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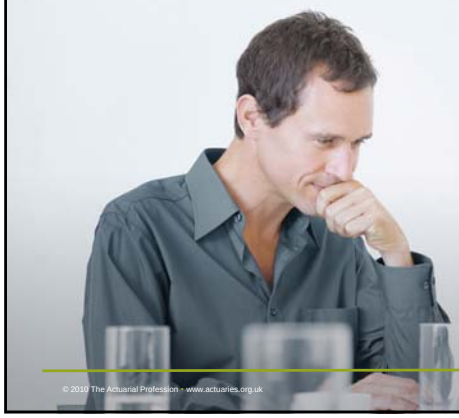
Life Conference and Exhibition 2011



How to hedge the risk-free rate under Solvency II

20-22 November 2011

Introduction to working party

Remit

- QIS5 specifications
- Not annuity focused
- Theory and practicalities

Working party members

- Alex Probyn
- Angelina Lai
- David Johnson
- Derek McLean
- Eamonn Phelan
- Emily Penn
- Oliver Firth
- Paul Collins
- Ross Evans

The views expressed are collective views of the working party
They do not reflect the view of any individual member, nor their employer, nor the Institute of Actuaries

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Why hedge the risk-free rate?

3

Why hedge the risk-free rate?

4

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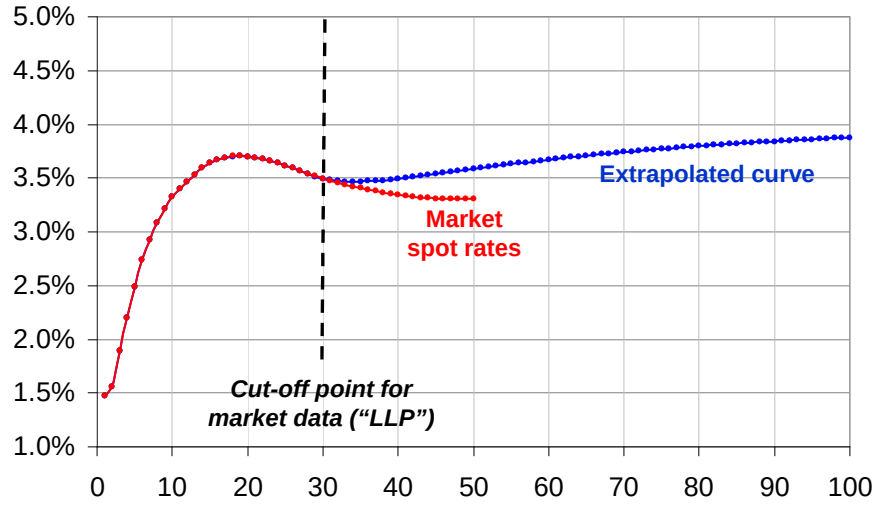
Hedging the basic risk-free rate

Solvency II basic risk-free rate

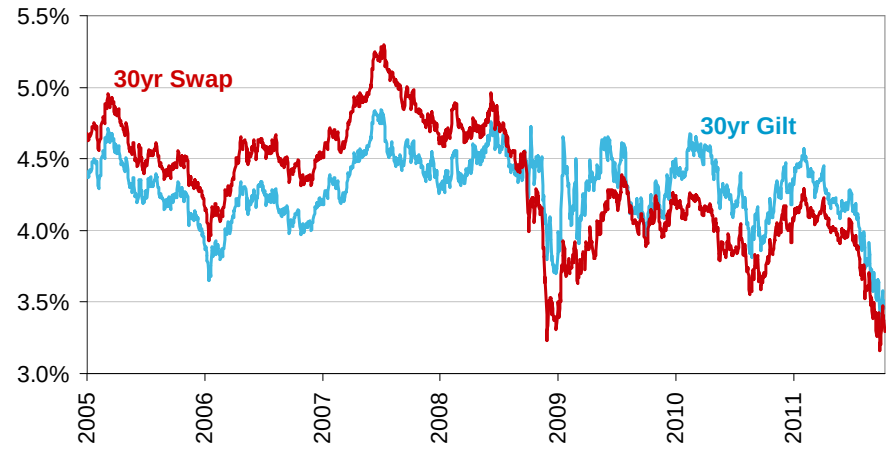


Risk-free rate prior to the “last liquid point”

