



IAPF Trustee Network Event  
“Considerations when managing  
liability risks”

# Considerations when managing liability risks

Simon Bentley, BMO Global Asset Management



For professional investors only

# Liability driven investment

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IAPF Trustee Meeting

# Investment risk

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The value of investments and income derived from them can go down as well as up as a result of market or currency movements and investors may not get back the original amount invested.

The objective of delivering a positive return regardless of market conditions cannot be guaranteed over the time period.

The income and capital due from bonds is dependent upon the issuing company's ability to pay and any default will adversely affect the value of your investment.

Changes in interest rates can affect the values of fixed interest holdings.

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**A brief recap of LDI**

**▶ Looking under the bonnet**

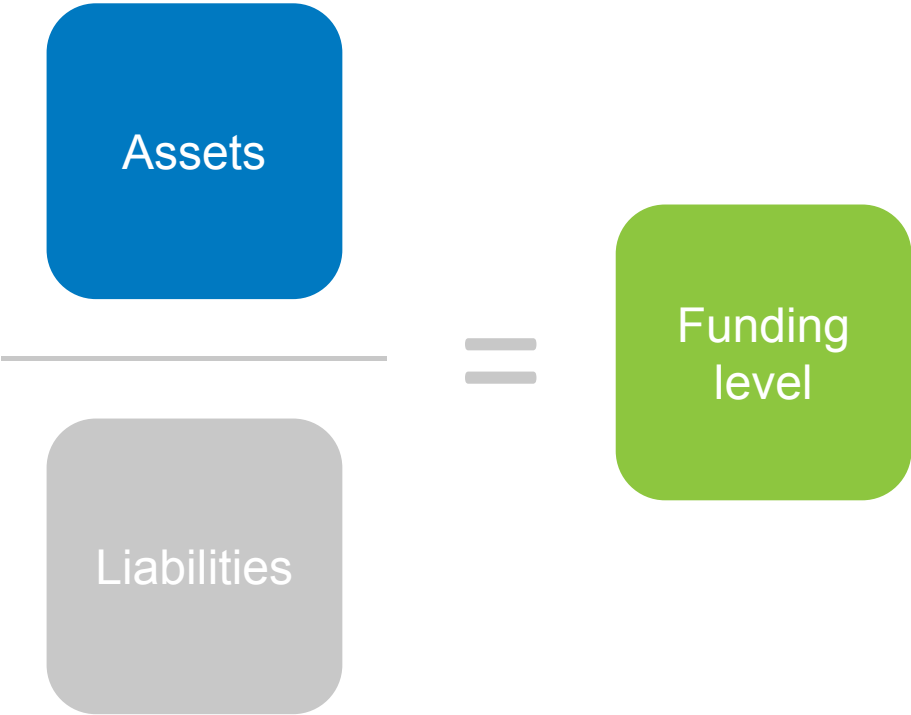
**Implementing LDI**

# A brief recap of LDI

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# What is LDI?

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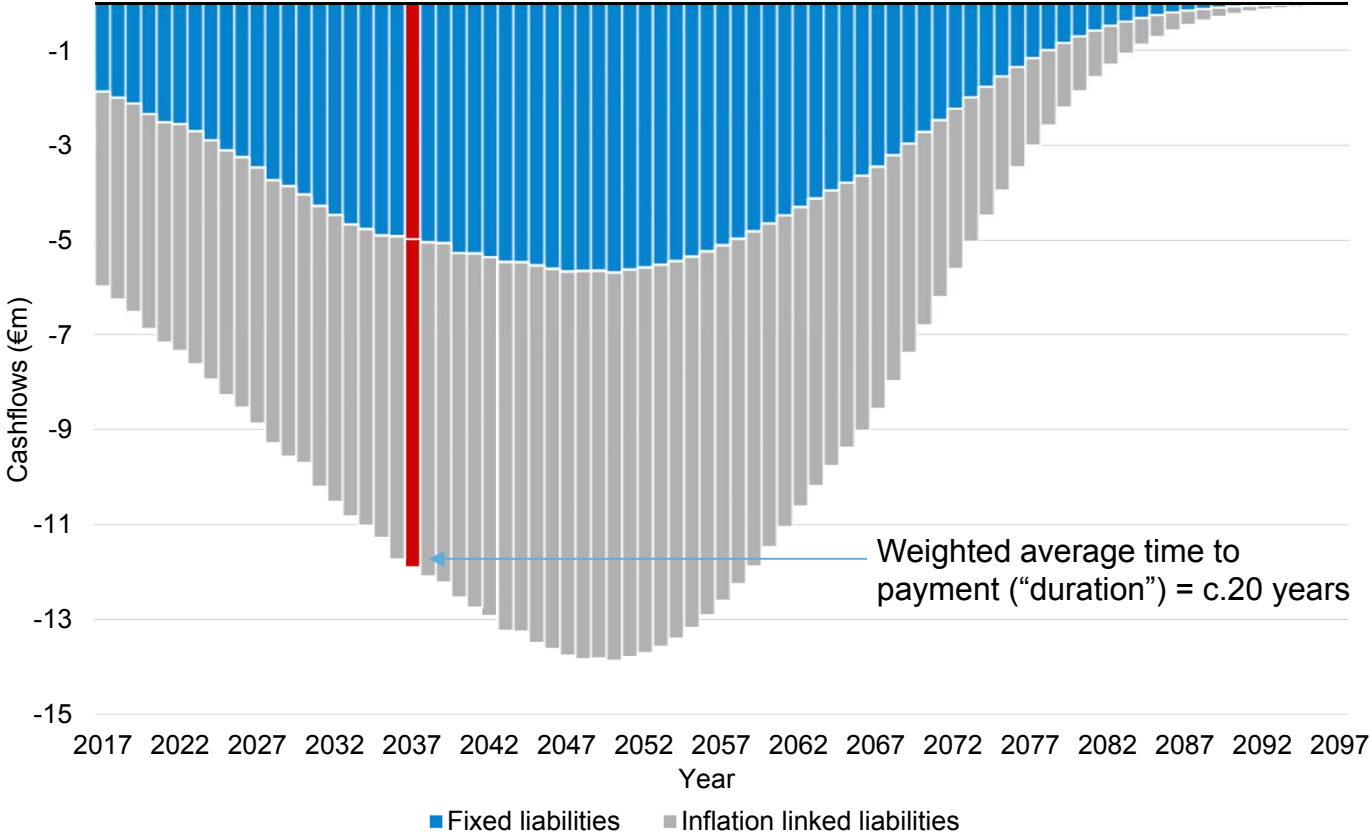
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To stabilise the funding level, we need to put the liabilities at the heart of your investment strategy

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# Liabilities of a typical defined benefit pension scheme

