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Longevity risk, LDI and holistic management of DB pension plans

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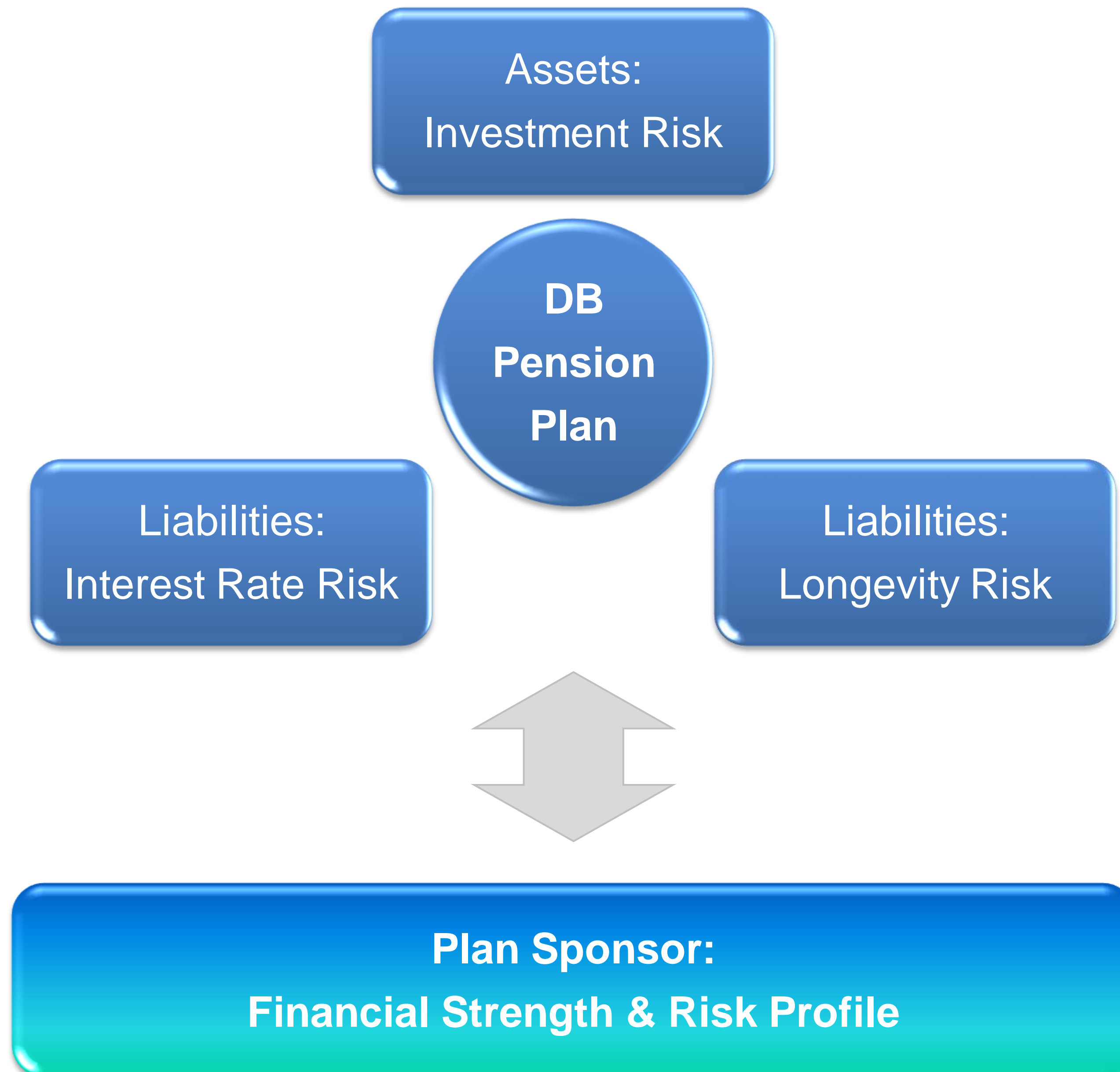
Overview

- The management of longevity risk in defined benefit pension plans should not be pursued in isolation

- To fulfil their duty to beneficiaries in an optimal way, pension plan fiduciaries/trustees should consider the plan holistically:
  - Take account of the plan sponsor
  - Consider the assets and liabilities in an integrated fashion

- Strategies based on LDI (Liability Driven Investment) will be suboptimal if interest rate (including inflation) risk is hedged without considering longevity risk

Longevity risk in DB pension plans cannot be managed in isolation



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Pension plan fiduciaries/trustees must understand the sponsor's financial strength, risk profile and interdependencies

- **Beneficiaries** rely on the sponsor to fund the plan
  - Without funding, their retirement income is at risk
  - Since over the long term, even strong sponsors can become insolvent

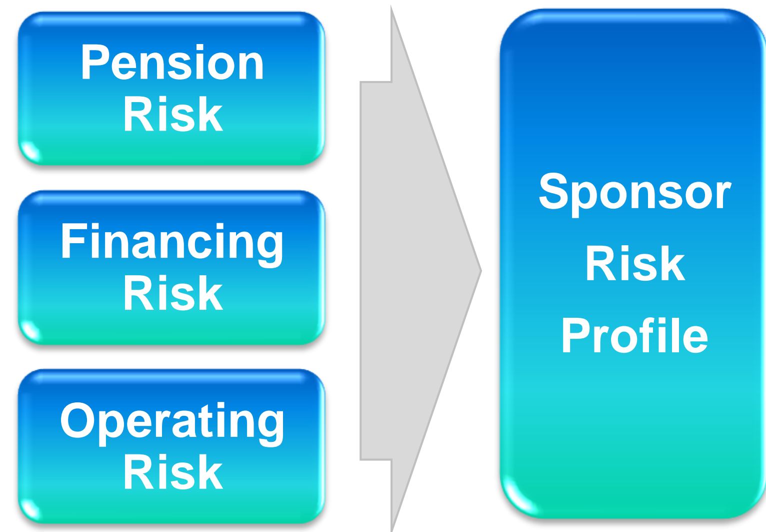
- **The sponsor** relies on the pension plan fiduciaries/trustees to manage the plan in an efficient and economically sound way
  - Without this, the sponsor faces large contingent calls on its cash flow
  - Large, avoidable contingent calls on cash flow, can place a strain on the sponsor, restrict its long-term sustainability and ultimately lead to insolvency

