Defined Benefit De-Risking

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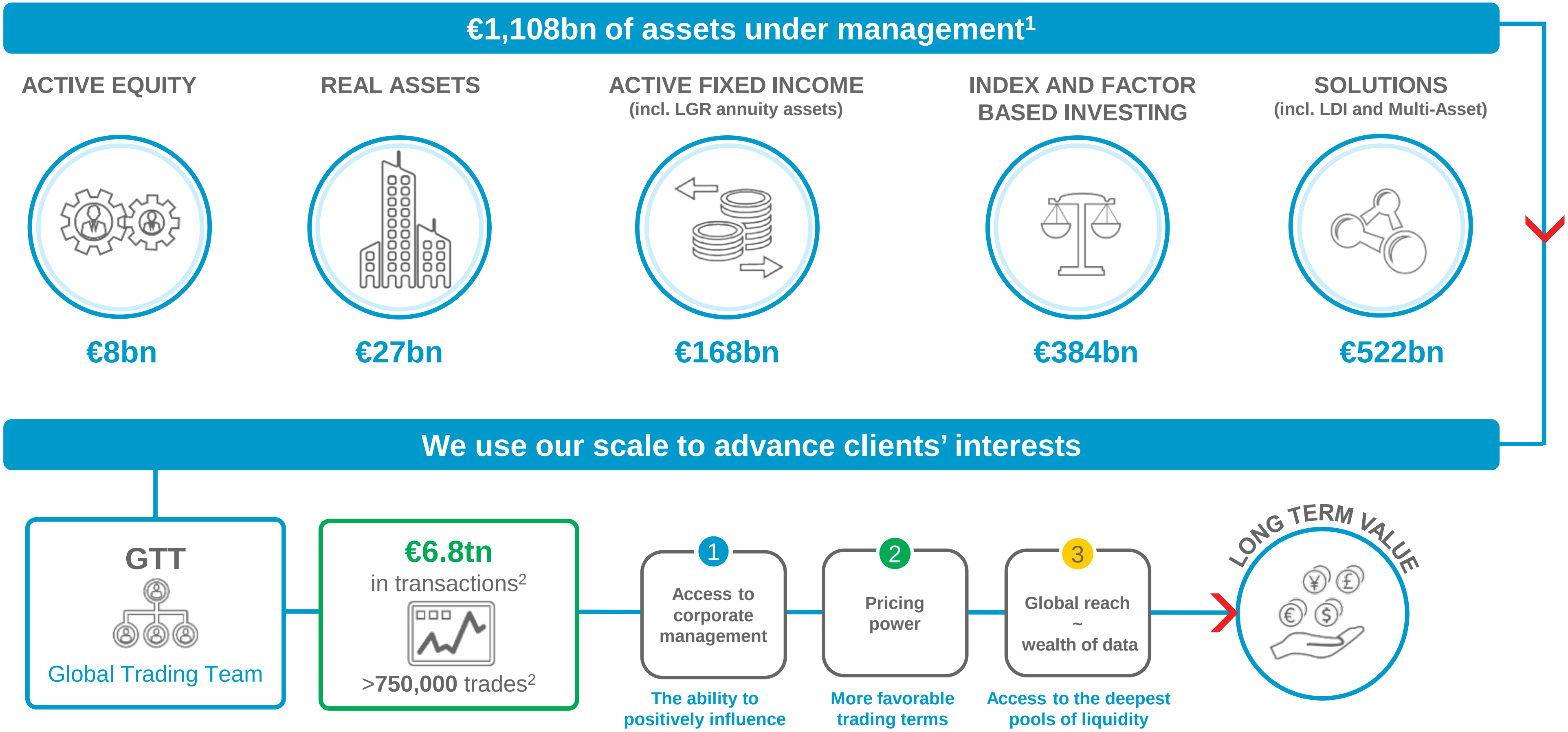
Legal & General
INVESTMENT MANAGEMENT

Solutions and scale

A trusted adviser across the investment spectrum



€1,108bn of assets under management[1]

ACTIVE EQUITY	REAL ASSETS	ACTIVE FIXED INCOME (incl. LGR annuity assets)	INDEX AND FACTOR BASED INVESTING	SOLUTIONS (incl. LDI and Multi-Asset)
€8bn	€27bn	€168bn	€384bn	€522bn

We use our scale to advance clients' interests

GTT

Global Trading Team

€6.8tn

in transactions[2]

>**750,000** trades[2]

1. Access to corporate management – **The ability to positively influence**
2. Pricing power – **More favorable trading terms**
3. Global reach ~ wealth of data – **Access to the deepest pools of liquidity**

LONG TERM VALUE

Source: 1. LGIM internal data as at 31 December 2017. These figures include assets managed by LGIMA, an SEC Registered Investment Advisor. Data includes derivative positions. Asset class figures have been rounded so there may be a rounding difference in the total.