## Expected annual cash flows



Source: BMO Global Asset Management. For illustrative purposes only



# Matching using derivatives

A bond portfolio can be replicated by a swap portfolio

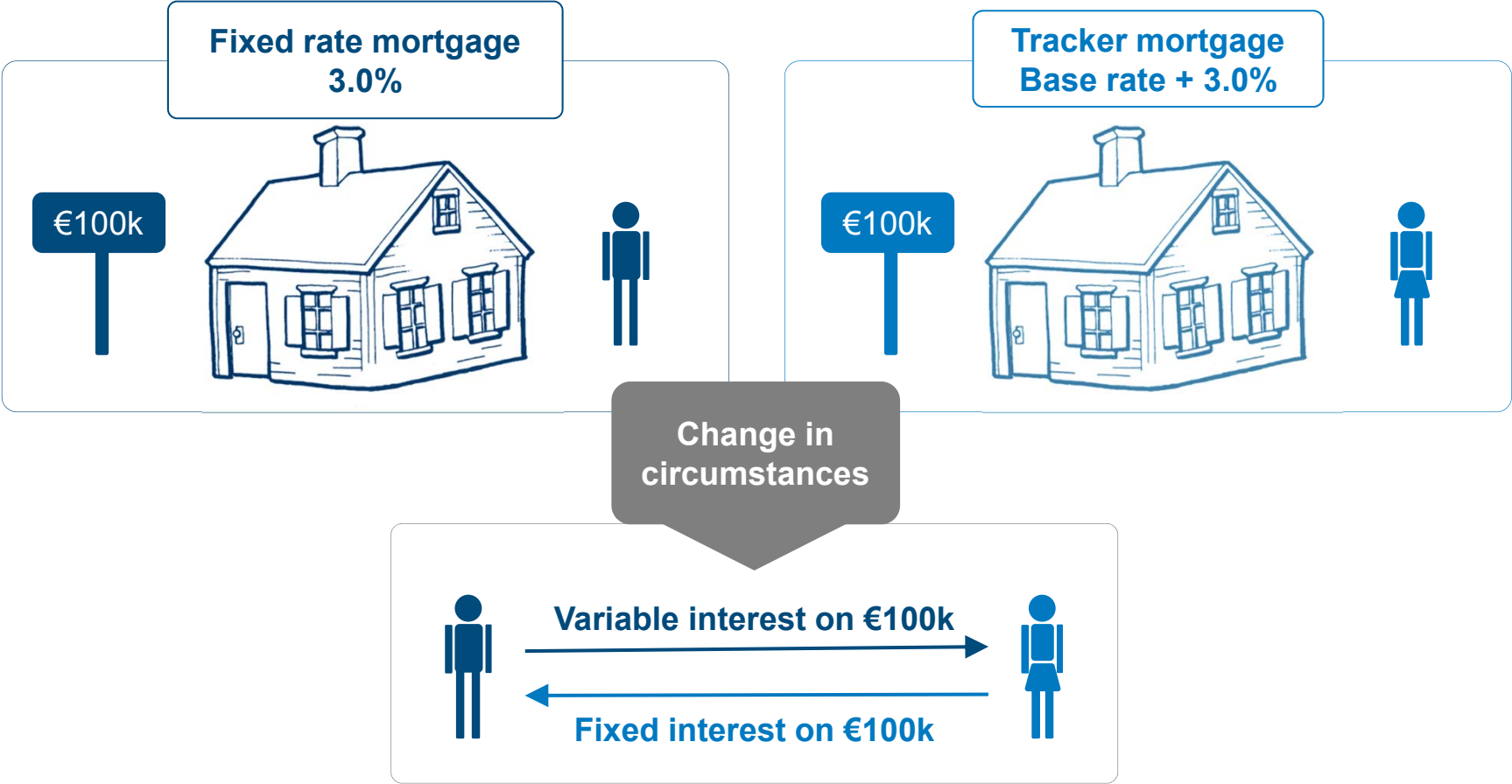
	Current	Bond market up 20%
<b>Liability value</b>	<p>€300 Value today      €600 Value in 20 years 3.5% interest rate</p>	<p>€360 Value today      €600 Value in 20 years 2.6% interest rate</p>
<b>1 Match with bonds</b>	<p>€0 Cash      €300 Bonds</p>	<p>€0 Cash      €360 Bonds</p>
<b>2 Match with swaps</b>	<p>€300 Cash      €0 Swaps</p>	<p>€300 Cash      €60 Swaps</p>

Source: BMO Global Asset Management. For illustrative purposes only.

**Swaps allow schemes to mitigate key risks without using up their assets**

# Swaps

A simplified example:



Source: BMO Global Asset Management. For illustrative purposes only.

# Jargon buster

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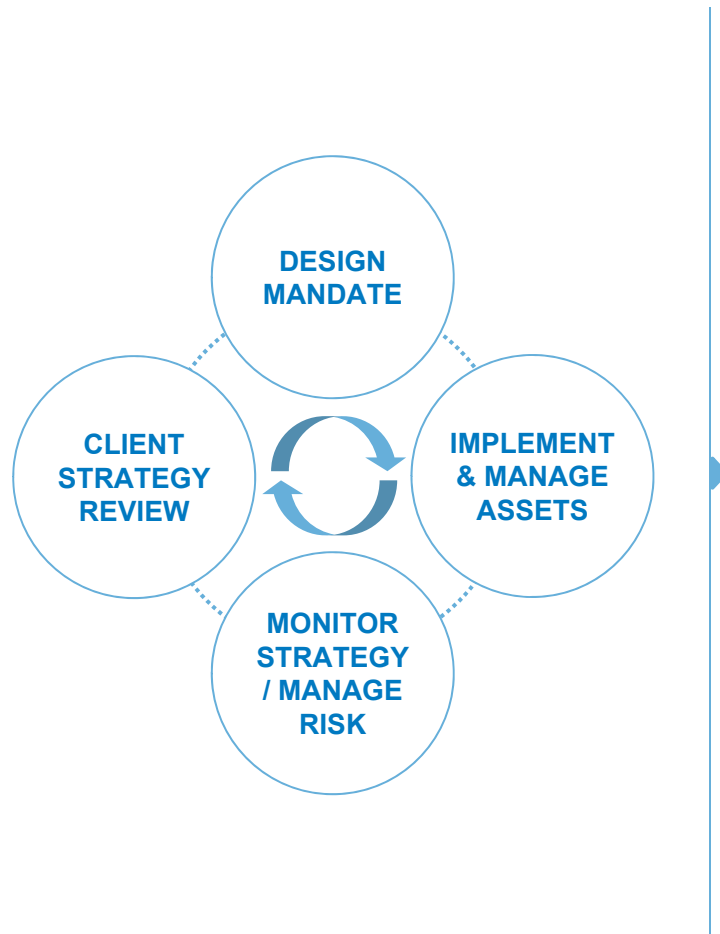
- Risk measured in “PV01” and “IE01” terms
- **PV01 (also known as DV01)** describes the impact of a 1 basis point (0.01%) rise in interest rates. This will be a negative number for pension schemes because a rise in interest rates results in a fall in liability value
- **RPI01 (also known as INF01)** describes the impact of a 1 basis point (0.01%) rise in inflation expectations. This will be a positive number for pension schemes because a rise in inflation expectations results in a rise in liability value

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**The objective of a liability hedging portfolio is to match PV01 and IE01 in total and across the term structure**

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# Building a solution



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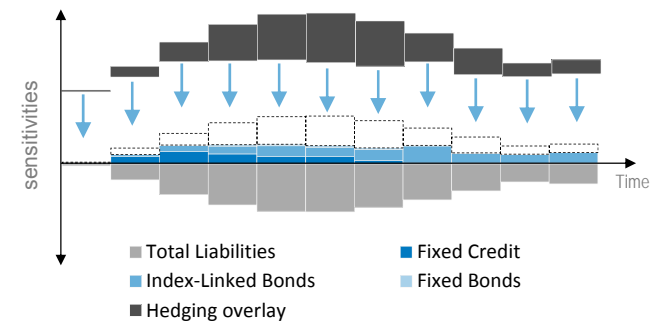
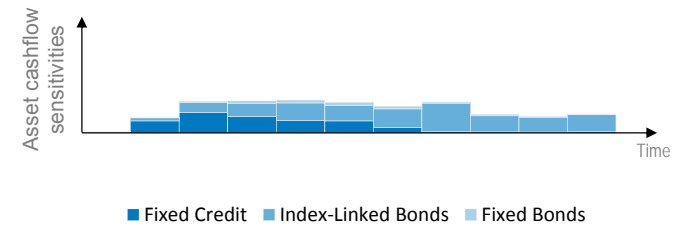
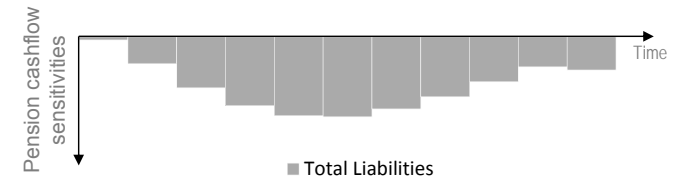
**Benchmark:**  
pension cashflow sensitivities (liabilities)