Pension plan and sponsor have a symbiotic relationship

Pensions can have a significant impact on the sponsor in several ways

Pensions impact the sponsor's…

- **Risk profile**
  - Can consume "risk budget" and cash flow
- **Creditworthiness**
  - Credit ratings / borrowing costs
- **Capital structure**
  - Can change financial leverage
- **Valuation**
  - Deficits are subtracted and surpluses are ignored



This needs be understood before addressing longevity hedging and pension risk management in general

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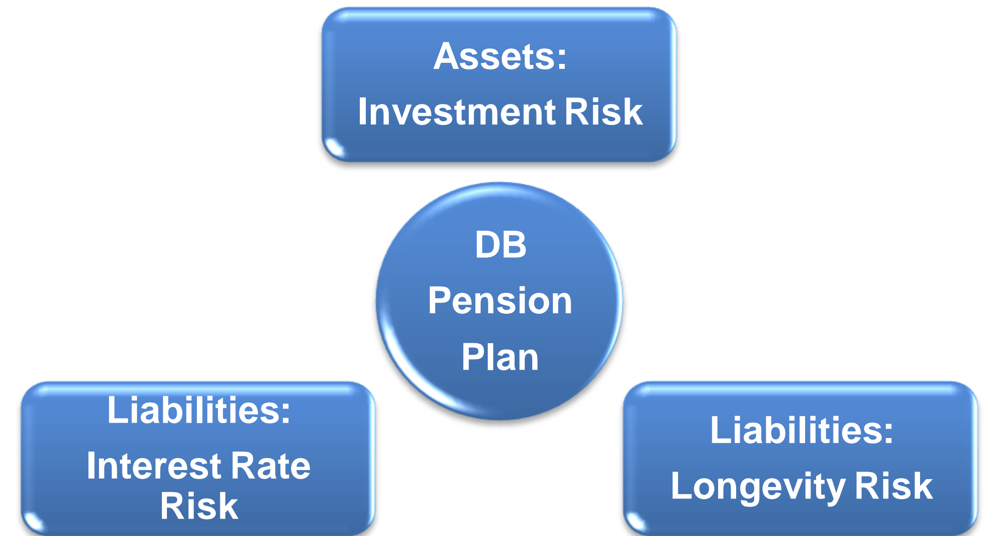
As well as being sponsor-aware, the pension plan needs to be managed on an asset-liability basis

- Integrated perspective on risk
- Coordinated decisions on
  - Asset allocation
  - Liability interest rate hedging
  - Liability longevity hedging



- Lack of integrated and coordinated approach can lead to:
  - Risk profile that is not optimal
  - Overall returns that are not optimal
  - Ineffective hedging

The end-game alternatives for defined benefit pension plans

Transfer
- Execute a pension buyout or termination with an insurer
- Sell the longevity risk along with everything else

Keep
- Commit to maintaining the plan for the long term
- Manage the longevity risk along with the other risks

- Both require taking an "economic" view of the plan, because
  - Insurer will take this view for buyout / termination
  - A long-term commitment to keep the plan necessitates a long-term perspective on performance and risk, and over the long run only the economics matter

This means measuring the pension liability in economic terms

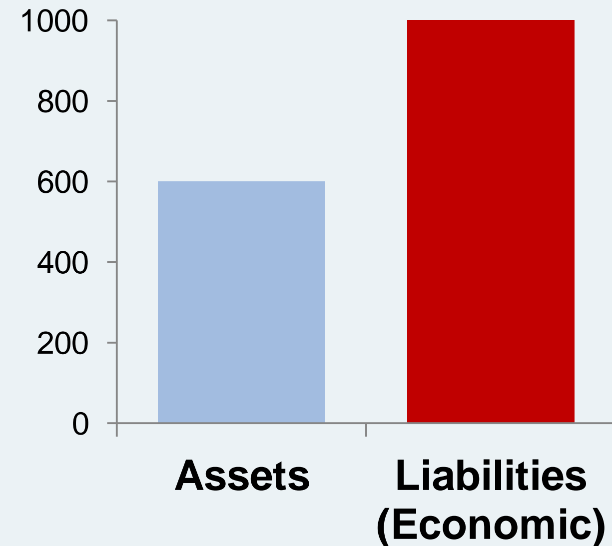
- The economic liability involves using
  - **Swap yield curve to discount liability cash flows**
    - This should be the primary measure of the liability for strategic decision making
    - Monitor other liability metrics, e.g., accounting and regulatory liabilities
  - **Realistic mortality / longevity assumptions**
    - Current mortality table must be up to date
    - Future mortality projections must reflect the latest data and models
      - Future mortality “improvements”

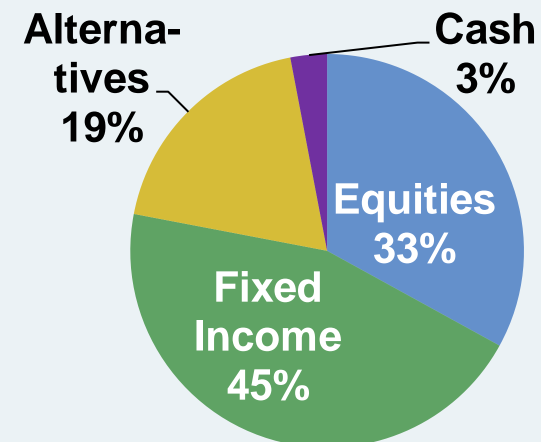
Whether managing for the long-term or managing towards buyout / termination, focus on the economic liability

