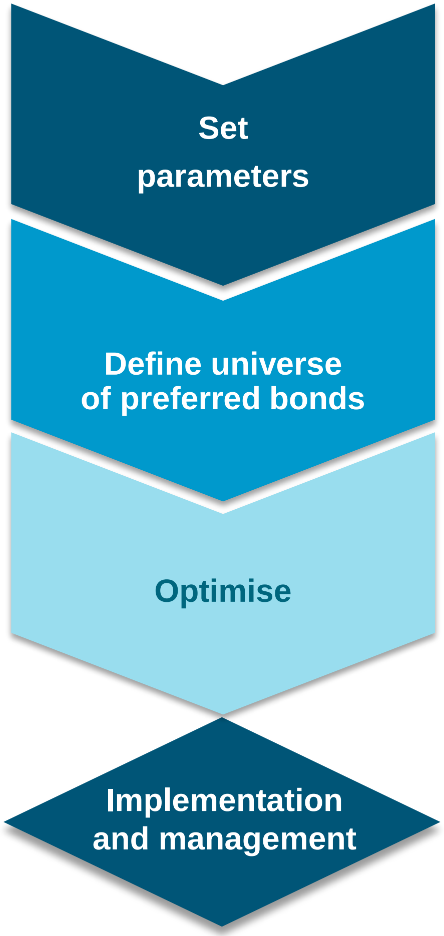
Cashflow matched profile

a) Matched cashflows, and
b) Cashflows paid out



Illustrative purposes only

Building a cashflow-matching portfolio



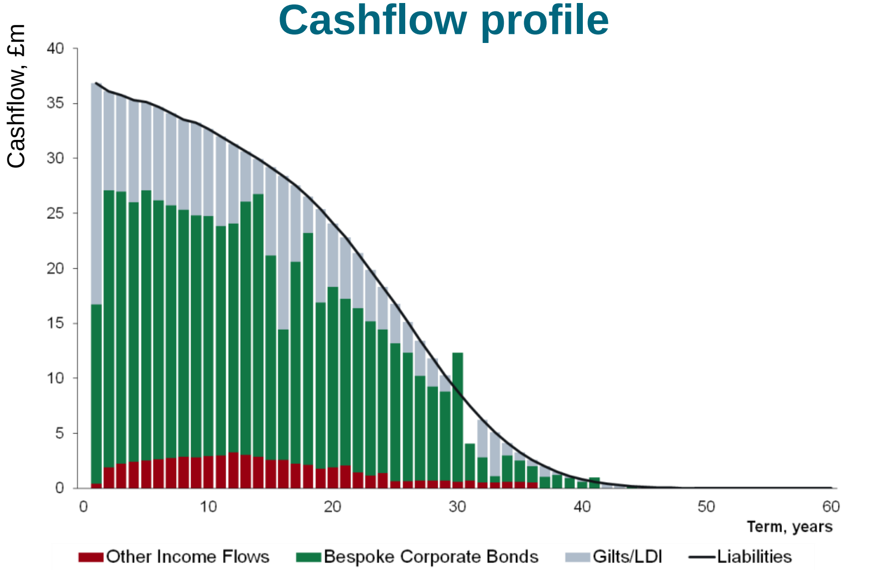
- Understand the requirements
- Select preferred universe - stable long-term issuers
- Create model portfolio – iterative process
- Pragmatic approach – avoid unnecessary costs

Cashflow matching: Case study 1

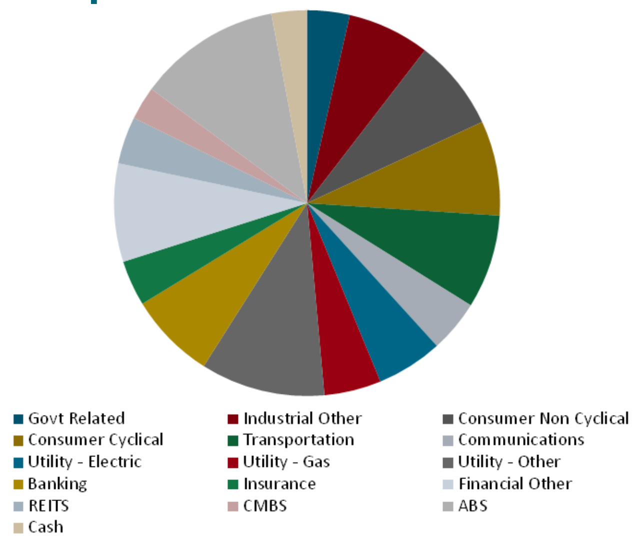
DB pension scheme – cashflow match pension payments only