2

**Matching assets:**  
credit & government bonds

3

**Filling the gap:**  
hedging overlay



# Looking under the bonnet

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# Trading swaps

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Its all about matching buyers with sellers



# Managing counterparty risk

## Key risk management tools

- All swaps are centrally cleared
  - Initial margin
  - Variation margin
- Ongoing vetting and monitoring of all counterparties and clearing members
- Full market access via a wide range of counterparty banks

### Derivative counterparties



### Clearing members



### Clearing houses

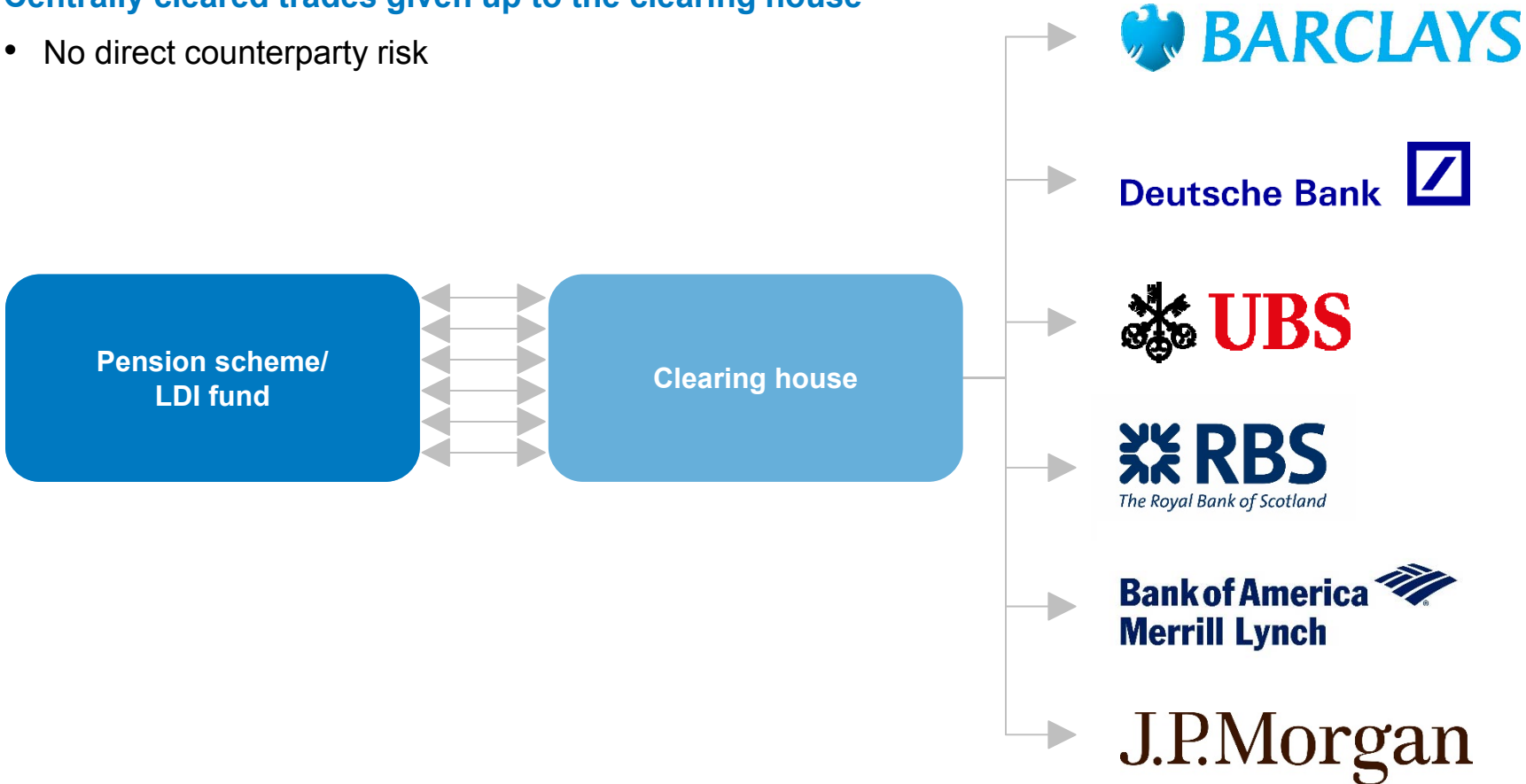


Note: List of counterparty banks is subject to change.

# What is central clearing?

## Centrally cleared trades given up to the clearing house

- No direct counterparty risk



Note: List of banks is not exhaustive and is for illustrative purposes only.



# What does it cost to trade?

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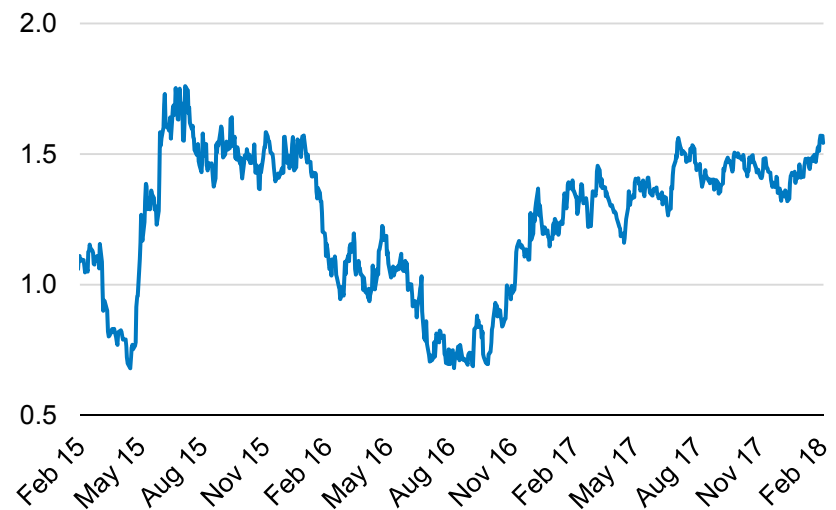
## 2 elements to consider:

Mid market level (going rate in the market)

Dealing charge (“commission” charged by the bank)

- Quoted as bps of PV01
- i.e. if charge is 0.5bps and PV01 of swap is €100,000 then cost of €50,000

**20 year euro swap rate (%)**



Source: Thomson Reuters Datastream

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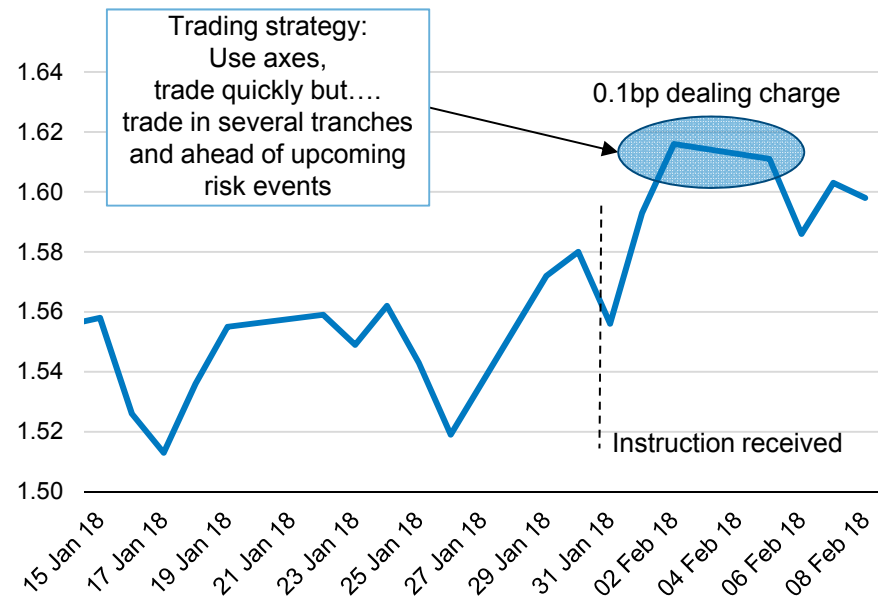
**Important to consider the “all-in” level i.e. both mid level and dealing charge**

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# Achieving the best price

- Specialist derivative trading team
- Focus on “all-in” level
- Trusted counterparty with banks gives us great liquidity when we need it
- Trading strategy varies depending on type of trade
- Judgement required to balance:
  - Speed of execution
  - Costs
  - Market environment

## 30 year euro swap yield (%)



Source: Thomson Reuters Eikon as at 08.02.2018.

