



STATE STREET GLOBAL ADVISORS | SSGA®



Liability Driven Investing

Top down or Bottom up

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Agenda

- An Evolutionary Environment
- Liabilities – Identifying the Real Risks
- Implementation Case Studies and 3 different Solutions



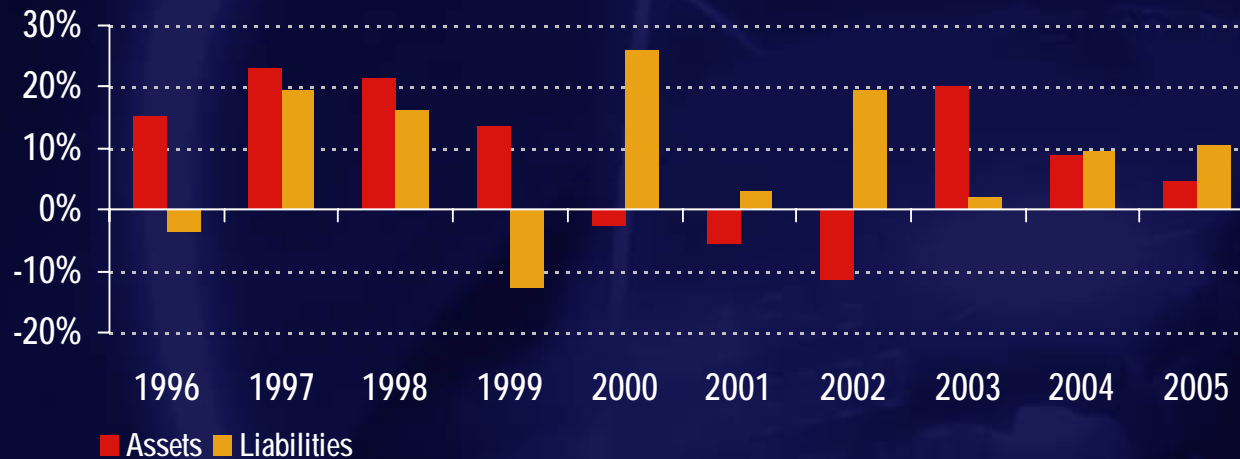
An Evolutionary Environment

Modern Portfolio Theory?