Practical illustration: Case study

- **Corporate DB pension plan**
  - Paying <u>fixed</u> benefits from retirement at age 65 for life (no inflation or COLA* linkage)
  - 60% funded on economic basis
- Plan has already begun de-risking:
  - Reduced equity exposure
  - Hedged liability interest rate risk (partly)
  - Has <u>not</u> hedged longevity risk

Pension plan balance sheet ($ million)





* COLA refers to a cost of living adjustment

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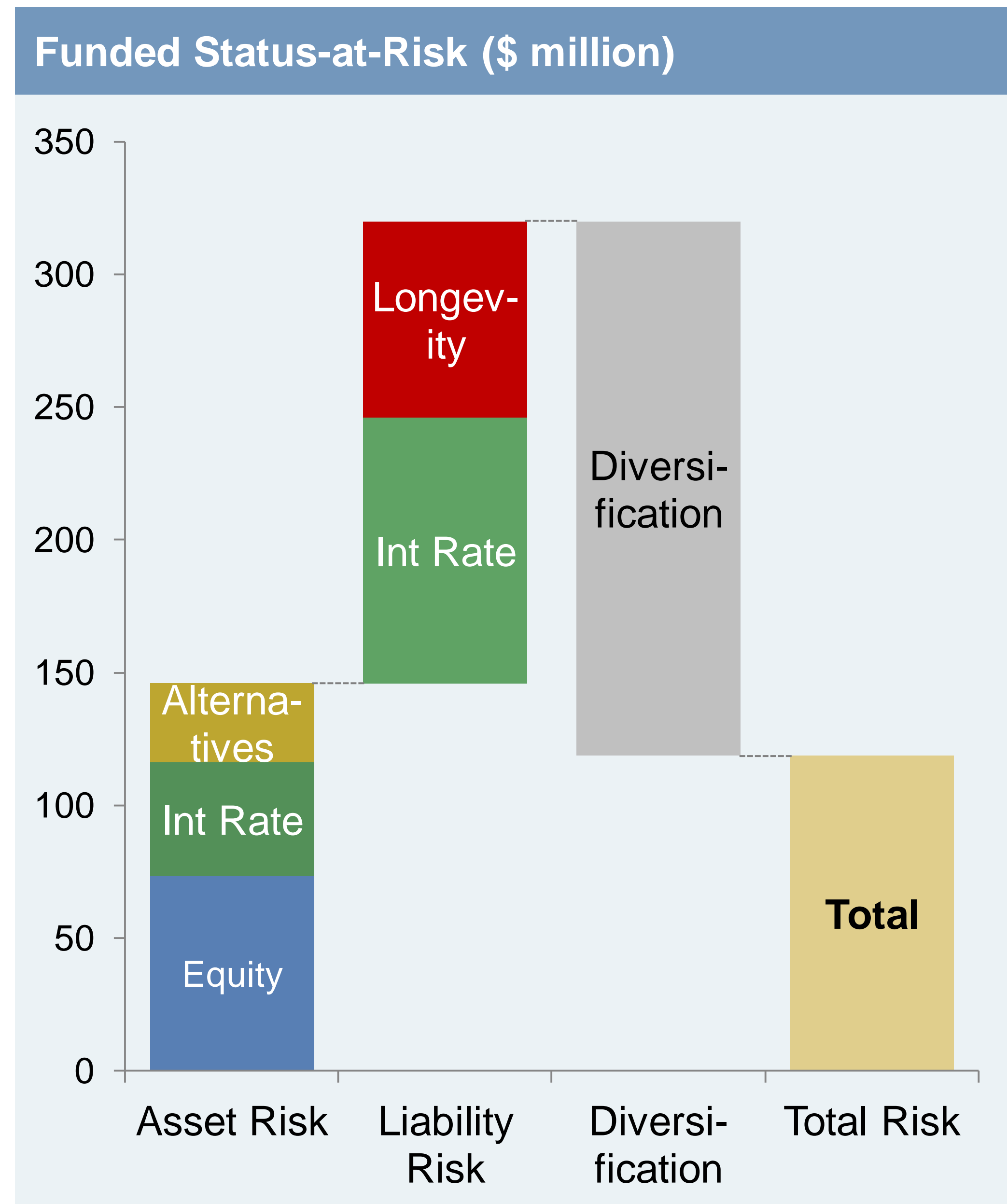
Risk map of the pension plan

- Longevity risk is comparable in size to other risks because:
  - Funded status in economic terms is low
  - Plan has reduced equity and interest rate exposure