The experience and infrastructure to minimise dealing costs

# Euro swap trading environment update

- Typical market trade sizes
  - Interest rates: €250k of PV01 (approx. €125m of liabilities)
  - Inflation: €50k of IE01 (approx. €25m of liabilities)
- Differential pricing between cleared and un-cleared trades becoming commonplace
  - Fewer banks prepared to quote for un-cleared trades
  - Dealing costs can be up to 10x higher for un-cleared trades
- Zero coupon swaps becoming prohibitively expensive beyond 20 years – increased use of par swaps
- Inflation liquidity remains good below 30 years, and is variable/limited beyond this tenor

**30 year interest rate swap rate (%)**



**30 year inflation swap rate (%)**

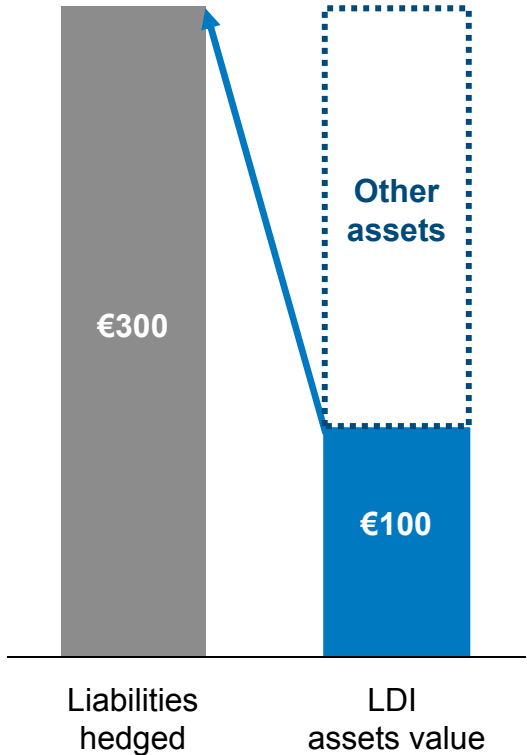


Source: Bloomberg as at 09.02.2018. Comments based on market observations.

# The concept of leverage

## Starting point

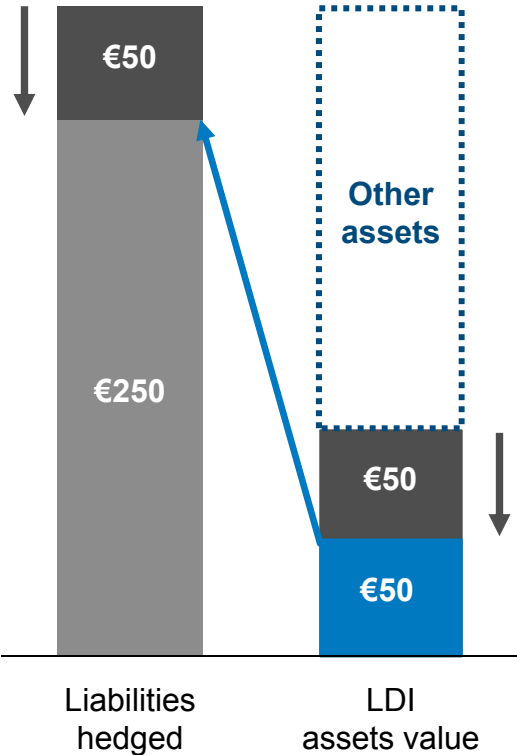
LDI Leverage = 3



## Before rebalancing

Liability falls in value

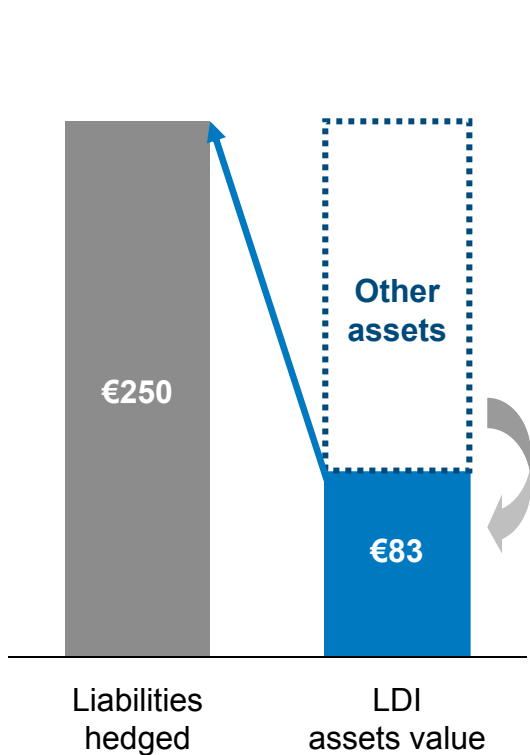
LDI Leverage = 5



## After rebalancing

Cash required to rebalance = €33

LDI Leverage = 3



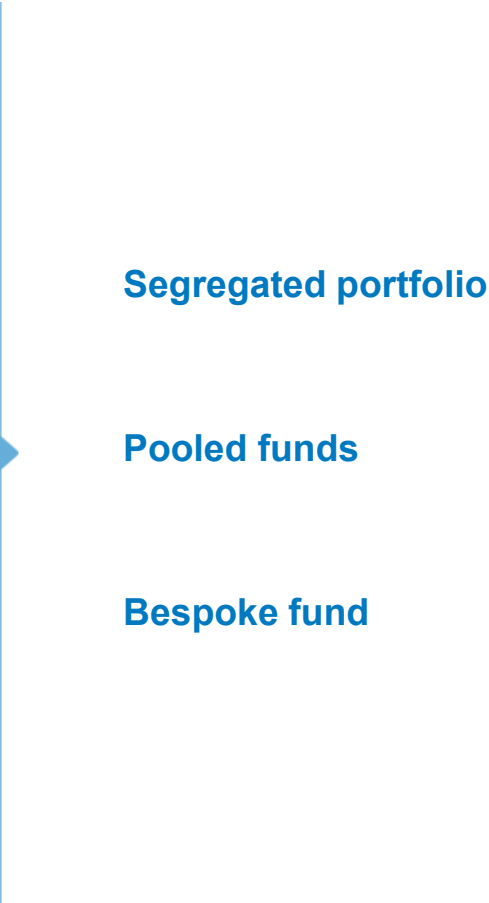
Source: BMO Global Asset Management. For illustrative purposes only.