Pension Environment

Assets and liability mismatch caused funding problem – hidden risks



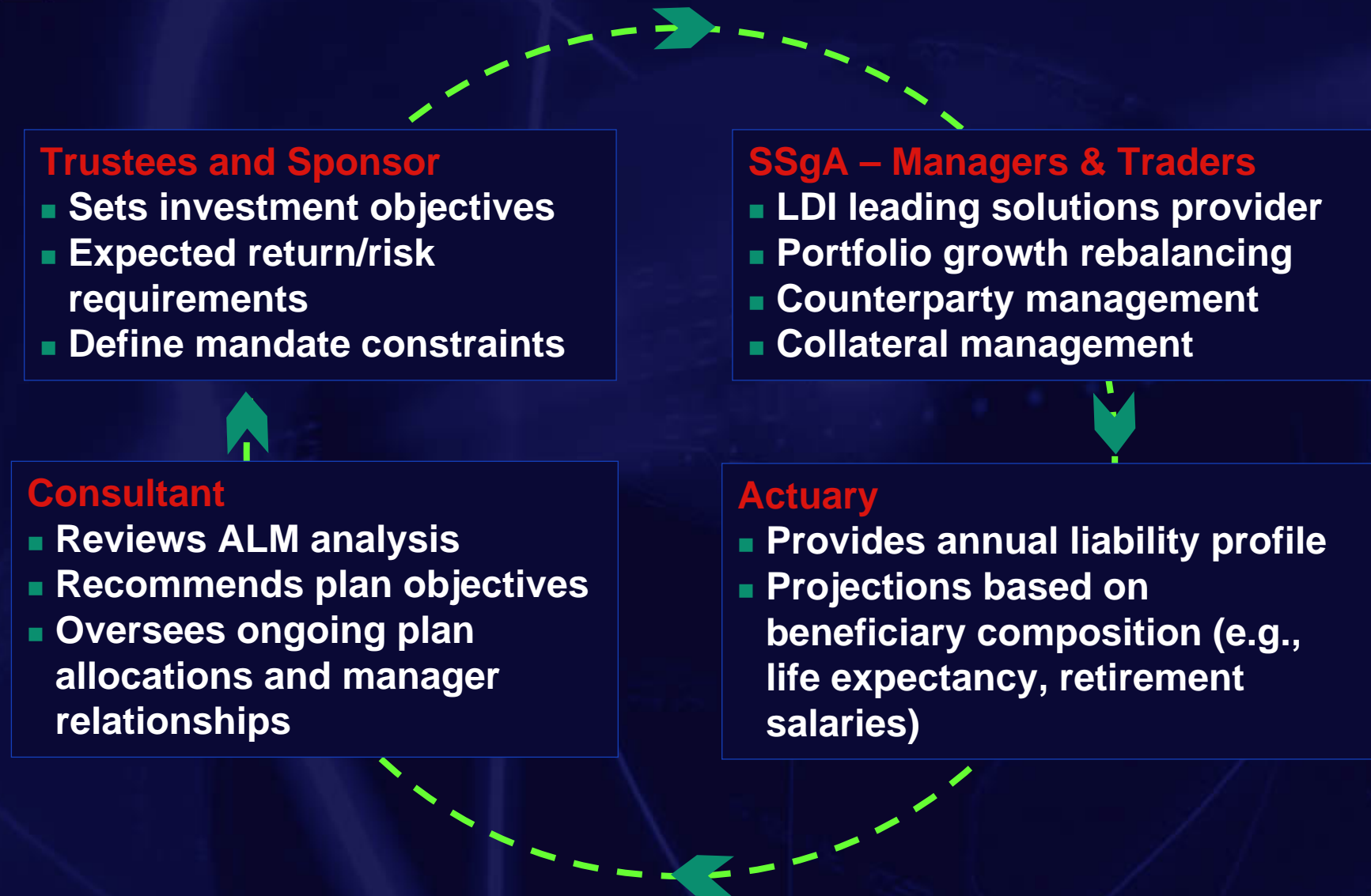
Liability Risk
2007

Benchmarks
1990s



Peer Groups
1980s

Implementation - The Elements Of Partnership



LDI vs. Conventional Investing

| | LDI | Conventional |
|------------------|--|--|
| Focus | Paying pensions | Relative performance |
| Benchmark | Liabilities | Market or other indices |
| Horizon | 50 years plus | Uncertain |
| Assets | Equities, bonds, alternatives, property etc., PLUS hedging swaps | Equities, bonds, alternatives, property etc. |
| Risk | Top down Helicopter View | Bottom up Hidden risks |



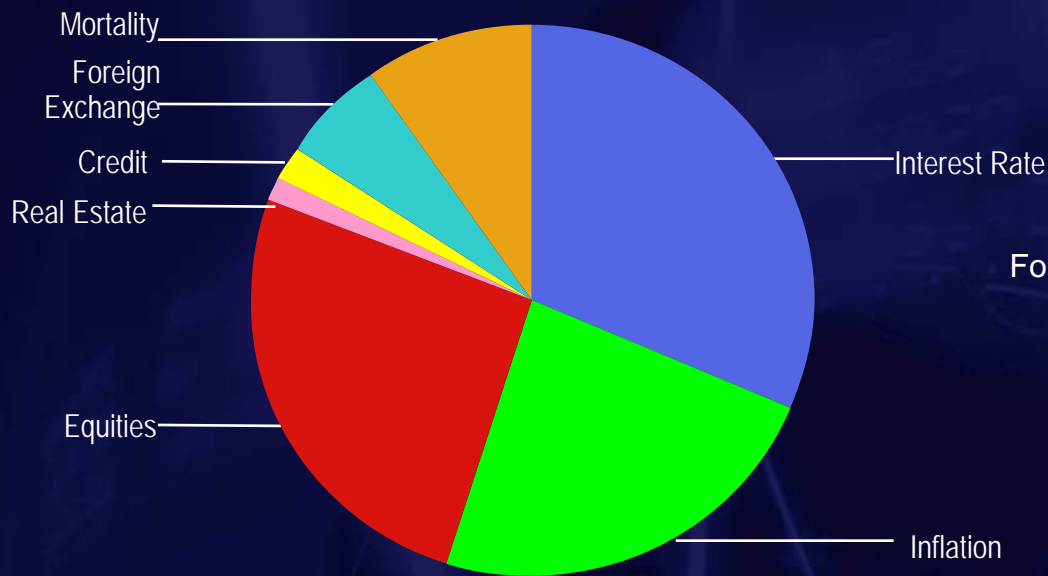
Liabilities - What are the Real Risks?