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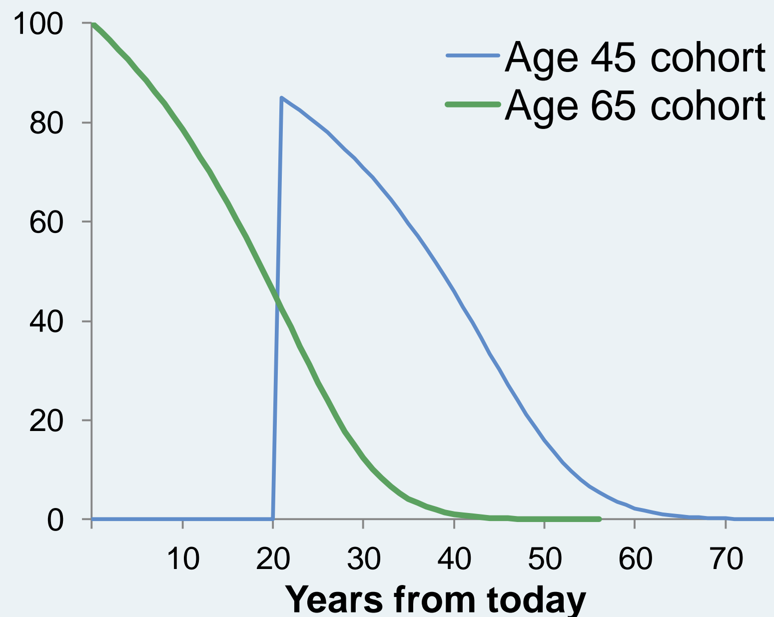
A closer look at longevity and interest rate exposure

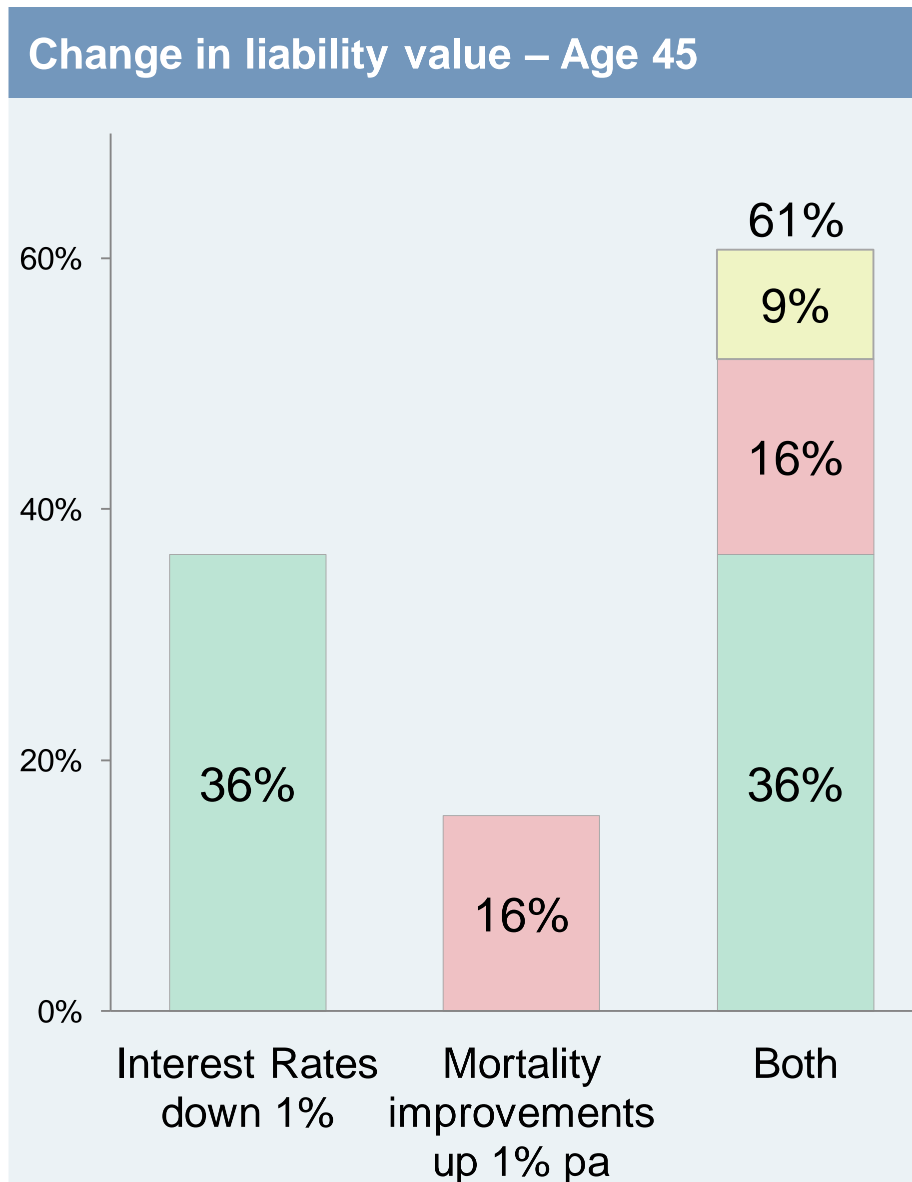


Liability sensitivity

	Age 45	Age 65
Interest rate duration	36	11
Mortality q-duration	16	5

- Cost of pension payments depend on interest rates and mortality improvements
- Sensitivity measured by "duration"
  - Interest rate duration = % increase in liability for a 1% fall in interest rates
  - Mortality q-duration = % increase in liability for a 1% increase in mortality improvements

Longevity risk and interest rate risk are intertwined



- Interest rate sensitivity of the liabilities (before hedging) is much higher than mortality/longevity sensitivity
- The combined impact of interest rate and longevity risk is bigger than the sum of the individual impacts
  - Risk Amplification