# Implementing LDI

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# 3 different portfolio structures

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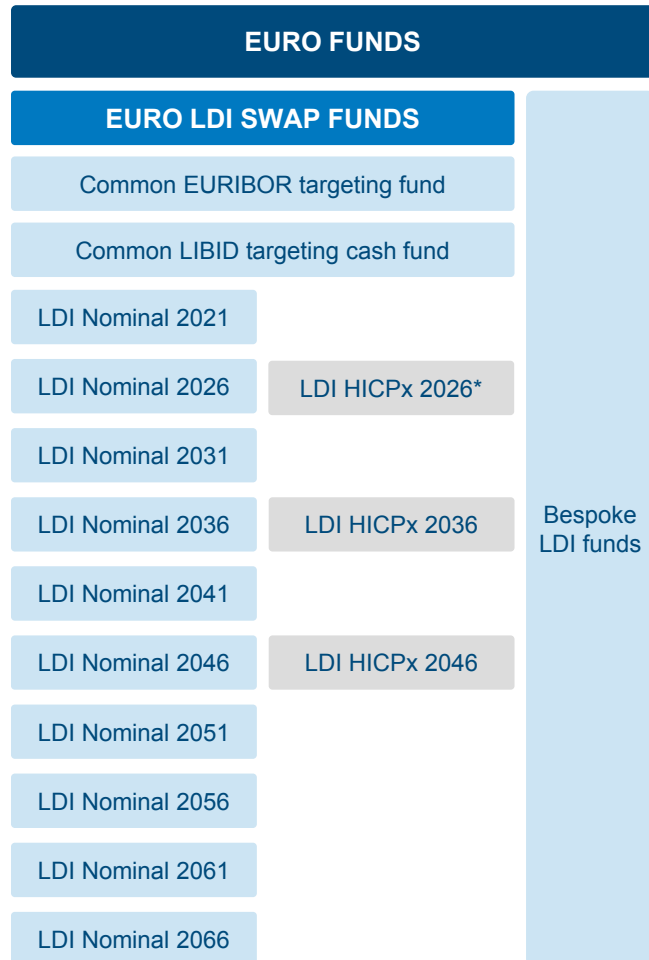


# Creating the right portfolio structure

	LDI pooled funds	Segregated portfolio	Bespoke fund
Lead time	Short	Long	Medium
Ease of implementation	High	Medium	High
Hedging instruments	Swaps	Swaps and bonds	Swaps and bonds
Ease of monitoring	High	High	High
Hedge accuracy	Good	Excellent	Excellent
Flexibility	Limited	Excellent	Excellent
Typical min investment	€1m	€100m	€100m

- LDI manager can provide guidance as to the most appropriate portfolio structure

# Our range of euro LDI funds



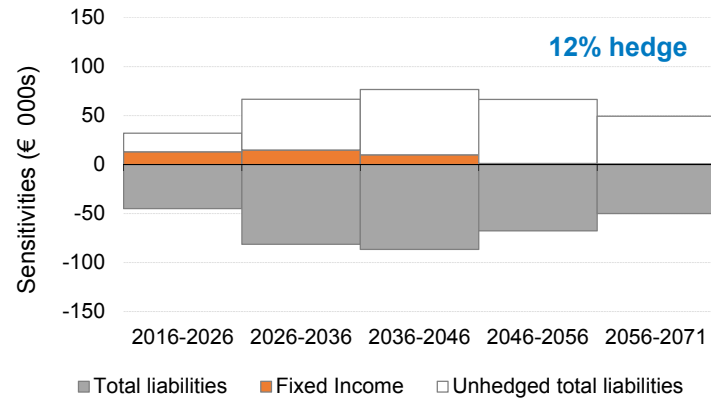
- We launched our Swap fund products in 2006
- €2bn invested in EUR LDI swap funds
- Flexibility to protect against:
  - Real interest rates
  - Nominal interest rates
- The funds are leveraged around 3x on average
- Backed by conservative money market fund
- Rebalancing mechanism to prevent leverage becoming too high or too low
- Centrally cleared to reduce counterparty risk
- The funds have an independent custodian and fund administrator
- Luxembourg domiciled FCP structure

Source: BMO Global Asset Management as at 31.10.2017. HICP = Harmonised Index of Consumer Prices, grey denotes unfunded sub-funds. EURIBOR = Euro Interbank Offered Rate. LIBID = Euro London Inter-Bank Bid Rate. \*2026 LDI HICPx Fund currently shelf launched and pending initial seed investment



# XYZ pension scheme – current allocation

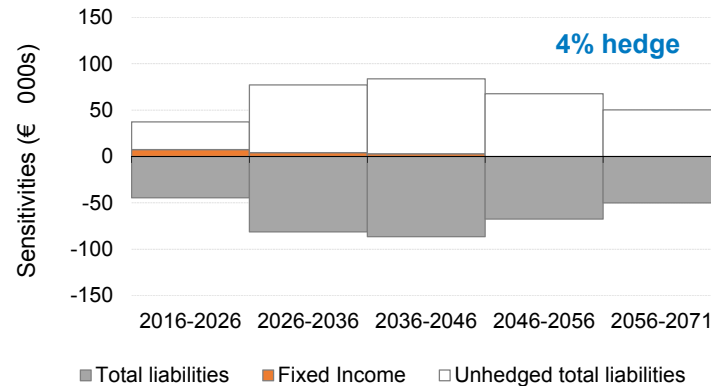
## Interest rate hedge



- Liabilities
  - c. €180m
  - Duration of total liabilities: 18 years

- Assets
  - Euro Core Nominal Bond portfolio: €17.25m
  - Euro Core Inflation Linked Bond portfolio : €17.25m
  - In this analysis, it has been assumed that no other matching assets are held

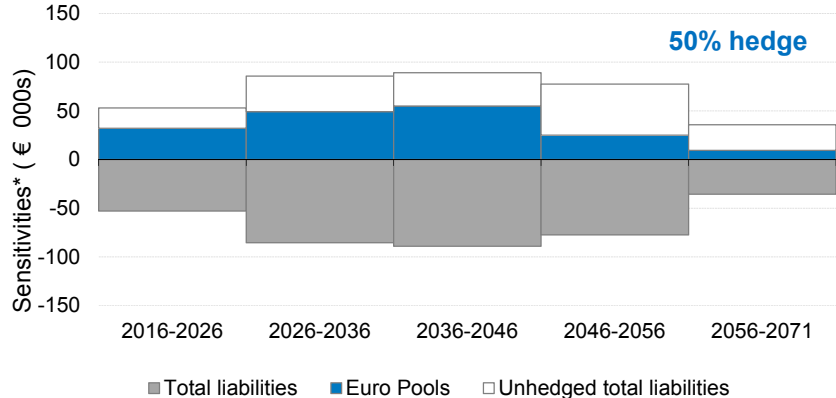
## Inflation hedge



Source: BMO Global Asset Management as at 29.09.2017. Hedge ratio percentage of total scheme liabilities. For illustrative purposes only.

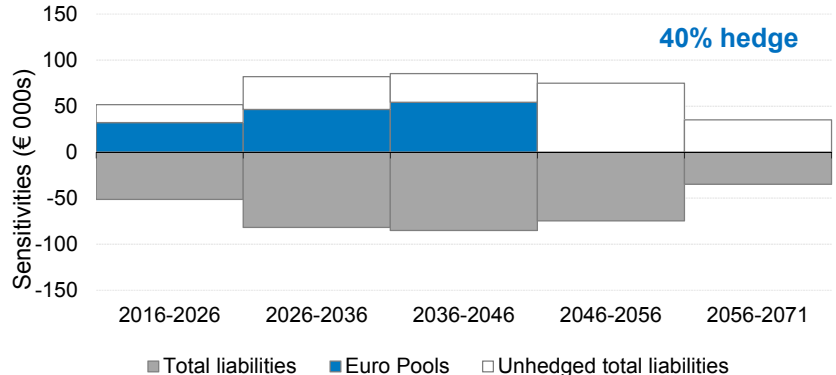
# XYZ pension scheme – 50/40% hedge ratio

## Interest rate hedge



- A 50%/40% hedge of interest rate and inflation risk can be achieved by investing:
  - €24.5m in the BMO Real HiCPx Euro funds
  - €5m in the BMO Nominal Euro funds
  - €5m cash released assuming full sale of Euro Core Fixed Income holding
- Assumes no other liability matching assets held

## Inflation hedge



Source: BMO Global Asset Management as at 29.09.2017. Hedge ratio percentage of total scheme liabilities. For illustrative purposes only.