A Helicopter Perspective

Absolute Risk

Risk Attribution



Absolute Risk

% Fall in Funding Level Under Stress Scenarios



Top Down Risk Assessment Framework



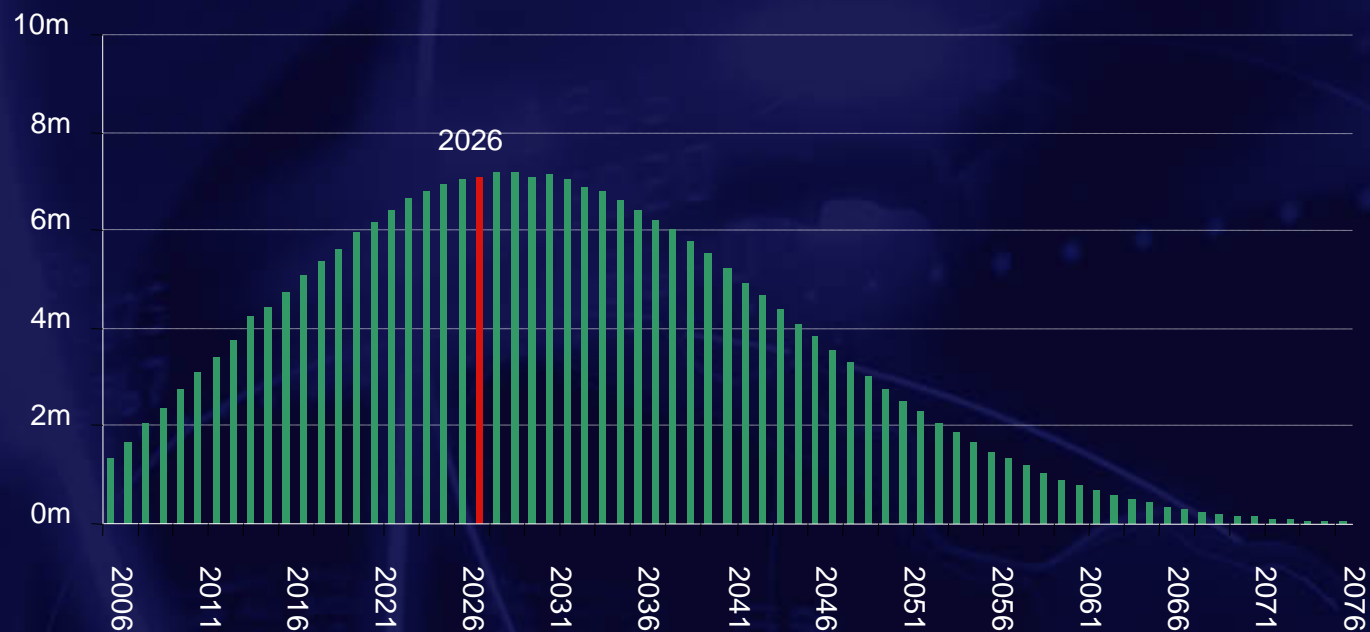
100m Of Liability Cash Flows At Market Rates

1
Pension
Promise

Liabilities Today
Value of 100m

Scheme Duration
19 Years

Liability Type
LPI(0-5%) Liabilities



Actuarial projected cash flows become the benchmark to beat

Funding Level Sensitivity

Liabilities are bond-like in nature

2
Funding
Level



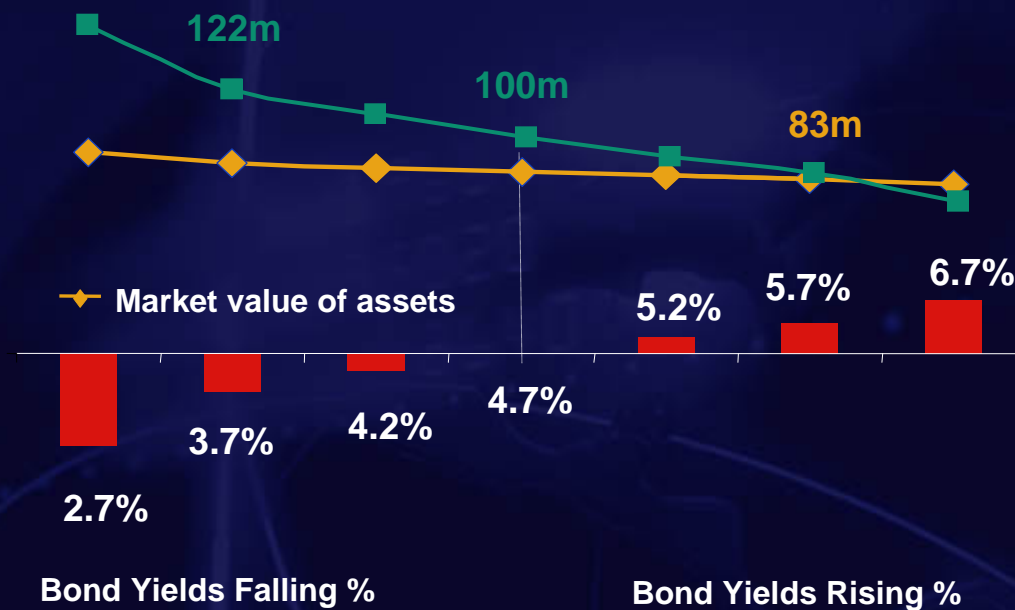
■ 1% change in yields means we can expect the liabilities to fall by 17m or rise by 22m