2. FY 2017.

The investment challenge for DB pension schemes

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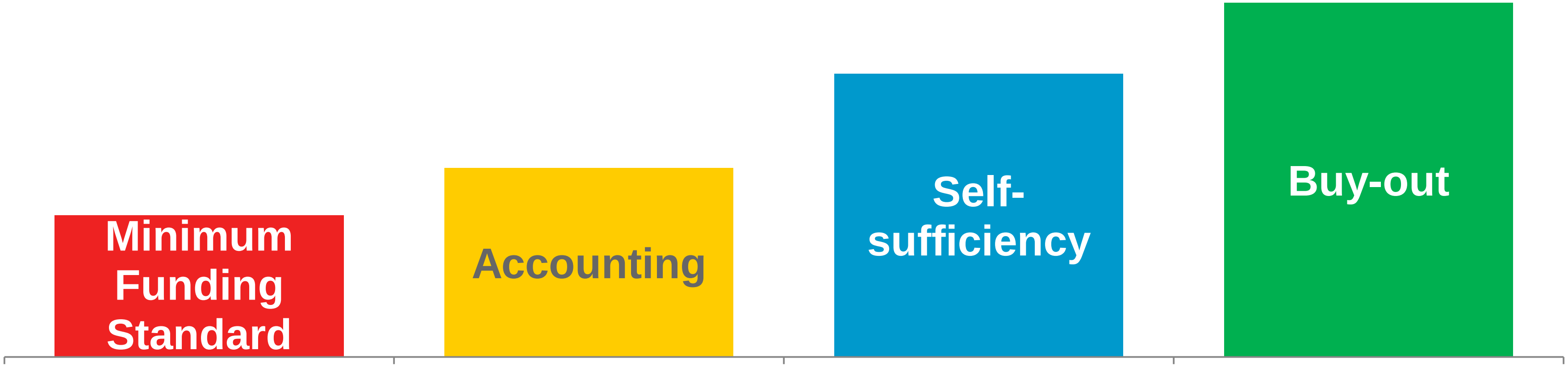
Objectives

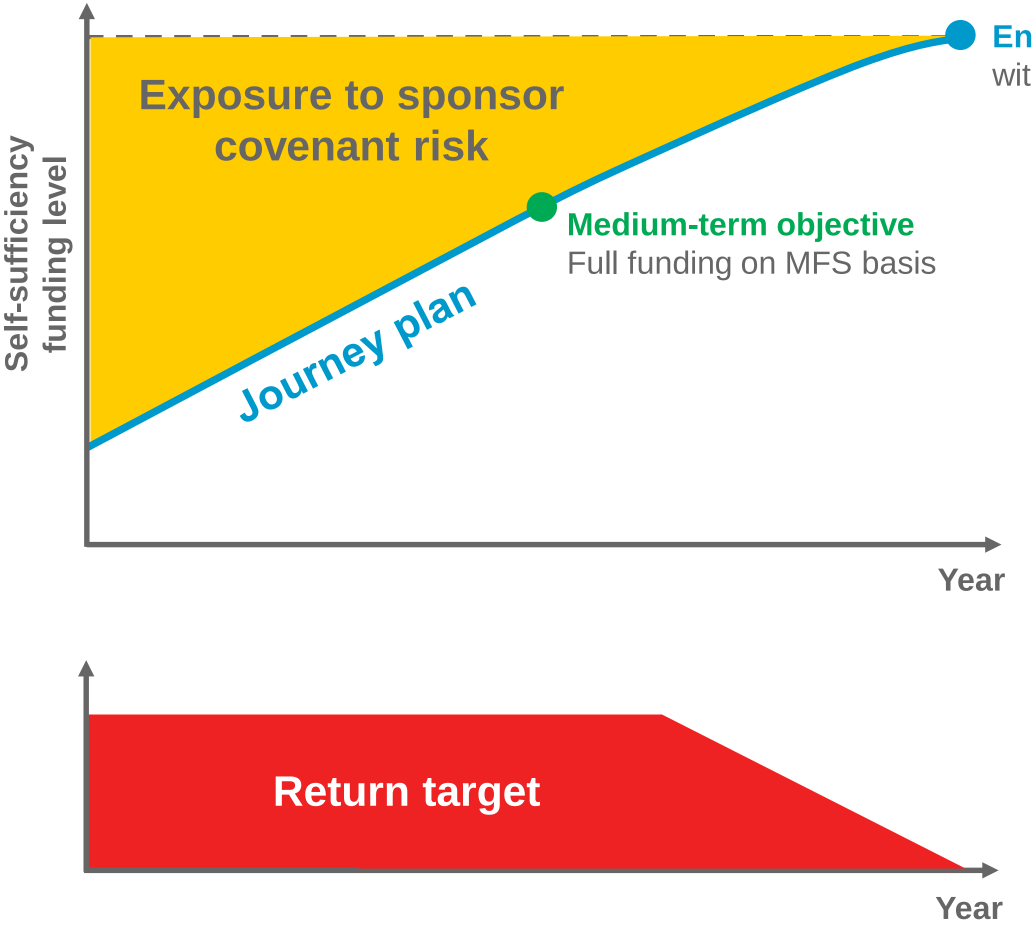
There are different ways to measure liabilities