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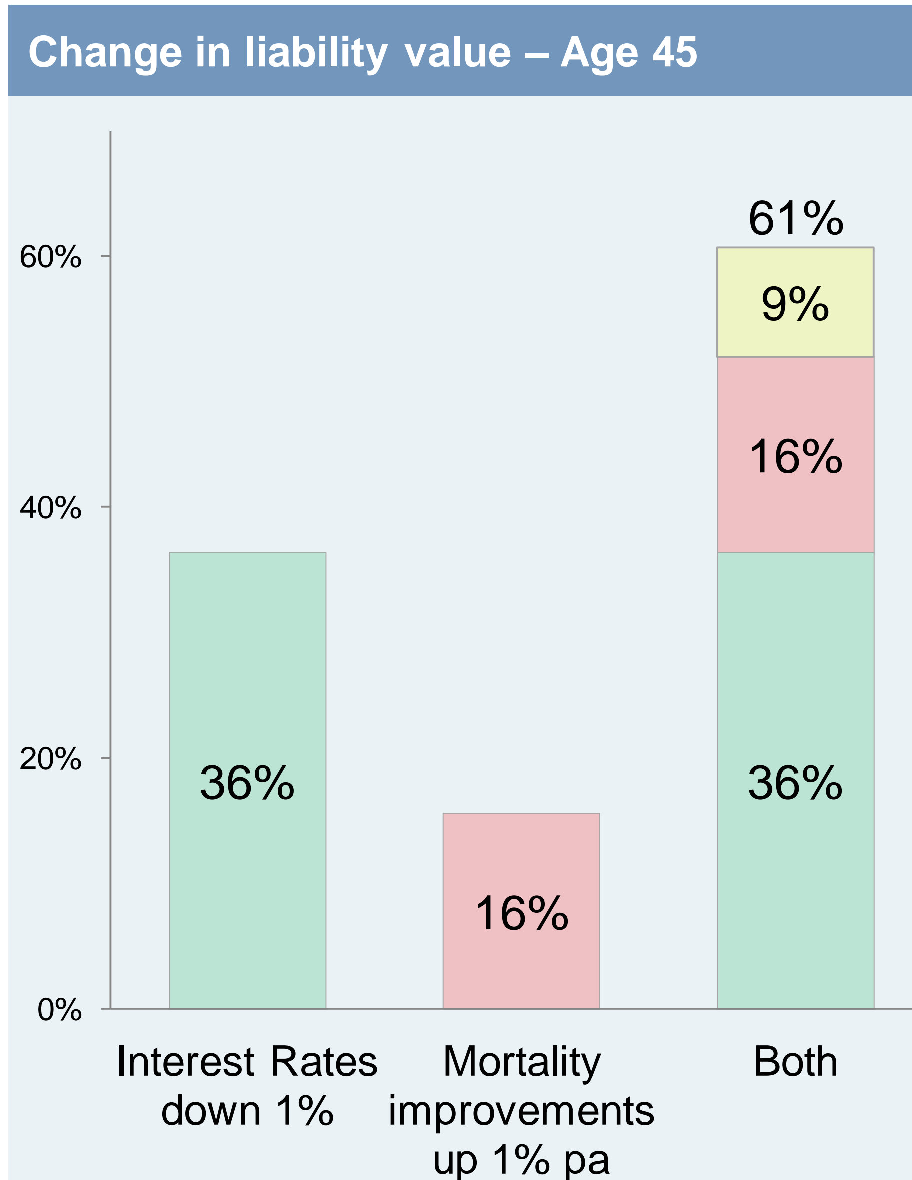