Sensitivity Of Asset Mix To Changing Bond Yields



Difference between assets & liabilities

3
Asset vs.
Liability Risk

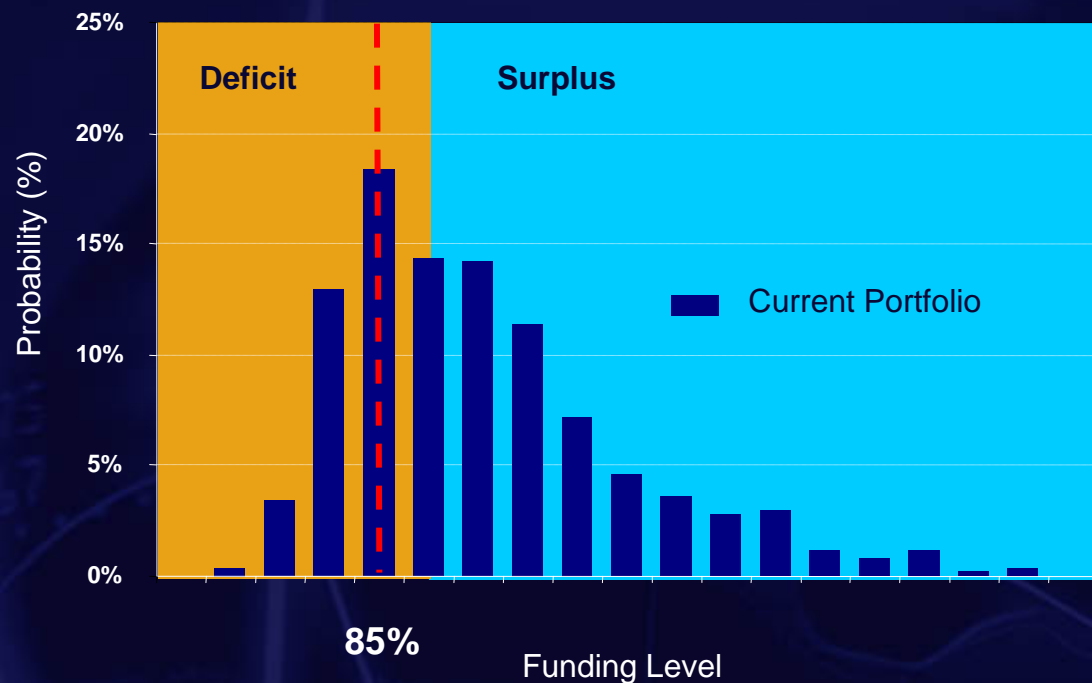


■ Changes in bond yields of $\pm 1\%$ alters the funding ratio either up to 98% or down to 73%

Sponsor Covenants

What is likely to happen?

Probability of deficit or surplus after 10 years

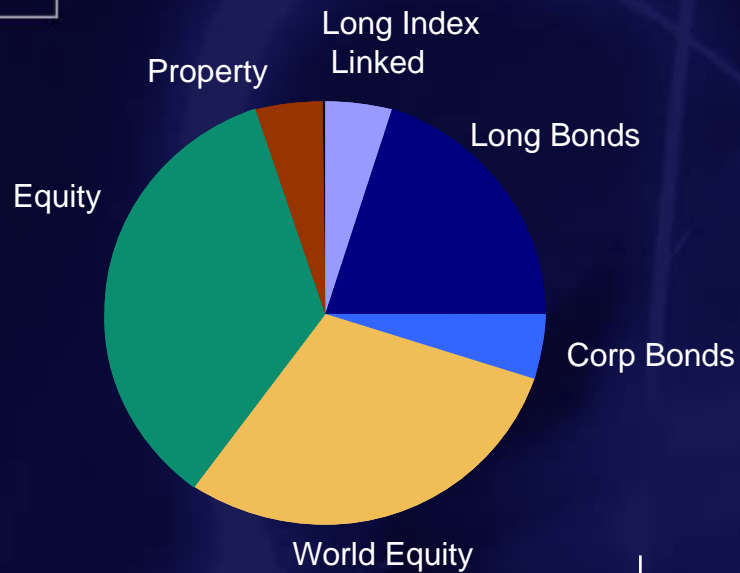


4
Sponsor
Covenants

- The sponsor can expect a 1 in 3 chance that the scheme will still be in deficit

