**The Actuarial Profession**
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# Funding in a LDI World

## Swaps, cashflows, yield curves…

# Imagine…

- DB Scheme.  At outset  there is a prudent discount rate based on 60% equities and 40% bonds

- Scheme buys inflation and interest rate hedge

- Equities and bonds perform in line with the assumptions

- Inflation/interest rate conditions change.  Hedge is "in the money".

- Derivatives now form 15% of the assets

- What is a prudent return assumption?

# Survey

- How many have clients whose funds include substantial derivatives portfolios?

- How many have given advice on prudent return assumptions in this situation?

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## Lessons learned

## Lessons learned 1

- Simplified approaches can throw up inconsistencies resulting in awkward questions

- Term-dependent assumptions for discount rates, pension increases etc are likely to reduce the likelihood of funding numbers contradicting investment information

- Hard to check valuations using term-dependent assumptions:
  - Easier to spot anomalies in graphs of the curves rather than in tables of numbers
  - Always worth checking that the forward rates look sensible

## Lessons learned 2

Liability valuation needs to be compatible with asset valuation...

- Assuming LIBOR returns on "buy and hold" portfolios of vanilla inflation and interest rate swaps may be, at best, a "best estimate"

- A different approach could be justifiable for tactical holdings of swaps

- Care is required in deciding what is "prudent" when swaps holdings have negative value

## Lessons learned 3

- Remember the curves are not uniquely defined
- Prefer ALM but consider suitability of the model for this purpose
- Scenario testing is useful - especially with asset swaps

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## Explanations

# Interest rate swaps

- Scheme receives fixed payments and pays LIBOR (similar to short-term deposit rate)
- Increases interest-rate sensitivity of the assets to reflect typically longer duration of the liabilities
- Changes the return distribution (even if MV = 0)
- Impact on return distribution depends on the correlation between returns on backing assets and LIBOR

# Modelling interest rate swaps

- If backing assets are largely return-seeking, may be possible to ignore swaps at outset because correlation with LIBOR is immaterial

- …but not once MV of swaps is material

- Ideally, use full ALM but only if model is suitable for this purpose

- Simpler alternative is to use asset model with a liability proxy modelling swaps as gilts less cash – difficult if swaps are not an exact match to the liabilities

# Is the asset model fit for this purpose?

- Is it a long-term model?

- To what period has it been calibrated?

- What are its term dependent features?
    - Inflation
    - Volatilities
    - Nominal yields
    - Credit spreads
    - Z spread

- Are bond returns representative of "standard" bond indices. How do these compare to your bond portfolio?

- Is the cash return based on LIBOR (or, for example, short-dated government securities

# Interest rate swaps – practical issues

- Doesn't fit easily with dual discount rate approach.  Not easy to determine what are the backing assets
- Frequently there is a wide spread of swaps with different durations, making the modelling more complex

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## Background information

# Interest rate swaps overlaying other assets

- A scheme may choose to hold non-cash assets even if it has interest rate swaps

- A common approach is to hold corporate bonds and use interest rate swaps to hedge out the duration mismatch between assets (short) and liabilities (long)

- In practice, pairs of interest rate swaps may be used:
  - One to swap the (short) duration of the bond payments to LIBOR
  - One to swap the LIBOR back out to the (long) duration of the benefit outgo