Minimum Funding Standard	Accounting	Self-sufficiency	Buy-out
‘Subjective’ financial assumptions	‘Objective’ financial assumptions	‘Objective’ financial assumptions	‘Objective’ in the sense that it reflects current market price of liabilities
Use to determine ‘pace of funding’ through contributions	Use to provide readers of accounts with objective estimate of scheme health	Shows level of assets required to run-off the scheme with very little investment risk	Shows level of assets required to pass all risks to an insurance company

Strategy

Setting a journey plan



End-game objective: high level of security for member benefits, with reduced reliance on covenant or investment risk

Before the end-game
Balance different risks…

- **Funding risk**
- **Investment risk**
- **Covenant risk**

Strategy

Consider various types of risk

Counterparty

Reputation

Implementation

Equity

Inflation

Complexity

Demographic

Market

Regulatory

Rates

Currency

Legal

Credit

Covenant

Liquidity

Operational

Governance

Specific

Model

Longevity

Manager

Reinvestment

Change in mindset

Success = ***assets outlasting the liability cashflows***

Cashflow driven investments

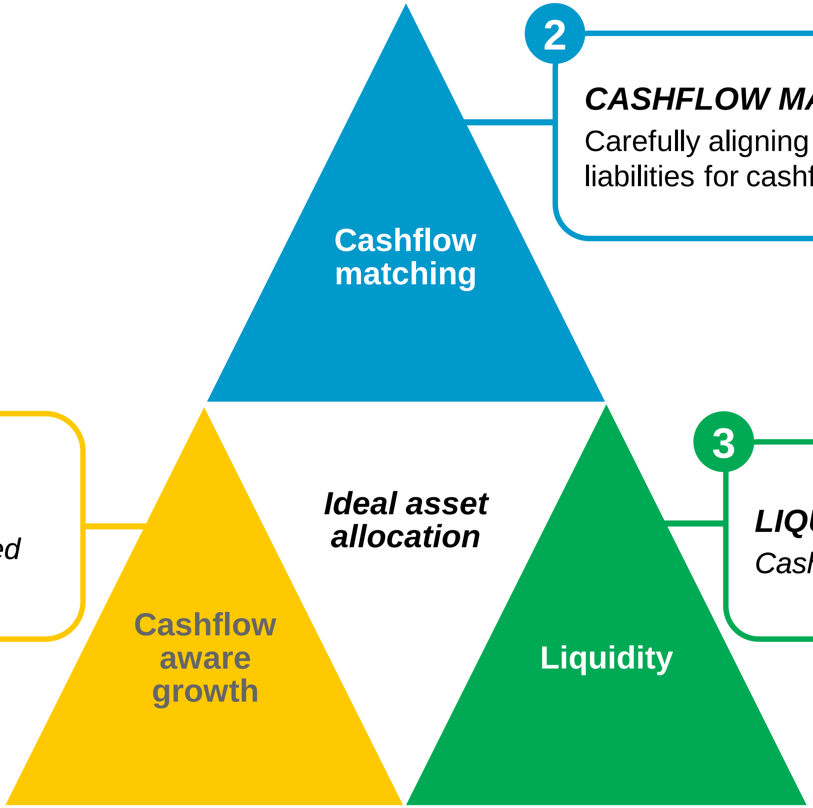
LDI

Buy In / Buy Out

Raising Cashflow Awareness

Cashflow “aware” investing

What do we mean?