Ability To Pay

Likelihood of meeting pension fund liabilities

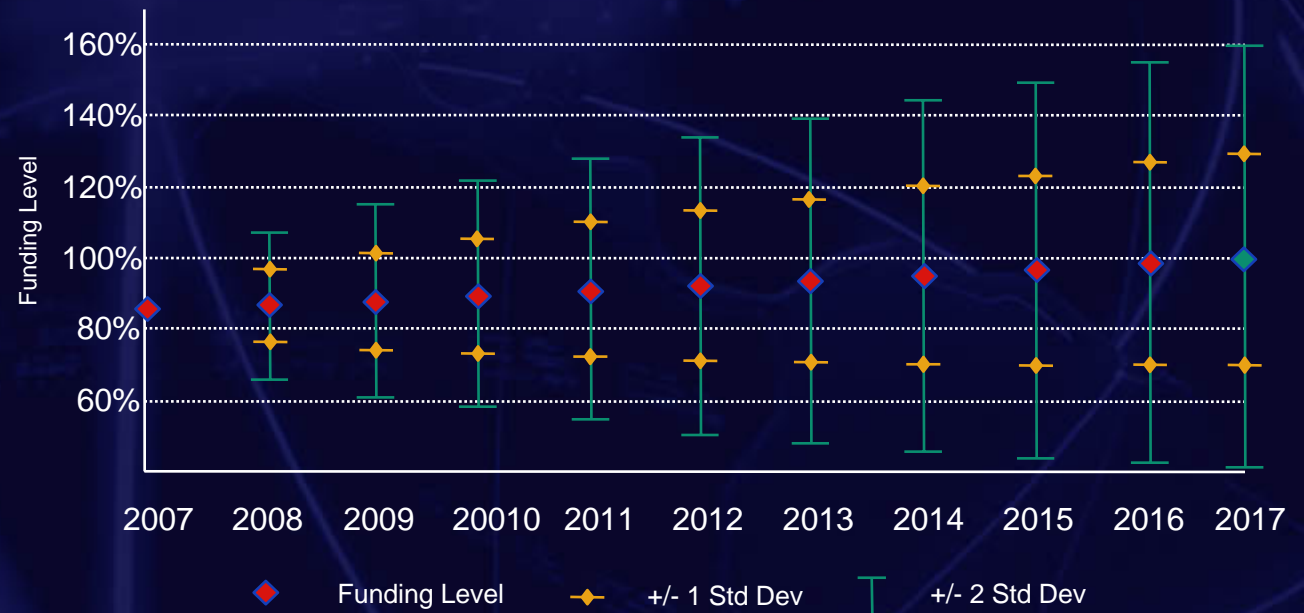


Conventional Today

LDI Portfolio

| | | |
|-------------|-------------------------|-------------|
| 1.5% | Return over Liabilities | 2.0% |
| 9.3% | Tracking Error | 4.0% |
| 0.16 | Efficiency Score | 0.50 |

5
Ability to
Pay



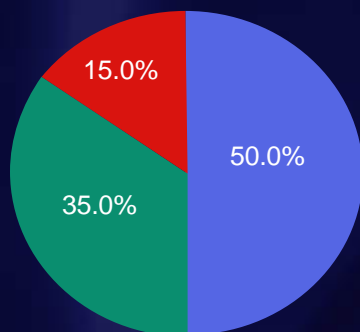
Combining Pooled Swaps And Alternatives



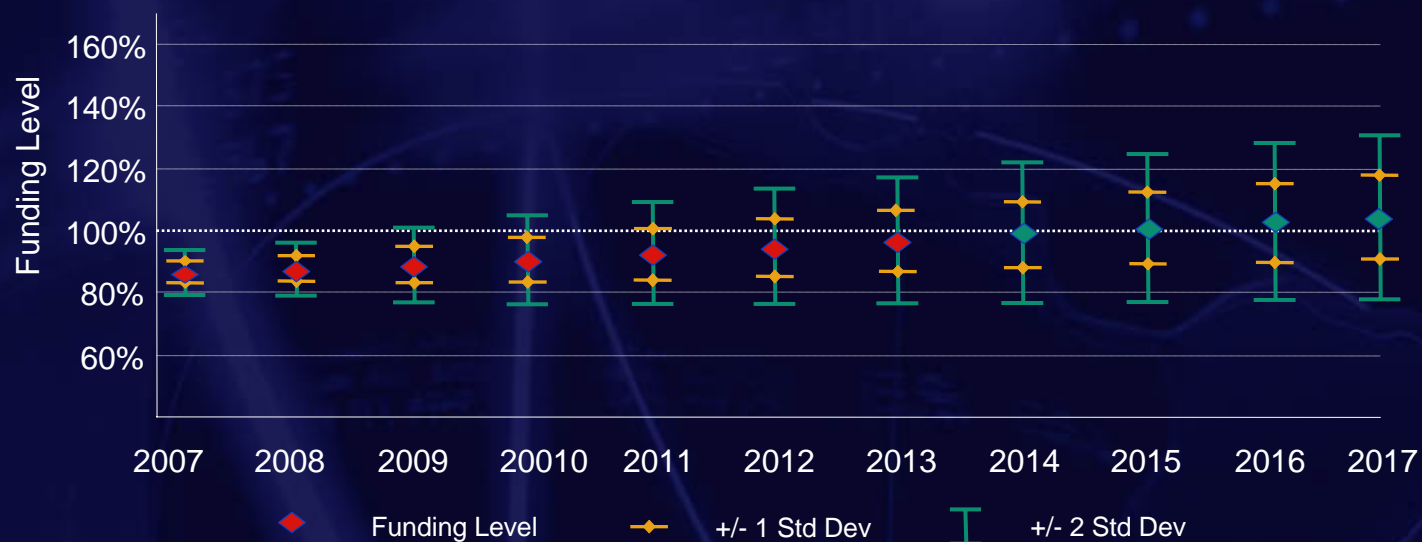
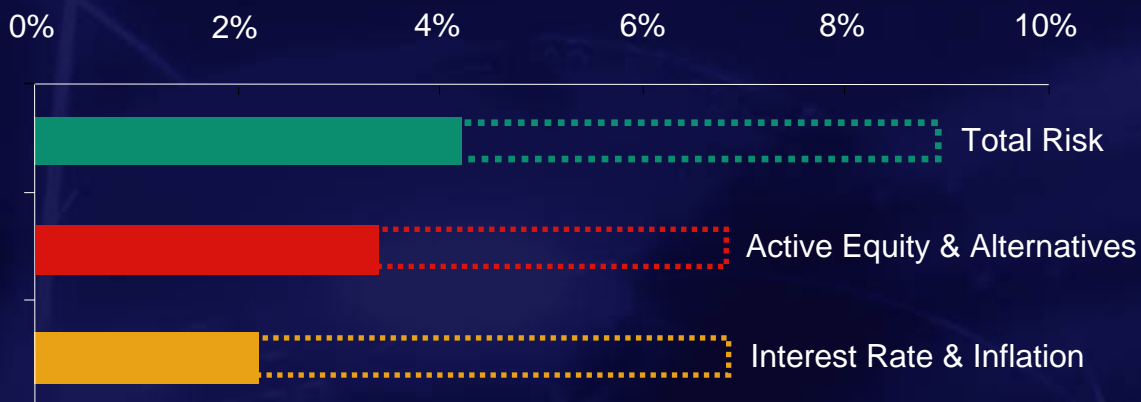
Multi Strategy
Hedge Fund