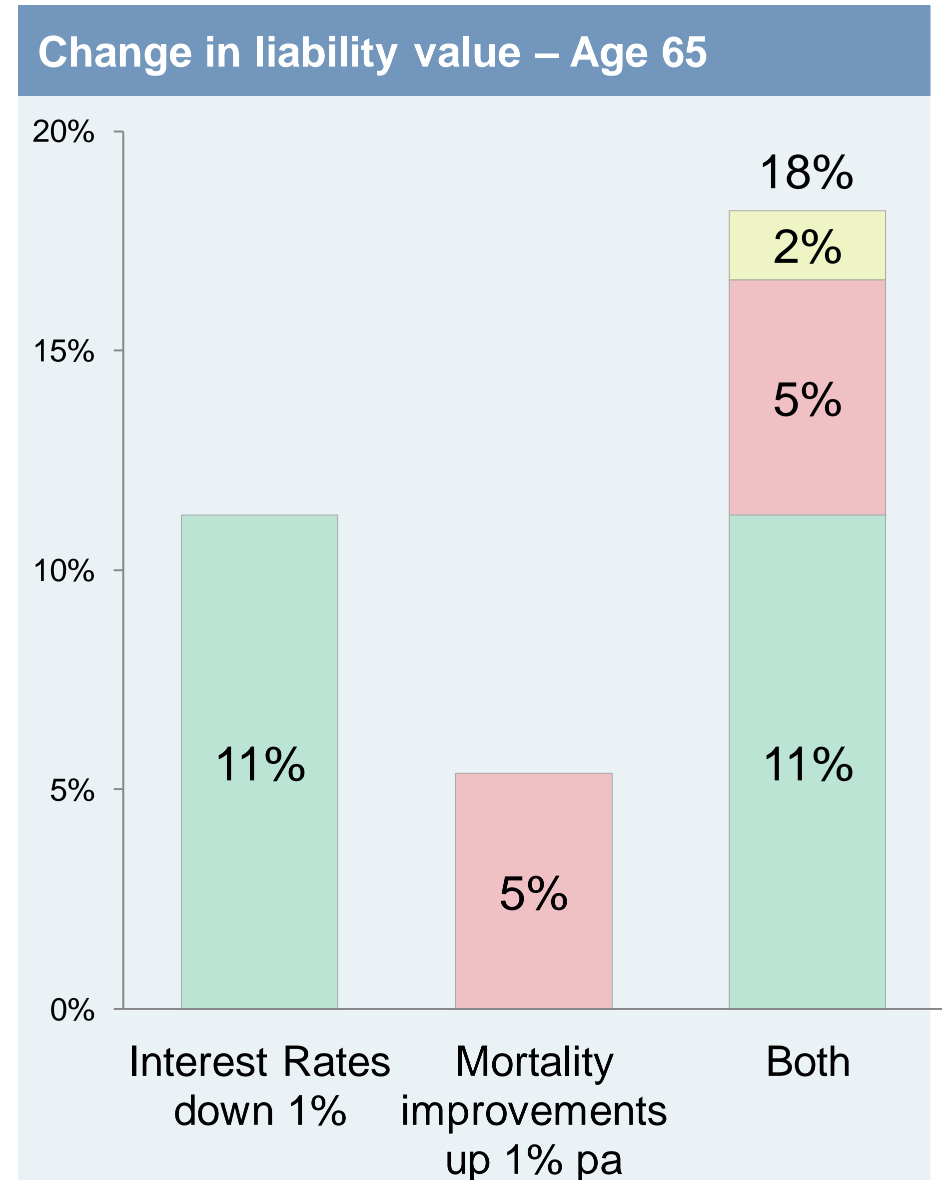

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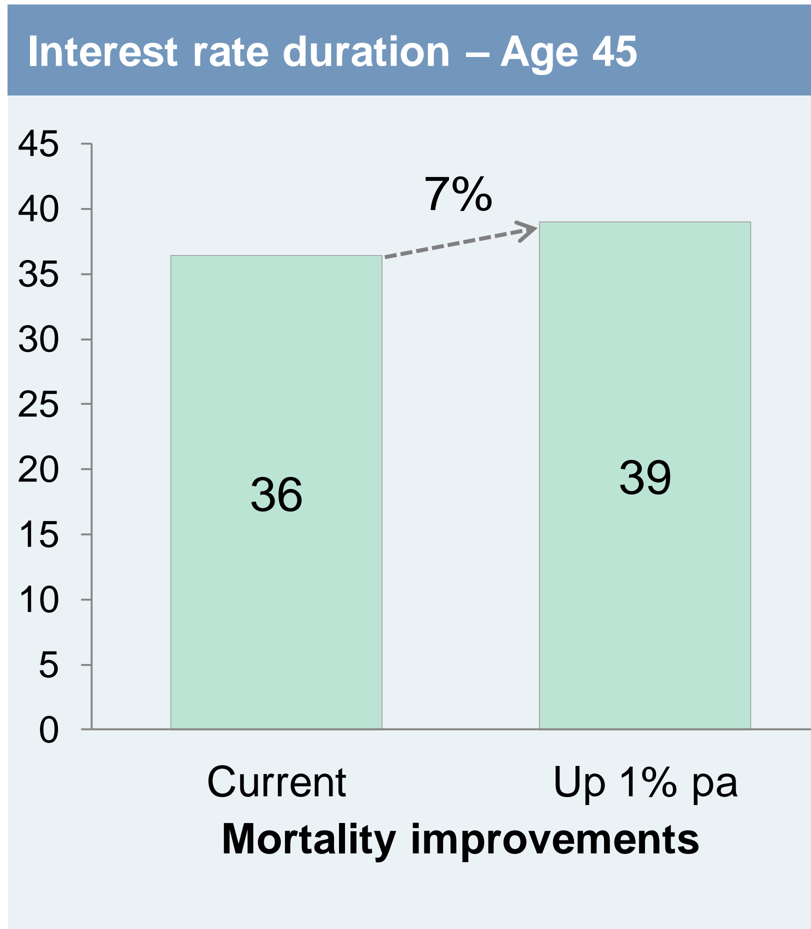
Interest rate risk depends on mortality improvements



- Interest rate risk increases by 7% if mortality improvements are higher than expected by 1% pa
- Hence the relative effectiveness of interest rate hedging will be lower