2

CASHFLOW MATCHING

Carefully aligning asset cashflows with expected liabilities for cashflow negative schemes

1

CASHFLOW AWARE GROWTH

Diversified exposure to income and growth assets with a focus on sustained cashflow over the longer term

3

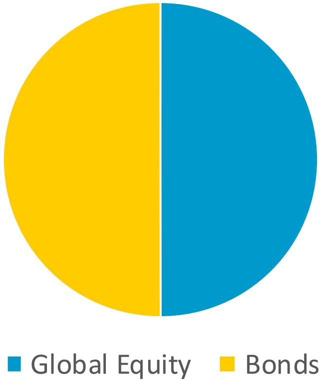
LIQUIDITY

Cashflow awareness in the short term

Consider cashflow in wider framework of overall investment strategy

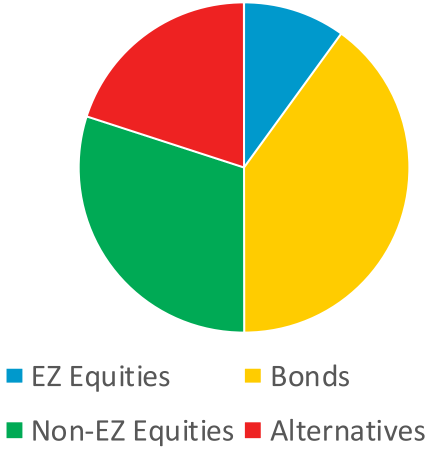
Why is cashflow awareness more relevant today?

Pension schemes 10-20 years ago did not have a liquidity issue but had poor investment strategies



- **Large Sponsor contributions**
- **Small pensioner payments**

Pension schemes today are more diversified and better hedged but face liquidity issues



- **Smaller Sponsor contributions**
- **Larger pensioner payments**
- **Asset calls**

Source: LGIM illustration only

Cashflow negative challenges

- Benefits > contributions *
- Majority of schemes cashflow negative, or soon will be
- Funding Level drag if underfunded – shrinking asset base – work harder just to tread water
- But outcomes sensitive to returns in early years
- Liquidity & risk of forced sales

FUNDING LEVEL DRAG EXAMPLE

	Before cashflow	After cashflow
Assets	75	65
Liabilities	100	90
Deficit	25	25
Funding Level	75%	72%

* Nothing to do with asset allocation

Cashflow aware principals

Key principals to help clients become cashflow aware

1
Strategic asset allocation

Focus on Strategic Asset Allocation to get right level of growth, diversification and hedging

2
Expected cashflows

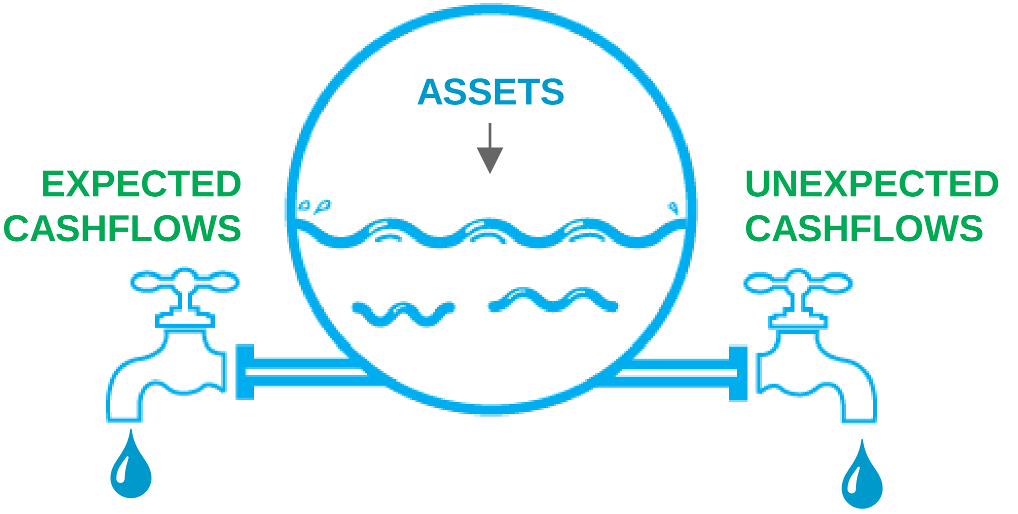
Target expected benefits using asset cashflows and growth for the longer term

3
Unexpected cashflows

Pre-emptively increase liquidity and have a plan for sales if necessary

Expected and unexpected cashflows

What cashflow requirements do we need to plan for?