LPI(0.5) PALMS

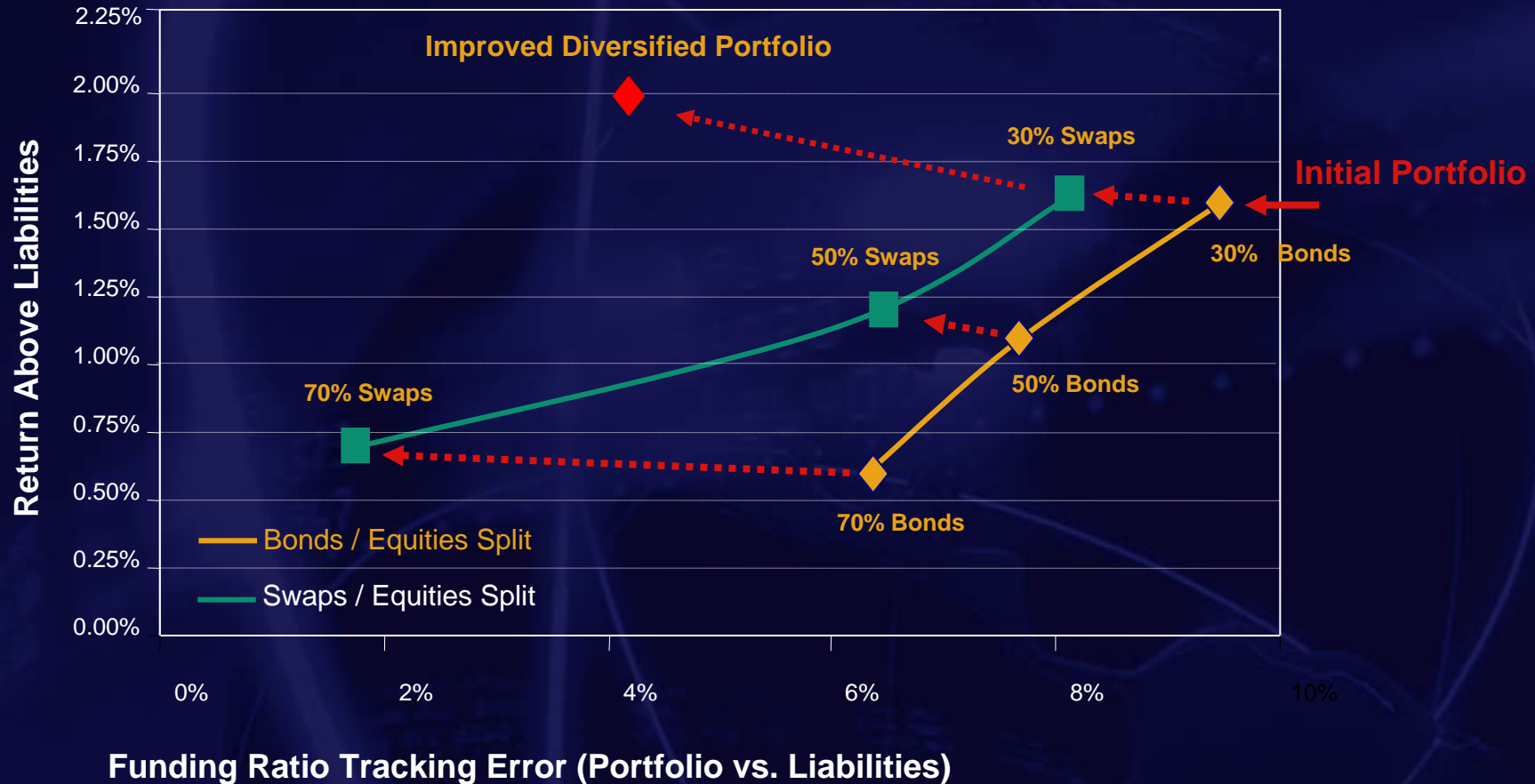
Active
Equity



Contribution To Funding Risk p.a.