# Managing leverage

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- Tried and tested process to maintain the leverage of the funds within permitted range
  - Re-capitalisation calls give clients 10 days to deliver additional cash
- Funds monitored against business as usual triggers at month end
  - Hitting the lower limit results in cash being returned to investors
- Funds monitored against maximum leverage trigger daily
- Hitting the stop loss trigger results in an immediate rebalancing

## Rebalancing mechanism

Stop-loss trigger 7.5x

Maximum leverage 4.5x

Business as usual max 4x

Target leverage 3x

Business as usual range 2.5x

Source: BMO Global Asset Management. Note: Example thresholds shown, precise thresholds vary from fund to fund. Actual parameter monitored is fund duration, leverage equivalents shown for illustrative purposes

# Leverage rebalancing thresholds

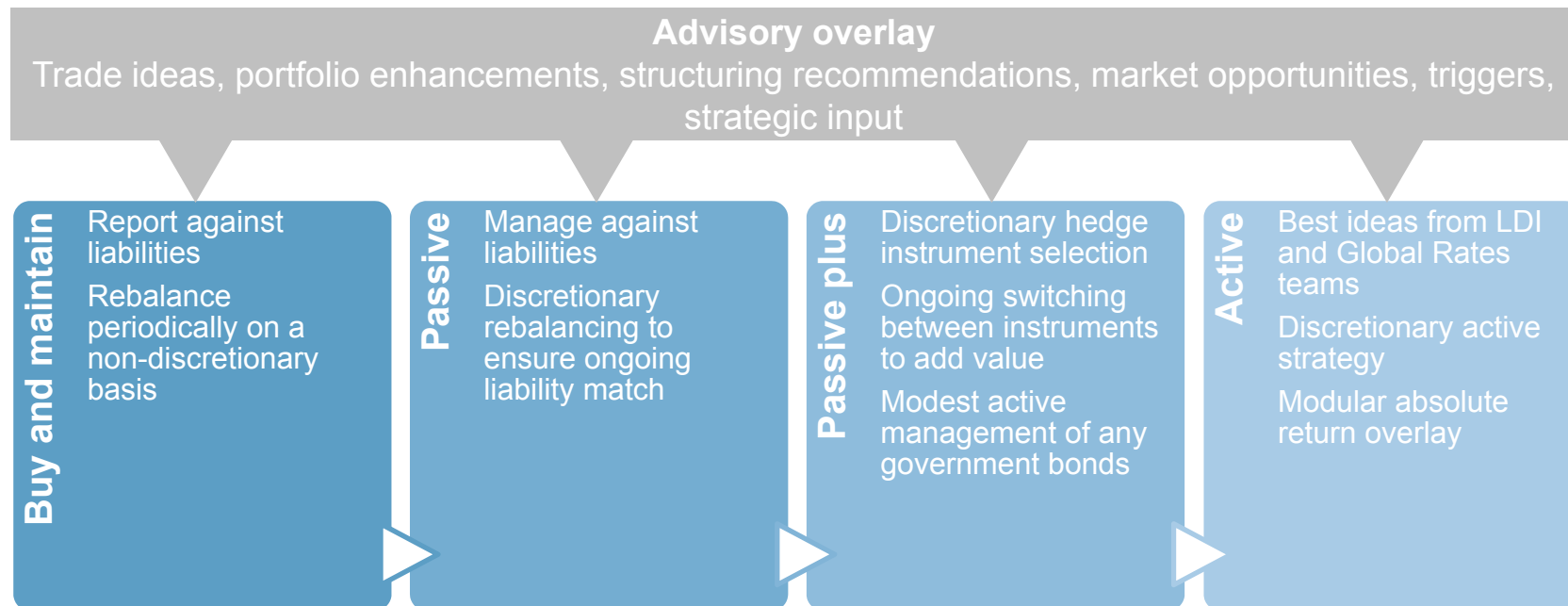
## Euro LDI pooled fund leverage rebalancing framework

Fund name	Rate shift to rebalance	Cash required per €1m
Nominal 2021	5.446%	186,642
Nominal 2026	0.634%	225,183
Nominal 2031	0.542%	288,519
Nominal 2036	0.673%	213,197
Nominal 2041	1.309%	151,203
Nominal 2046	0.706%	206,624
Nominal 2051	1.793%	114,009
Nominal 2056	0.506%	232,005
Nominal 2061	1.247%	145,761
Nominal 2066	1.653%	112,493
HICPx 2026	N/A	N/A
HICPx 2036	0.937%	184,592
HICPx 2046	0.347%	264,995

Source: BMO Global Asset Management as at 31.12.2017. For illustrative purposes only assuming rebalancing triggered by "BAU" max threshold

# The range of segregated/bespoke management approaches

Each portfolio is tailored to the client's unique requirements

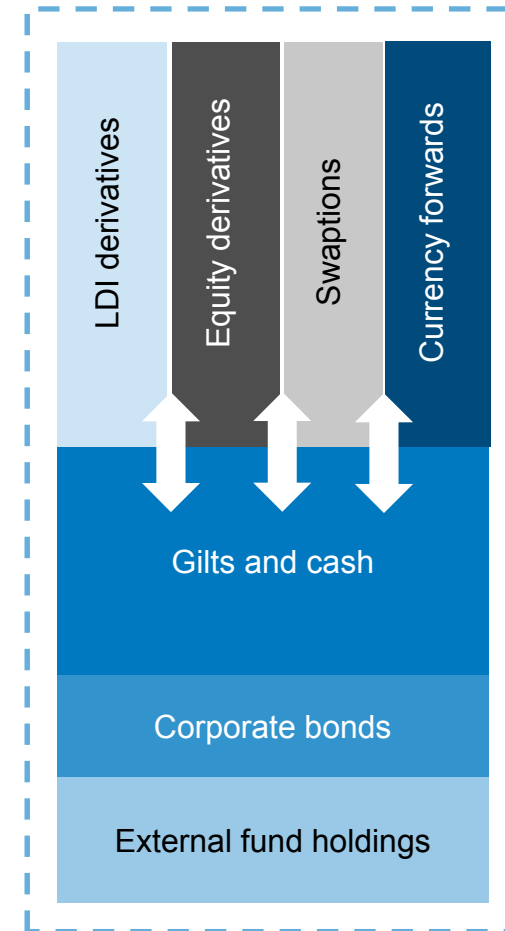


- Core LDI portfolios typically take one of the forms illustrated above
- Non-core derivative strategies can be combined with the above including: swaptions, synthetic equity, equity protection, volatility controlled equity, FX, synthetic credit

# BMO Global Asset Management's bespoke LDI fund

## A unitised fund set up for the exclusive use of a single client

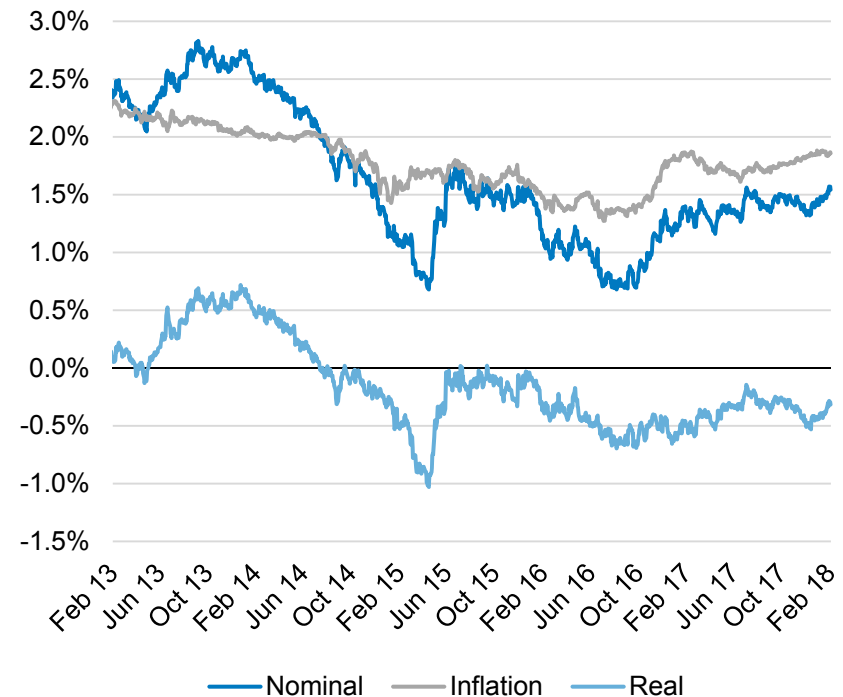
- Provides a segregated style solution
  - Without the need for a custodian
  - With a short lead time
- Unitised fund details:
  - Luxembourg domiciled Fonds Commun de Placement (FCP)
  - Fully ring-fenced sub-fund legal structure
  - No upfront set-up costs
- Derivative based strategies can be supported by efficient single collateral pool
- BMO Global Asset Management can easily:
  - Rebalance allocations to target
  - De-risk in response to intra-day triggers
  - Ensure ongoing collateral sufficiency
  - Add or remove investments in response to client instructions