ASSETS

EXPECTED CASHFLOWS

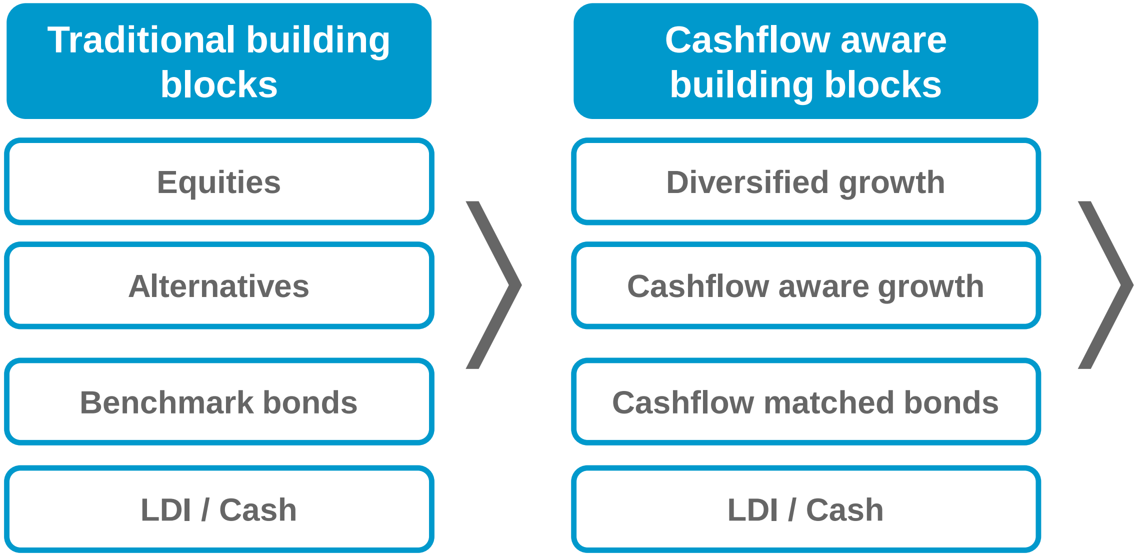
Pensioner payments

UNEXPECTED CASHFLOWS

- *Transfer values*
- *Commutations*
- *Derivative calls*
- *Longevity*

Need to plan for the unexpected

Evolving client strategy utilising cashflow aware building blocks



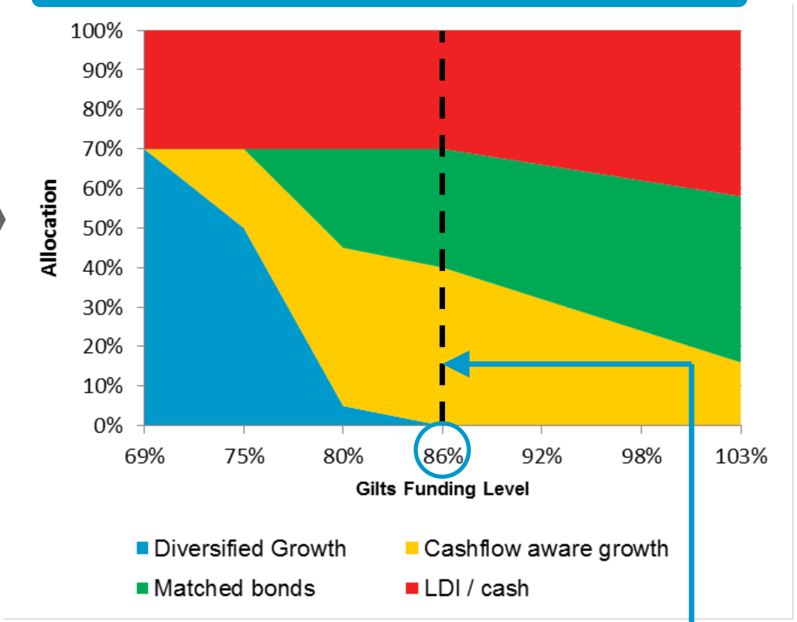
Traditional building blocks

- Equities
- Alternatives
- Benchmark bonds
- LDI / Cash

Cashflow aware building blocks

- Diversified growth
- Cashflow aware growth
- Cashflow matched bonds
- LDI / Cash

Optimal portfolio[1]



- Example scheme with 86% gov bond funding level
- 40% Cashflow aware growth, 30% Matched bonds and 30% LDI / cash

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1. BBB sponsor, 20 year duration, 100% rates/inflation hedged. Qualitative adjustments and smoothing. For an explanation of EPBM = “Expected Proportion of Benefits Met” see http://www.lgim.com/library/knowledge/thought-leadership-content/client-solutions/Client_Solutions_covenant_risk_July_17_UMBRELLA.pdf EPBM (Expected Pension Benefit Met) optimisation did not allow for any alpha on these funds