Combining Alternatives With Less Concentrated Equity Beta

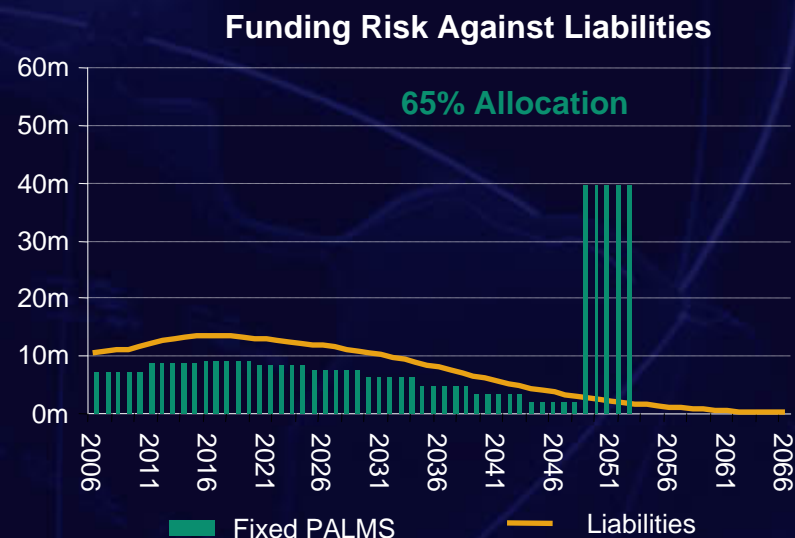
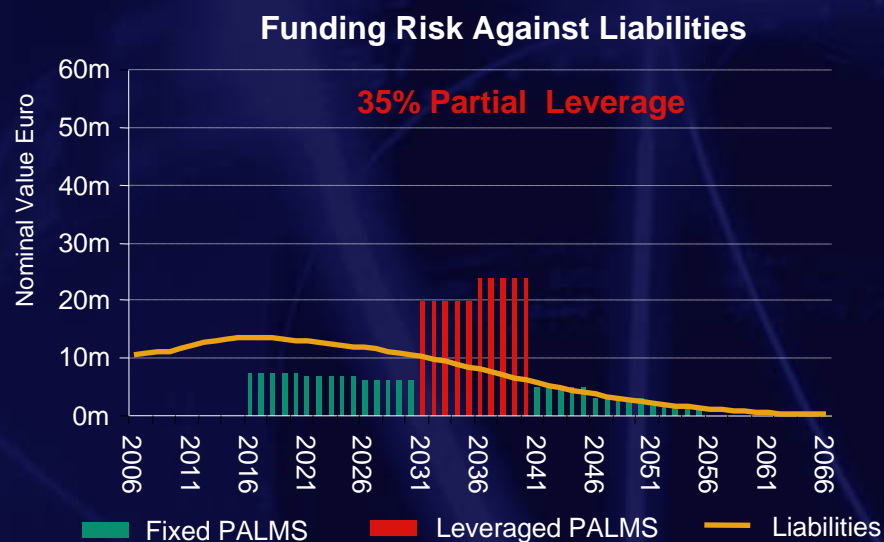
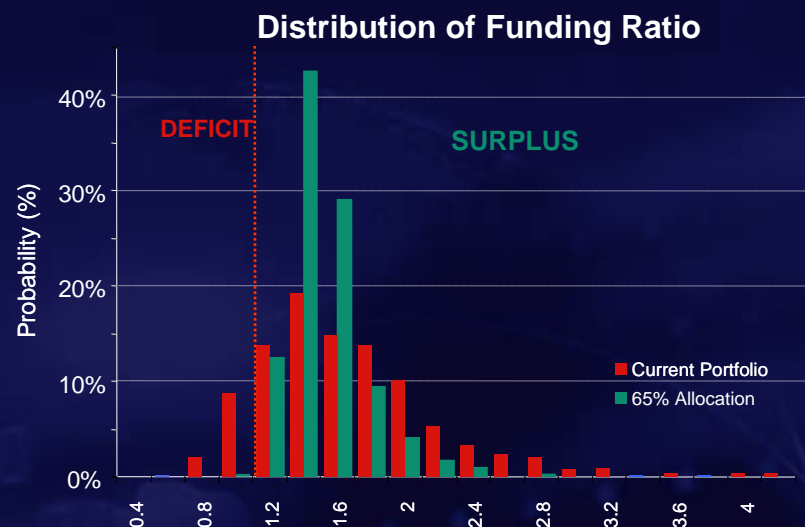