# Expanding the hedge – trigger monitoring

- Flexibility to monitor a wide range of trigger types
  - Funding level triggers
  - Yield-based triggers
    - Swap rates
    - Bond yields
    - Best of both
- We currently monitor over 100 separate triggers
- Advice on trigger levels and structure
- Regular review of triggers to ensure ongoing suitability

## 20 year euro swap rates

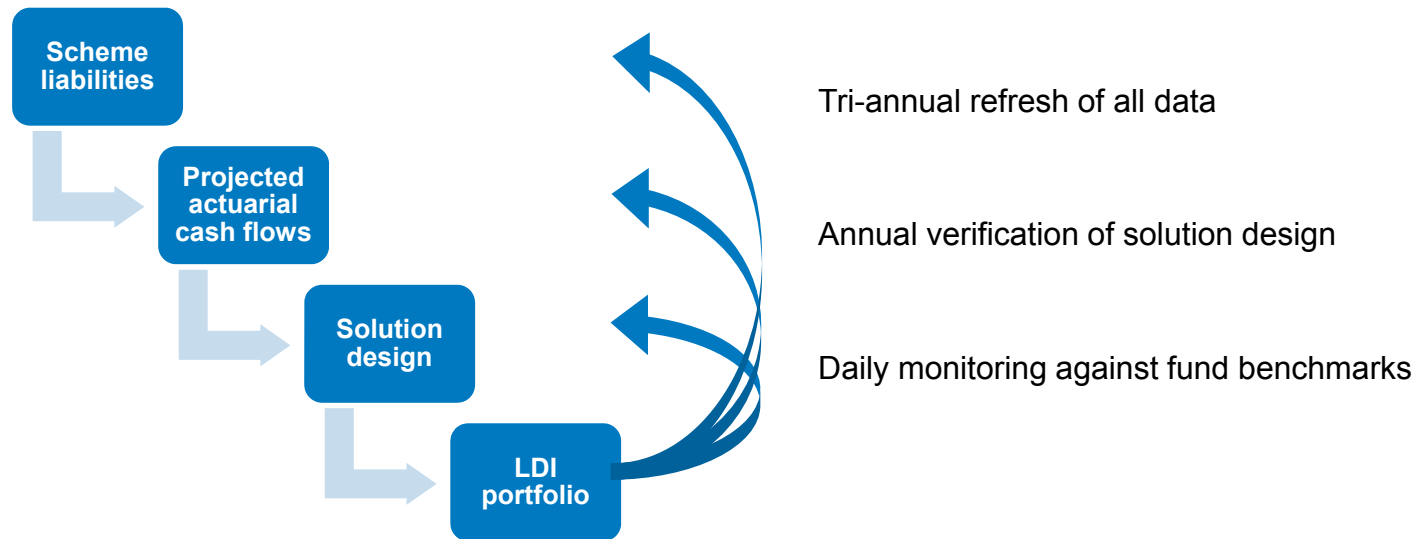


Source: BMO Global Asset Management, Bloomberg as at 02.2018.

**Triggers can be monitored daily, in real time**

# Maintaining the effectiveness of the hedge

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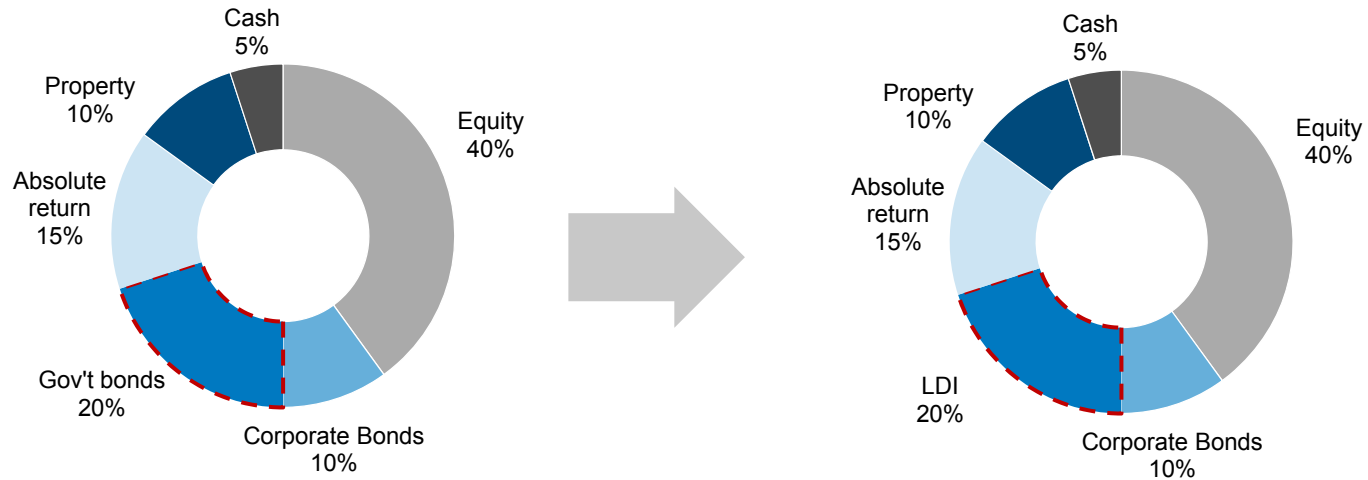


- Hedge design can be reviewed periodically to allow for
  - Market movements
  - Changes in non-LDI assets (e.g. corporate bonds)
  - Changes in underlying scheme liabilities
- Balance between cost and hedge accuracy when determining need to hedge adjustment