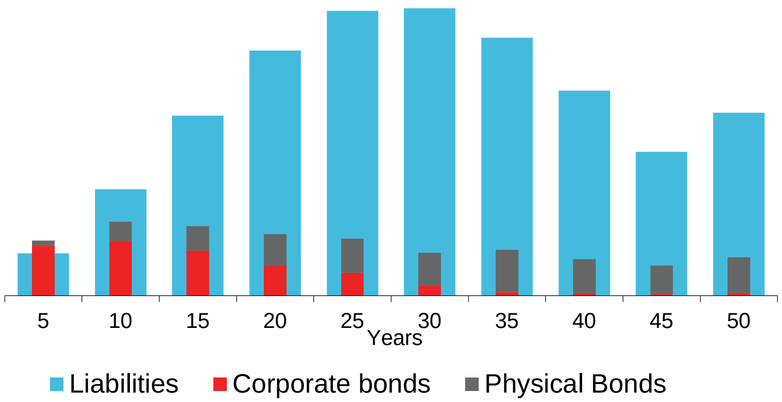
How does LDI help to de-risk portfolios?

How can LDI help manage the liability risks?

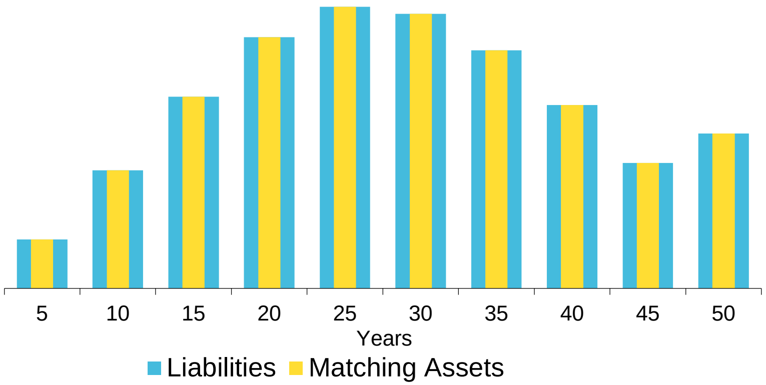
- Investment strategy taking into account your liabilities
- ***Aligns the sensitivity of your assets and liabilities*** to changes in interest rates and inflation

Sensitivity of asset and liabilities (€)

Typical pension scheme



Fully matched position



For illustration purposes only

How does LDI work in practice to help minimise these risks?

Delivering LDI solutions for our clients

- Starting point allows for existing matching assets
- Analyse client liabilities
- Simple, low governance approach

Design a solution using simple to access pooled funds

European Gvt conventional bond Funds

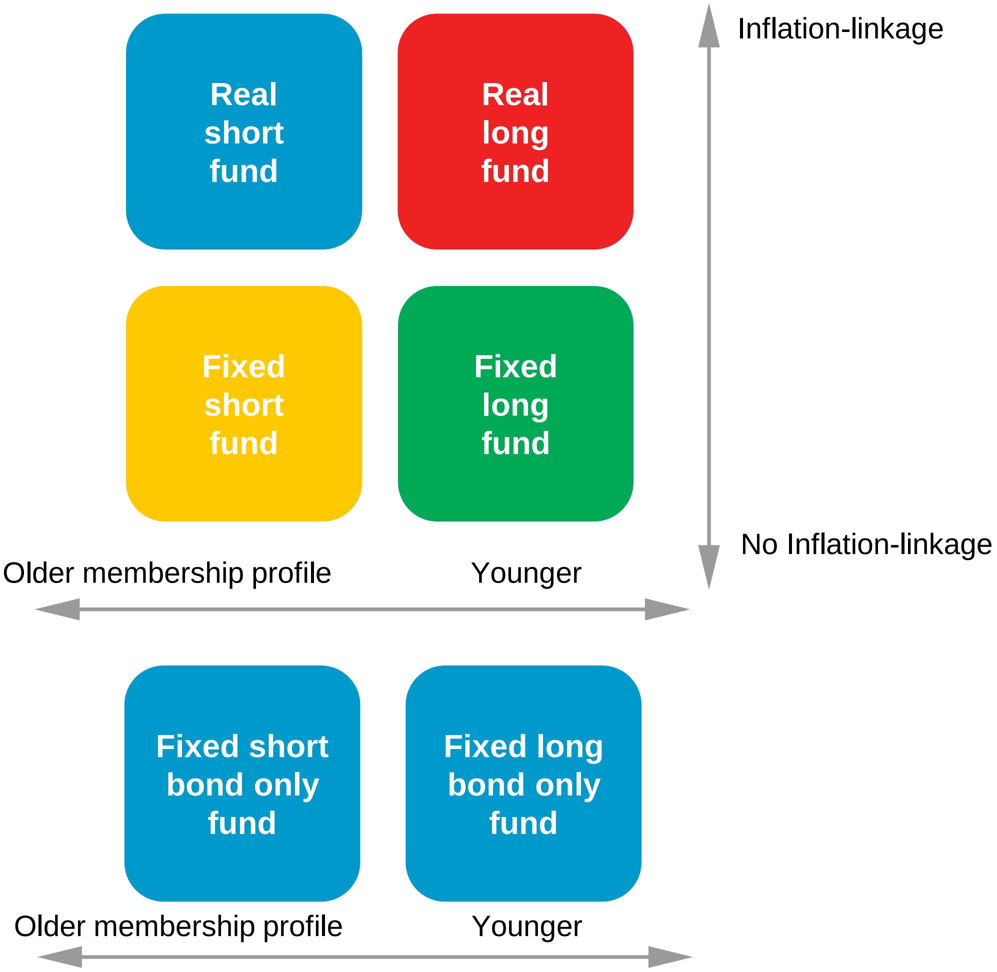
European Gvt Inflation linked bond Funds