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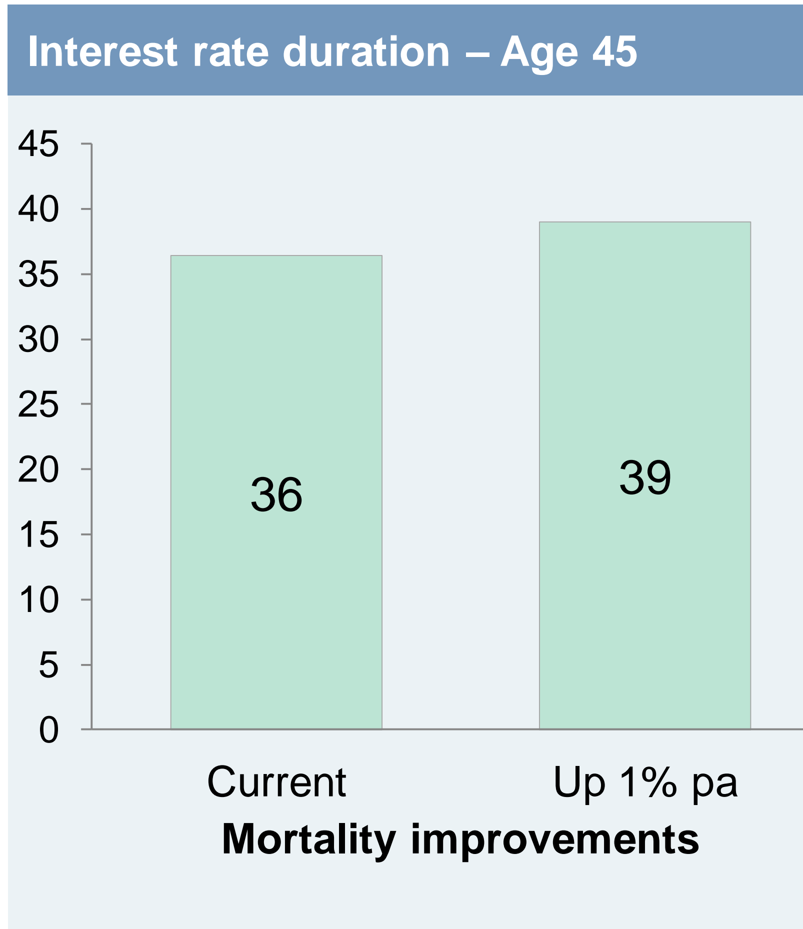
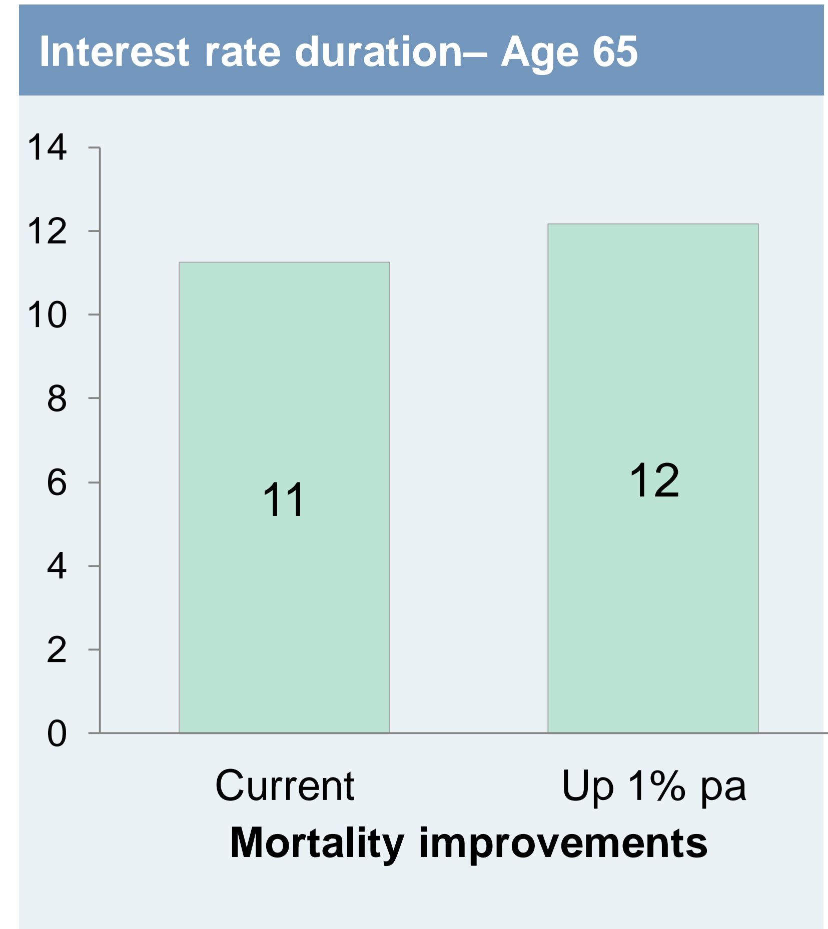
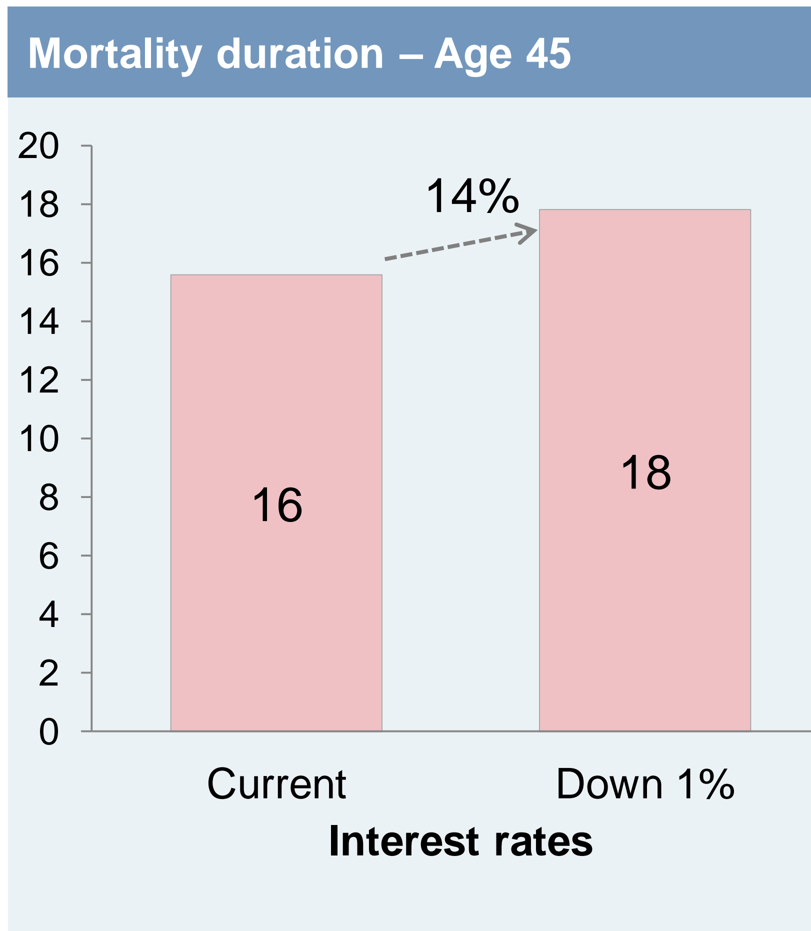
Interest rate risk depends on mortality improvements