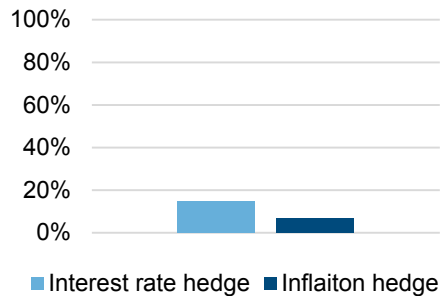


# Funding an allocation to LDI – from government bonds

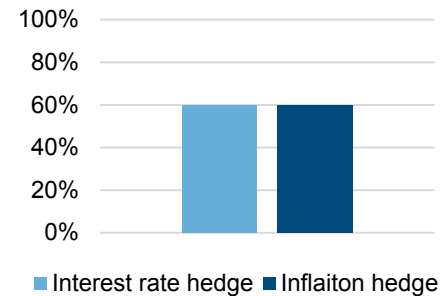
## Asset allocation



## Hedging level

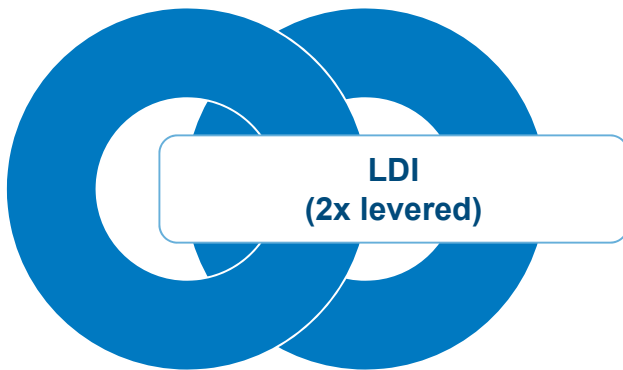


## Hedging level



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

# Funding an allocation to LDI – from equities



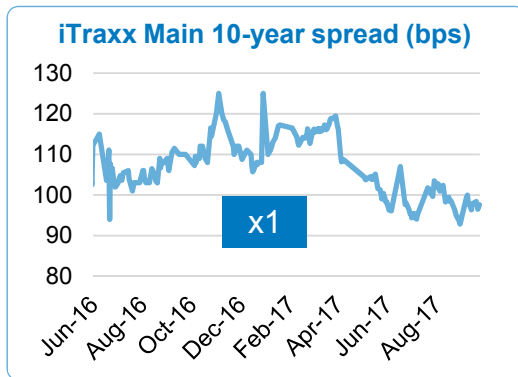
## Example strategy

- €100 invested results in:
  - €200 of liability hedging (Real or Nominal)
  - €100 of equity exposure
- Passive global equity exposure via equity futures
  - 50% S&P 500
  - 20% Eurostoxx 50
  - 15% FTSE 100
  - 10% Topix
  - 2.5% Hang Seng
  - 2.5% ASX 200
- Non-euro currency risk is hedged
- Representative of typical schemes' liability profile
- Allows material increase in hedging whilst retaining exposure to equities
- Can be implemented via pooled funds or segregated/bespoke portfolio

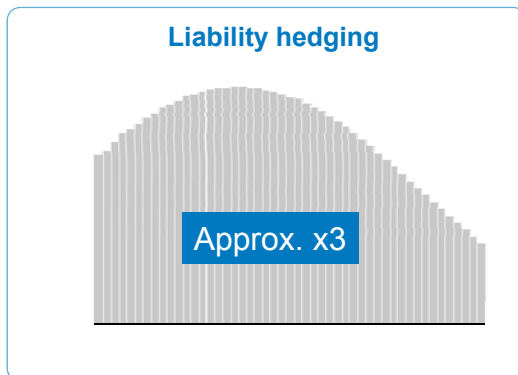
Source: BMO Global Asset Management, for illustration purposes only.

# Funding an allocation to LDI – from corporate bonds

## Example strategy:



+



- €100 invested results in:
  - €300 of liability hedging (real)
  - €100 of credit spread exposure
- Credit spread exposure via CDS
  - 50% iTraxx Main (European IG credit)
  - 50% CDX (US IG credit)
- Non-euro currency risk is hedged
- Diversified exposure across 250 issuers
- Representative of typical schemes' liability profile
- Can be delivered via pooled funds or segregated/bespoke portfolio

Source: BMO Global Asset Management, Bloomberg. IG = Investment Grade; CDS = Credit Default Swap; CDX = Credit Default Swap Index. Charts for illustrative purposes only.

# LDI considerations for an Irish Pension Fund

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## Stabilising the funding ratio

- Key strategic questions:
  - What liabilities?
  - How much to hedge?
- Key implementation questions:
  - Assets to use?
  - What inflation best matches liabilities?
  - When to hedge? e.g. based on affordability
  - Set triggers to automate?

### Ongoing liabilities

- Determined by the Scheme Actuary
- Can be hedged by investing in appropriate bonds and/or swaps

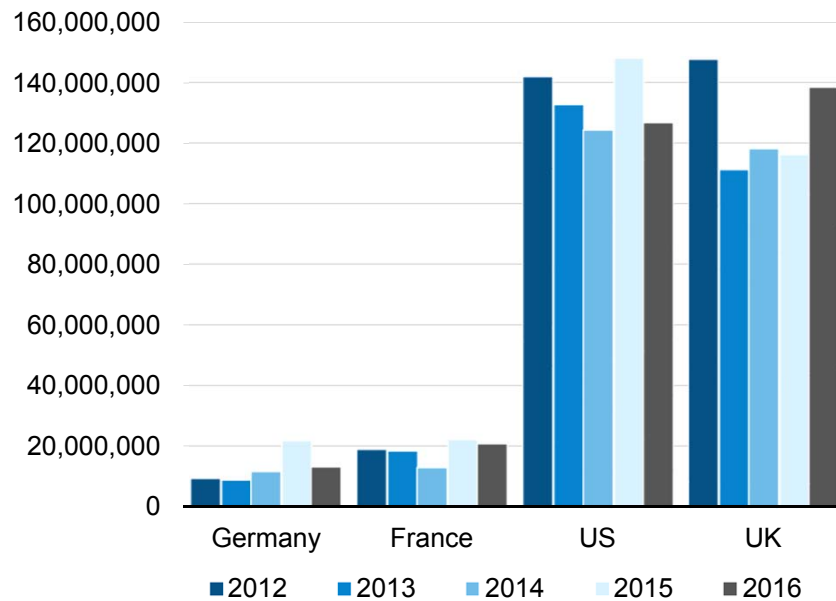
### Funding Standard (MFS)

- Ability to hedge limited to proportion linked to market interest rates
- “Investibility” increases as maturity of scheme increases
- Include Risk Reserve
  - 10% x (MFS liabilities less bond assets and cash) plus
  - Change in value of MFS liabilities less change in value of assets, if a 0.5% fall in interest rates

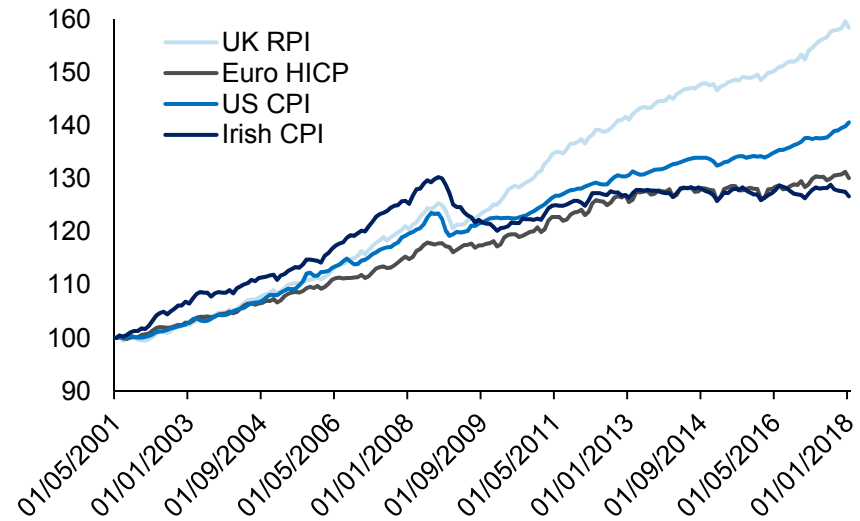
# Hedging inflation

- Scheme liabilities linked to Irish CPI or similar
- Limited market for Irish inflation-linked instruments
- Eurozone inflation (HICPx) is a sensible proxy given common currency

## Gross inflation linked government bond issuance (euro PV01)



## Regional inflation indices (rebased)



## Correlation with Irish CPI since 1 May 2001

	US CPI	UK RPI	Euro HICP
Correlation	92%	87%	92%

Source: Thomson Reuters Eikon, Bloomberg. As at 19.02.2018

# Contact us

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# Q&A

## Considerations when managing liability risks



Simon Bentley  
BMO Global Asset  
Management

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- 26 April IAPF Golf Outing
- 3 May IAPF DC Conference
- 15 May Trustee Training Essentials
- 16 May Evening Seminar *'Defined Benefit De-Risking'*
- 23 May AGM & Evening Seminar

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