Capital Efficient LDI Funds

Corporate Bonds

Investing in Euro LDI Matching Core funds

What would this mean you invest in? - 4 leveraged funds & 2 bond funds



Simple and tailored to objectives

- Each fund targets a liability benchmark
- Bonds chosen to maximise yield within each 5 year maturity bucket
- Maximum 60% exposure to any one country
- Vanilla hedging instruments
- Tailor to your scheme - flexible range of building blocks

Efficient

- Best of ‘swaps and government bonds’ benchmark
- Reduce the cost of hedging at:
  - Implementation
  - And throughout

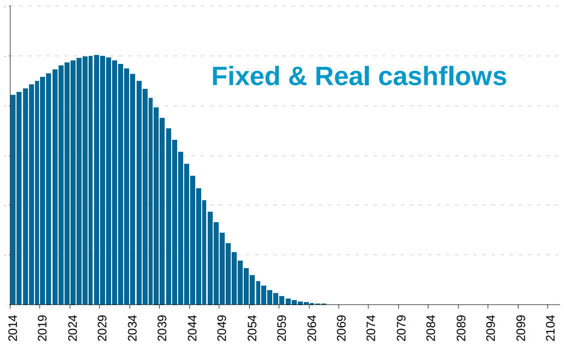
Comfort for clients & advisors

- Transparent external benchmark

Building block profiles tailored to our client's liabilities

Short Maturity Fund

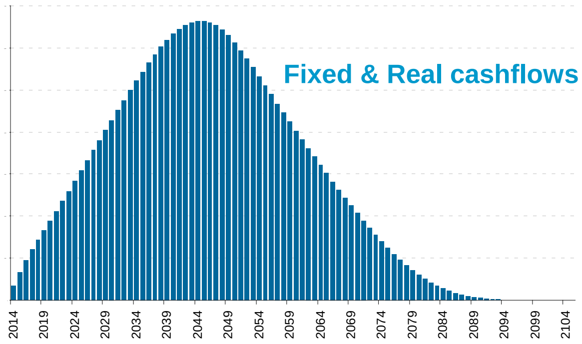
Pensioners – 13y duration


Fixed & Real cashflows

+

Long Maturity Fund

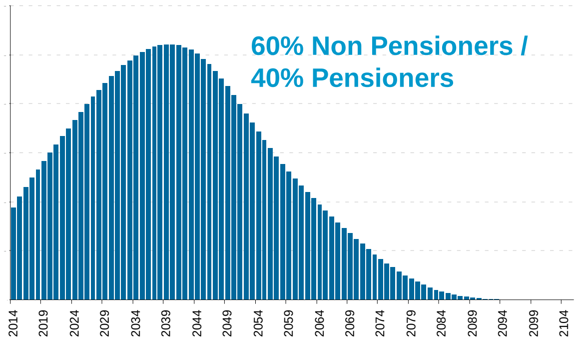
Non Pensioners – 24y duration


Fixed & Real cashflows

=

Average Scheme cashflows

c. 20y duration


60% Non Pensioners / 40% Pensioners

Simple

- The Four Leveraged Matching Core profile funds can be combined to give average scheme cashflows (duration and shape)
- Duration and shape of profiles have been set with reference to typical pensioner (short) and deferred (long) liabilities

Flexible

- Combination of funds chosen to match scheme specific duration profile
- Short dated funds have duration similar to credit indices: Credit + long fixed fund = liability hedge