- Cashflow match pension payments only incorporating all asset cashflows
- Designed subject to minimum return target across portfolio
- Phased restructure of existing corporate bond portfolio

Cashflow profile



Credit portfolio sector breakout

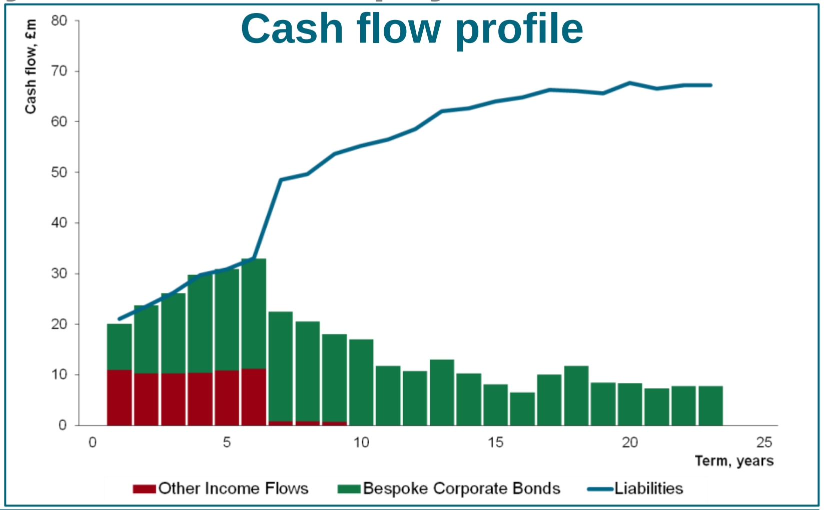


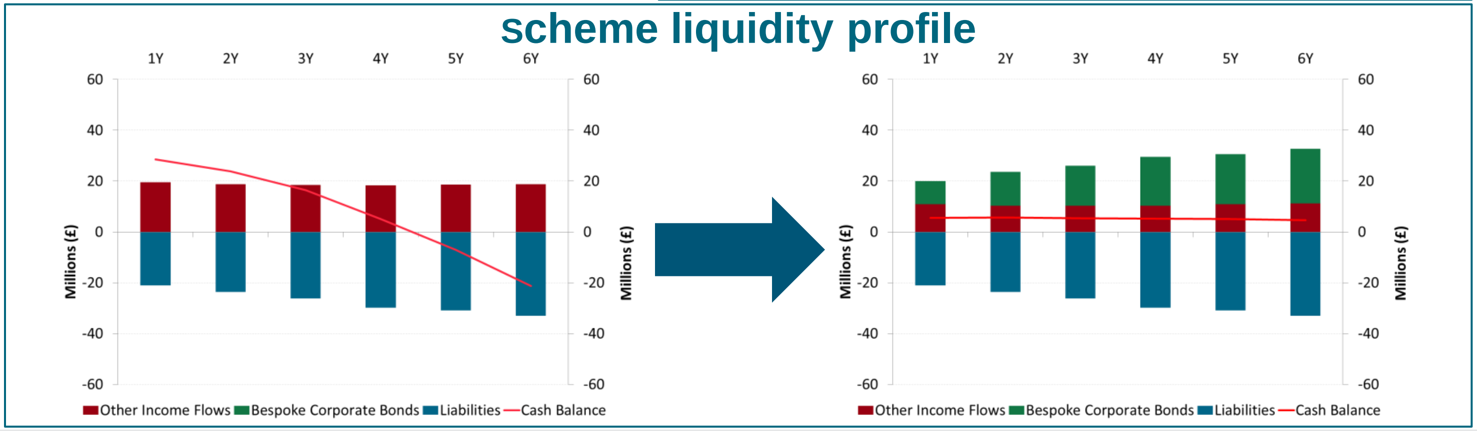
Source: LGIM. The example is made for illustrative purposes only

Cash flow matching: Case study 2

DB pension scheme – cash flow match first 6 years of benefit payments

- Reshaped holdings to fully meet expected liability payments over first 6 years
- Future bond purchases to target >6 years cash flow requirements





Q & A

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