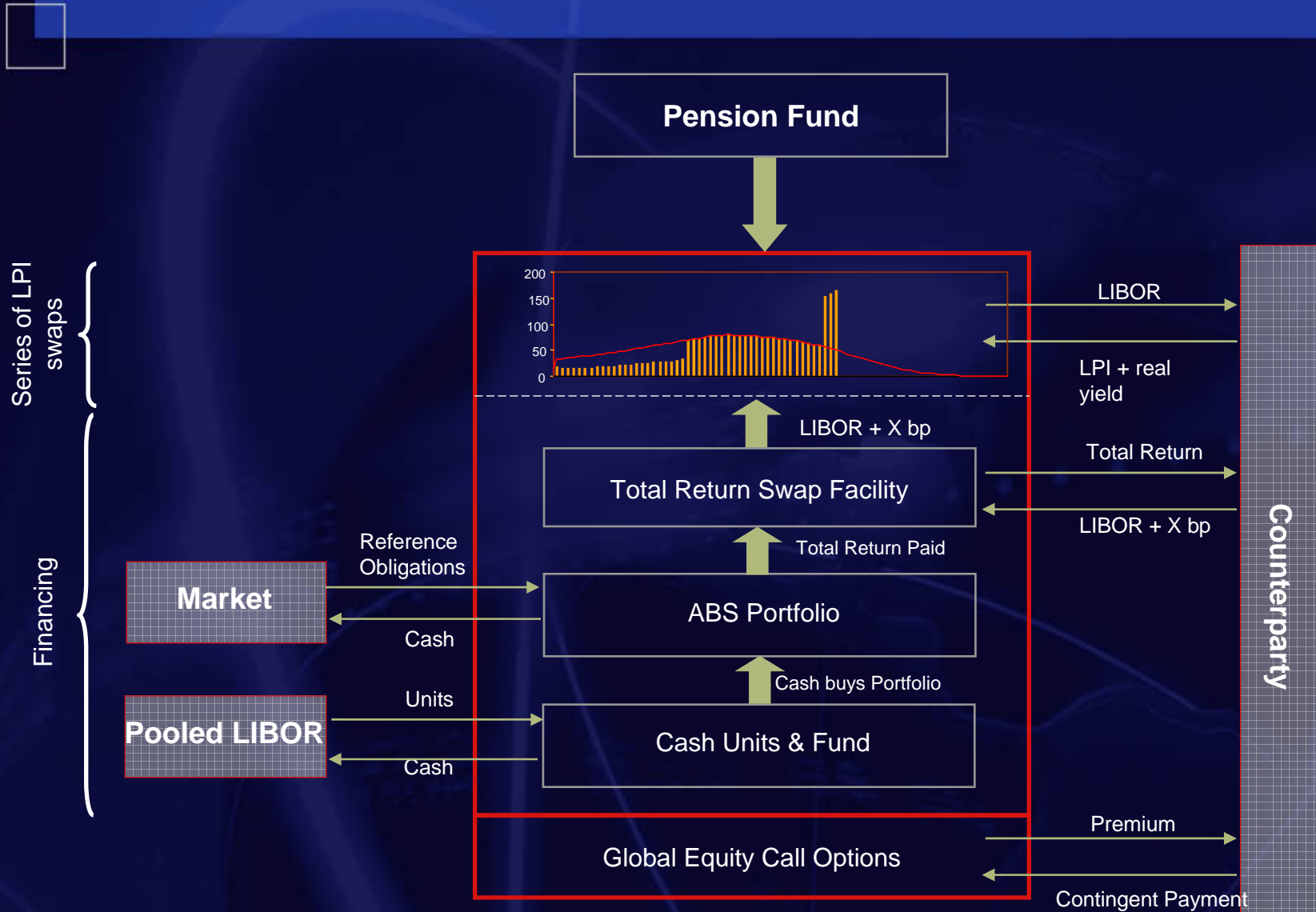
Case Studies



Example 1: Building A Surplus Funding Position



Example 2: Structured LDI Solution



Example 3: Structured Open Architecture

Current Structure
Total Scheme 70/30

SSgA MPF Pooled Bond Funds

Index linked

Gilts

SSgA MPF Pooled Equity Funds

UK Equity

Europe ex UK

Pacific Equity

Pacific ex Japan

Manager 2

Manager 3

Manager 4

Manager 5

Exposure Fund
Total Scheme 60/40

Exposure Hedging Swap



Swap Collateral - Gilts

Hedging Equity Futures
Basket
to 60/40 position

Futures Cash Margin

**Flexibility to incorporate
other Managers**

Conclusion

- **Understanding multi-dimensional risk means schemes are now adopting their liabilities or using proxy benchmarks**
- **Swaps and alternatives clearly provide useful diversification benefits**
- **Pension schemes have very different requirements and solutions**

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Thank You