For illustration purposes only

Supporting you through our partnership

Design tailored solution and training plan

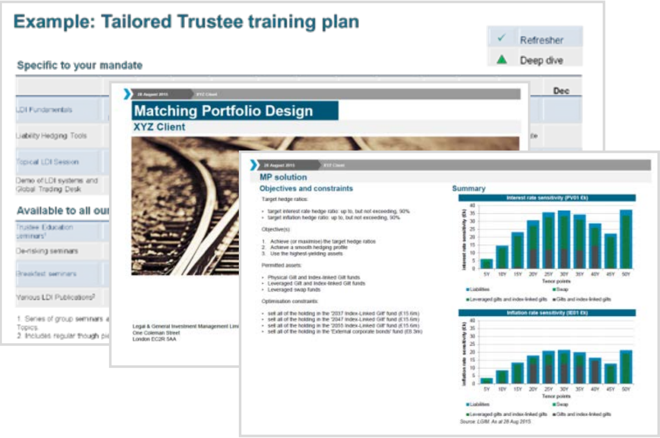
- ✓ Dedicated team working with the trustees and their advisors
- ✓ Design tailored solution
- ✓ Support through training plan
- ✓ Can be accessed online

Efficient implementation

- ✓ Reduce governance burden
- ✓ Straightforward documentation
- ✓ Minimise transaction costs e.g. in specie, matching buyers/sellers, low default spreads

Comfort for the long term

- ✓ Robust risk management
- ✓ Partnership approach
- ✓ Tailored reporting on all your matching assets



Example: Tailored Trustee training plan

✓ Refresher

▲ Deep dive

Specific to your mandate

Dec

LDI Fundamentals

Liability Hedging Tools

Topical LDI Session

Demo of LDI systems and Global Trading Desk

Available to all our

Trustee Education seminars¹

De-risking seminars

Breakfast seminars

Various LDI Publications²

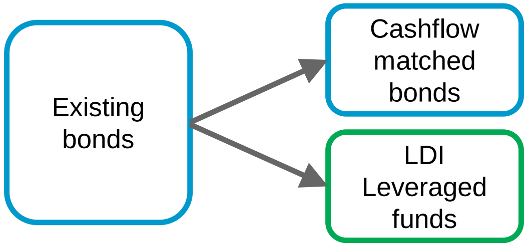
Matching Portfolio Design

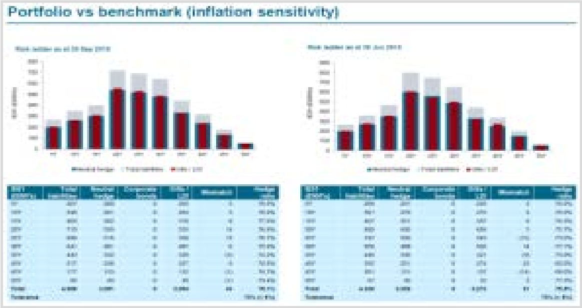
XYZ Client

MP solution

Objectives and constraints

Summary





Portfolio vs benchmark (inflation sensitivity)

http://www.lgim.com/uk/en/knowledge/trustee-education/

Appendix

Preparing for the End Game?

The full range of de-risking options available is extremely broad, but some commonly adopted approaches can be summarised as:

De-Risking Options

Managing investment risk	through reducing exposure to risky assets, diversifying the risky asset exposure that remains, hedging the interest rate and inflation risks inherent in DB liabilities, and cashflow matching.
Hedging longevity risks	using longevity swaps, or more commonly purchasing bulk annuities from an insurer ('buy-in').
Liability management	including retirement flexibility, offering enhanced transfer values (ETVs) and pension increase exchanges.
Buy-in/Buy-out	the ultimate settlement of liabilities with an insurance company.

Pension strategy

How can we build a framework for cashflow planning?

CASHFLOW AWARE ↔ CASHFLOW MATCHED

CONSIDERATIONS

- Funding level
- Cashflow negativity / maturity
- Sponsor risk
- Longevity risk
- Size of scheme

Requirements

- Use all natural cashflow generation
- Run-off assets in a downturn to avoid being a forced seller

Focus on cashflow where appropriate – total return less costs are still key

Requirements

- Line up contractual asset cashflows to meet expected liability payments
- Run-off assets when the scheme is ready

Focus on contractual cashflows

Consider cashflow in wider framework of overall investment strategy

How should we decide what amount of liabilities should be hedged?

Consider in three stages

1. Objectives	Consider overall goals of liability hedging, and **how risk could be minimised against those goals**	Funding level risk vs deficit risk Liability measure
2. Portfolio efficiency	Consider expected return impact of liability hedging, and **overall impact on investment efficiency** of total portfolio	Expected cost/return impact of hedging Extreme risk protection
3. Implementation constraints	Consider **practical limitations** around the implementation of the hedge	Available capital Leverage achievable Governance budget

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