Intelligent Solutions for the Risk Management Challenges Facing UK Pension Schemes: a case study

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This training material is intended only for investment professionals. The content is provided for information purposes and should not be viewed as being investment, legal, regulatory or tax advice.
Agenda

- Why are most DB schemes underfunded?
- What is LDI and why is it imperative?
- The practicalities, risks and investment governance challenges of:
  - implementing a dynamic de-risking programme, and
  - responding to changes in economic and market conditions
    - exploiting relative value opportunities
    - using alternative matching assets/de-risking tools, and
    - employing illiquid LDI and illiquid credit
- Actively managing and monitoring key risks and opportunities
- Moving towards a terminal portfolio
A typical position

Illustrative example
ASPS’ assets and liabilities March 2008 … an unmatched asset/liability position …

Assets £7.0bn

Liabilities (gilts flat) £10.5bn

Asset duration = 13 years

Liability duration = 22 years
... which had resulted in the Scheme being exposed to significant interest rate risk
“Please Sir, may I have some more cash?”
So what were the ASPS trustees to do?

- Adopt Liability Driven Investment (LDI)!
- LDI is not a new idea and the philosophy underpinning LDI is quite simply:
  "the assets are there to fund future liabilities, therefore the assets should be managed so that they perform in such a way as to minimise the likelihood that the liabilities will not be met."
- Design an asset portfolio with the liabilities as the benchmark
LDI has risk management at its core

<table>
<thead>
<tr>
<th>Long-run un(der)rewarded risks</th>
<th>Long-run potentially rewarded risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest rates</td>
<td>Market beta</td>
</tr>
<tr>
<td>Inflation</td>
<td>Risk premia</td>
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<tr>
<td>Longevity</td>
<td>Alpha</td>
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</tbody>
</table>
March 2008…
A concentration of un(der)rewarded risk …

ASPS Value at Risk (VaR) ex-longevity risk, March 2008
... with the **VaR Walk** showing that removing potentially rewarded equity risk would have little effect on *VaR* (but significant impact on *E(R))*...

Selling equities reduces *VaR* but also reduces expected returns.

<table>
<thead>
<tr>
<th>Hedging level</th>
<th>50%</th>
<th>40%</th>
<th>30%</th>
<th>20%</th>
<th>10%</th>
<th>0%</th>
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<tr>
<td>0%</td>
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<tr>
<td>80%</td>
<td>9%</td>
<td>8%</td>
<td>7%</td>
<td>6%</td>
<td>6%</td>
<td>5%</td>
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<tr>
<td>100%</td>
<td>6%</td>
<td>5%</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Hedging unrewarded risk reduces *VaR* without materially affecting expected returns.
... and **stress testing** further confirming where the risks lay.
...with PV01/IE01 analysis further highlighting the Scheme’s exposure to adverse movements in interest rates and inflation...
Time was of the essence as market conditions were continuing to look unfavourable … (and so it proved)
Decision time: March 2008

• VaR to be reduced by 30% by hedging 35% of interest rate PV01 and inflation IE01 by June 2009 … but how?
• Education, infrastructure, instruments and governance issues …
De-risking: a seven stage process

1. Appoint LDI Consultant
2. Conduct scheme risk analysis
3. Appoint LDI Asset Manager
4. Set up De-risking Working Party
5. Pre-execution – setting up the infrastructure
6. Execution/implementation
7. Post-execution – active management, monitoring, seeking out new opportunities
Amongst other criteria, negative z-spreads favoured swaps

Source: Redington
Stage 5. Setting up the pre-execution infrastructure

- DWP and Pension Scheme Manager worked with Scheme Lawyers, LDI Consultant and LDI Asset Manager in:
  - amending the Scheme Statement of Investment Principles (SIP)
  - setting up a panel of competing investment banks
  - outlining the execution framework to the banks
  - setting up the ISDA counterparty documentation
  - setting up the collateral agreements
  - appointing a Calculation Agent
  - ensuring valuation/accounting/reporting/compliance in place
Stage 6. Execution/implementation

LDI Consultant’s established network of contacts provided direct access to deal flows, with deals being prioritised

Supply ‘axes’

De-risking objectives and timing

Communication and decision making

LDI Asset Manager’s in-depth market knowledge, scale and presence enabled strong negotiating position

Investment bank trading desks

Implementation partners

Trustee Board

Investment committee

De-risking Working Party Sponsor Pension Scheme Manager

Trade negotiation
Exploiting relative value opportunities

Proposed Hedging Profile: pro-rata allocation

Actual Hedging Profile: concentrated in 10-30 year buckets

Proposed Hedging Profile: pro-rata allocation

Actual Hedging Profile: concentrated in 50 year bucket

Source: Redington
Responding to changes in market conditions

Index-linked gilt yield vs. Swap Real Yield

Source: Redington, Bloomberg
By June 2009… Significant risk reduction benefits achieved with substantial cost savings

- Programme completed in 12 months
- Programme was completed on time despite unprecedented market conditions
- VaR reduced by 30%
- Scheme sensitivity to interest rate and inflation risk was cut by 35%, reducing VaR by 30%
- Cost savings in excess of £10m
- Best execution and advanced governance resulted in £10m+ cost savings compared with budgeted transactions costs
June 2009… Mitigating un(der)rewarded risk reduced the VaR to a more palatable number.