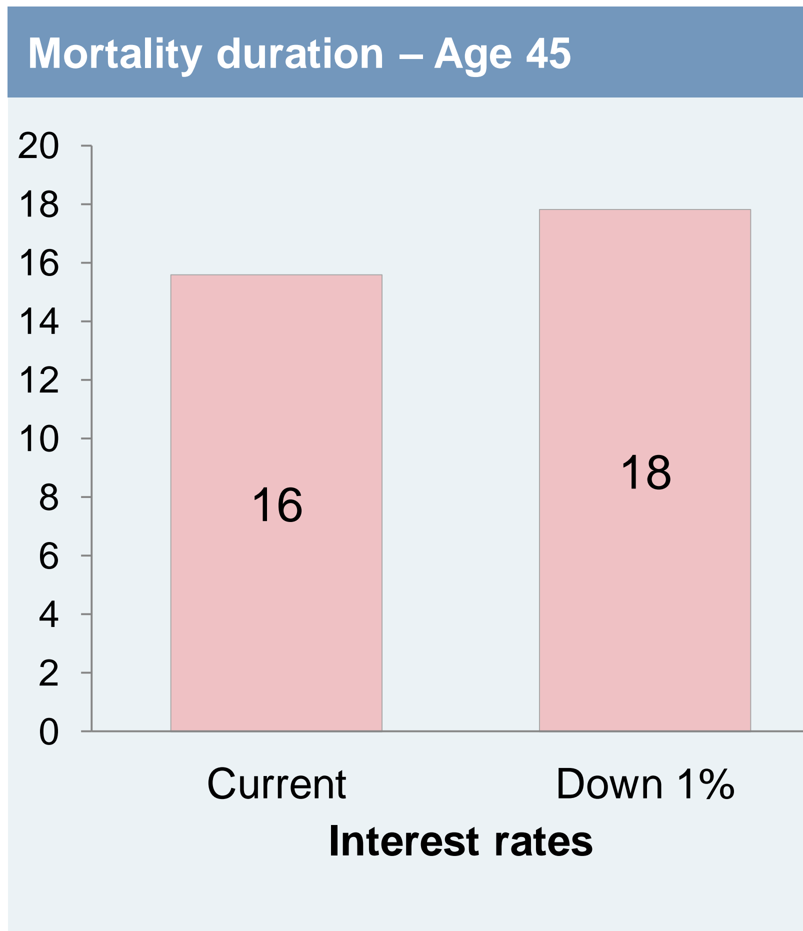
Interest rate risk increases by 7-8% if mortality improvements are 1% pa higher than expected

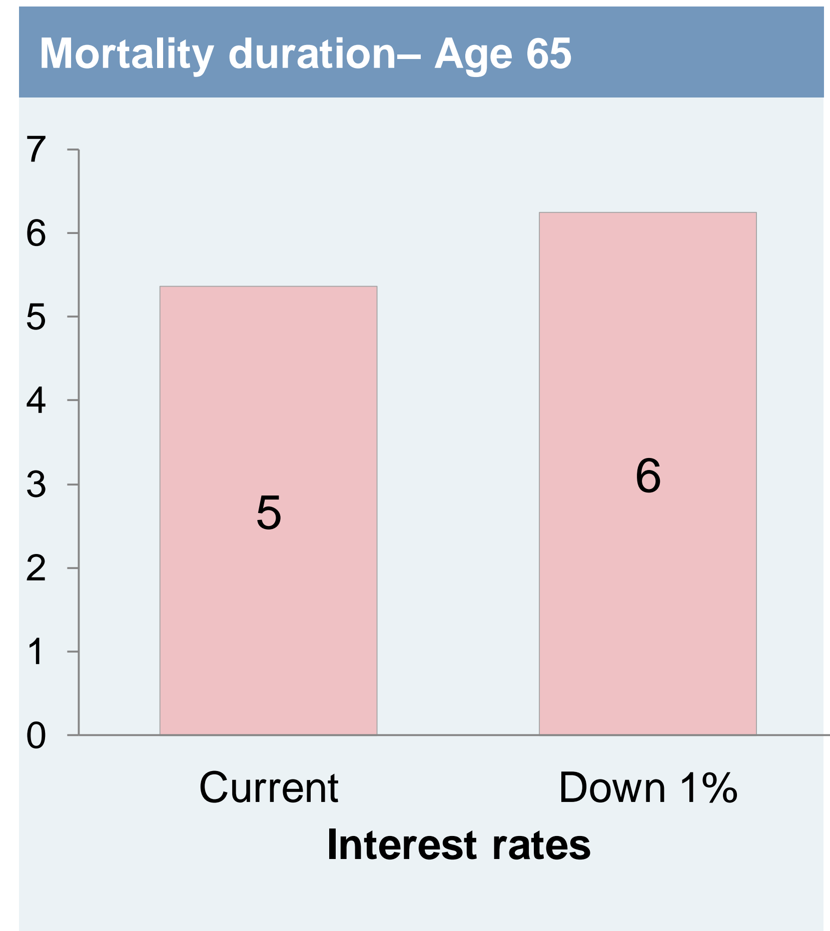
Longevity risk depends on interest rates



- Longevity risk increases by 14% if interest rates fall by 1%
- Hence the relative effectiveness of certain types of longevity hedges will be lower

Longevity risk depends on interest rates





Longevity risk increases by 14-16% if interest rates fall by 1%

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Implications for pension management

- There are two obvious implications for the management of DB pension plans
  - Measure longevity risk alongside the other pension risks
  - Coordinate longevity and interest rate hedging strategies

- LDI (liability driven investment) strategies that don't take account of longevity risk will be less effective in reducing risk
  - This will become more and more apparent as the plan becomes better funded and endeavours to increase de-risking

- Even more important for liabilities that have inflation or COLA linkage

Summary

- The management of longevity risk in defined benefit pension plans cannot be pursued in isolation

- To fulfil their duty to beneficiaries optimally, pension plan fiduciaries/trustees should consider the plan holistically:
  - Take account of the plan sponsor
  - Consider the assets and liabilities in an integrated fashion

- LDI strategies will be suboptimal if interest rate (including inflation) risk is hedged without considering longevity risk