**ASPS VaR ex-longevity risk, June 2009.** VaR includes basis risk within interest rates and zero floor risk within inflation.
Stage 7. (in part) …Now time to move to Phase 2 of the de-risking programme …and seek out new opportunities given the continued decline in real yields…
Responding to changes in market conditions…

• Since 2010 ASPS has sought complementary (and more governance intensive) matching assets/de-risking tools:
  
  • Illiquid LDI
  • Illiquid credit
  • Other de-risking tools

  … ever mindful of the Scheme’s illiquidity budget and liquidity premia
... doesn’t have to mean trading return for risk

\[ E(R) \text{ over gilts} \]

\[ \text{Risk} = \frac{\text{FRaR}}{\text{VaR95}} \]
Illiquid LDI: characteristics

**Matching characteristics**
Long-term nature of asset cashflows provides duration to match liabilities. Inflation-linked cashflows provide a hedge against pension increases.

**Security of income**
Typically security is provided by physical assets and investment grade/government covenant.

**Enhanced return**
Enhanced income return due to illiquidity premium and underdevelopment of the market. Additionally returns may provide diversification benefits.
Illiquid LDI: typical assets

- Long-lease commercial real estate;
- Ground rents;
- Social housing;
- University accommodation;
- Solar panels, and
- Senior infrastructure debt
Illiquid credit: typical assets

- High yield
- Leveraged loans
- Asset and Mortgage Backed Securities
- Commercial mortgages
- Private lending
Other de-risking tools

• Gilt TRS
• Gilt repos
• Interest rate swaptions
Like Oliver, ASPS heading towards a happier ending despite the headwinds …
In countering the headwinds the Funding Ratio has steadily improved…
...as has the VaR attribution...given a hedge ratio equal to the funding ratio

ASPS VaR attribution March 2013. VaR excludes longevity risk but includes basis risk within interest rates and zero floor risk within inflation.
...and the ability to withstand stressed scenarios...

... given a progressively more liability focused and robust asset allocation as the required return fell.
# Heading towards a happier ending despite the headwinds... a summary

<table>
<thead>
<tr>
<th></th>
<th>31 March 2008</th>
<th>31 March 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding ratio (gilts flat)</td>
<td>66%</td>
<td>77%↑</td>
</tr>
<tr>
<td>PPF index funding ratio (s.179)</td>
<td>98.7%</td>
<td>82.6%↓</td>
</tr>
<tr>
<td>VaR95</td>
<td>25%</td>
<td>9.6%↓</td>
</tr>
<tr>
<td>Interest rates PV01</td>
<td>£16.9m</td>
<td>£8.6m↓</td>
</tr>
<tr>
<td>Inflation IE01</td>
<td>£17.1m</td>
<td>£7.0m↓</td>
</tr>
<tr>
<td>Stress tests – equities/interest rates/inflation/credit</td>
<td>n/a</td>
<td>n/a↓</td>
</tr>
<tr>
<td>30 year nominal swaps yield</td>
<td>4.60%</td>
<td>3.00%↓</td>
</tr>
<tr>
<td>30 year breakeven inflation</td>
<td>3.63%</td>
<td>3.73%↑</td>
</tr>
<tr>
<td>15 year ILG yield</td>
<td>1.1%</td>
<td>-0.87%↓</td>
</tr>
<tr>
<td>FTSE 100</td>
<td>5,702</td>
<td>6,412↑</td>
</tr>
<tr>
<td>Aviva credit rating, CDS spread, share price ≈ sponsor covenant</td>
<td>n/a</td>
<td>n/a↓</td>
</tr>
</tbody>
</table>

Note: all ASPS and Aviva metrics have further improved since 31 March 2013.
... though there’s still a need to actively...

• improve investment governance
• monitor, manage, value and stress test swaps, collateral positions, illiquid LDI and illiquid credit
• monitor and evaluate counterparty banks
• re-coupon *in-the-money* swaps
• manage de-risking programme in line with funding ratio
• look for new relative value and de-risking opportunities
• consider actions resulting from EMIR
• monitor and manage longevity risk (despite the recent longevity swap), basis risk and zero floor risk…
... and ultimately work towards constructing the buyout or terminal portfolio...
Thank you