- Swap curve minus 10bps

Muddying the water – Government bonds

History of 30yr Gilt yield and 30yr Swap rate



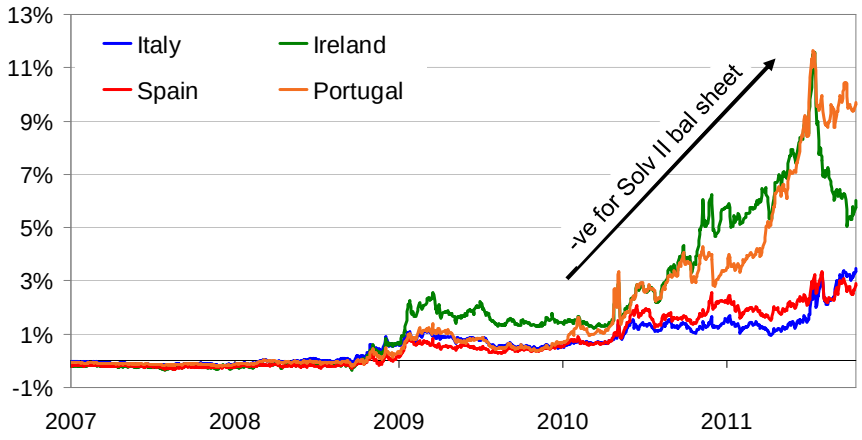
Volatility through the balance sheet

Tracking the Net Asset position over time

9

Even more volatility for non-UK

Spread over swaps on 10yr EU government bonds



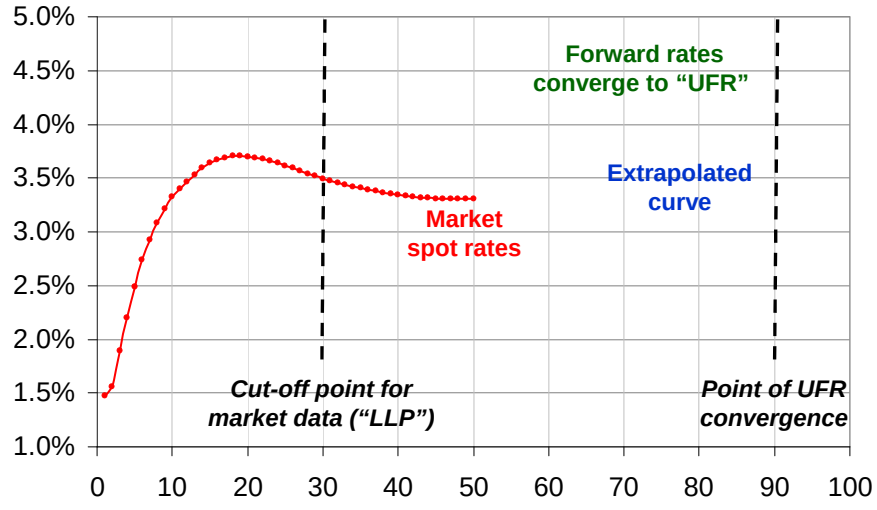
Source: RBS, Bloomberg

10

Risk-free rate beyond the “last liquid point”

- Extrapolated from market curve
- “Smith-Wilson” technique
- Macroeconomic approach
  - Ultimate long-term forward rate = 4.2%
  - Converges by 90yrs

What that looks like in practice

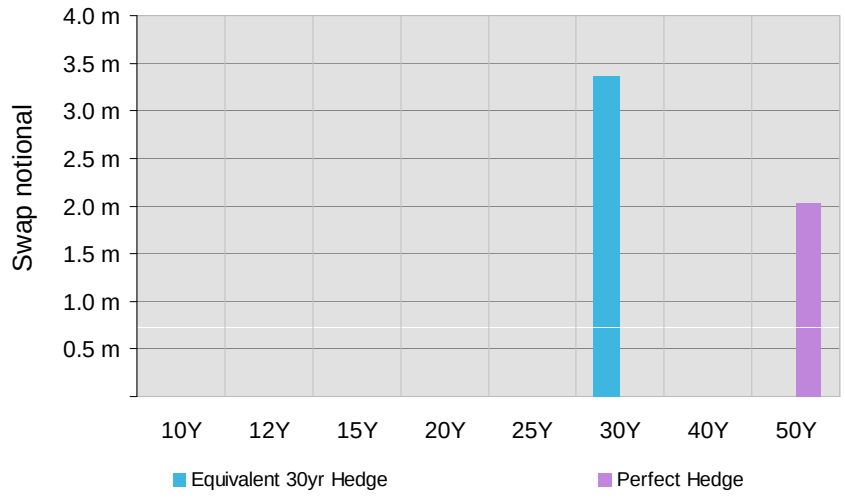


Hedging implications

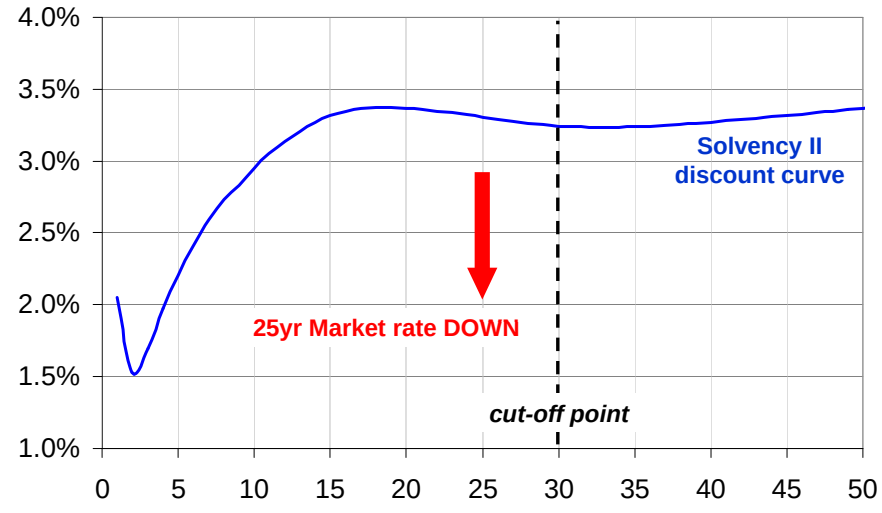
Simple example

- Bullet 50yr liability
- EUR 10m

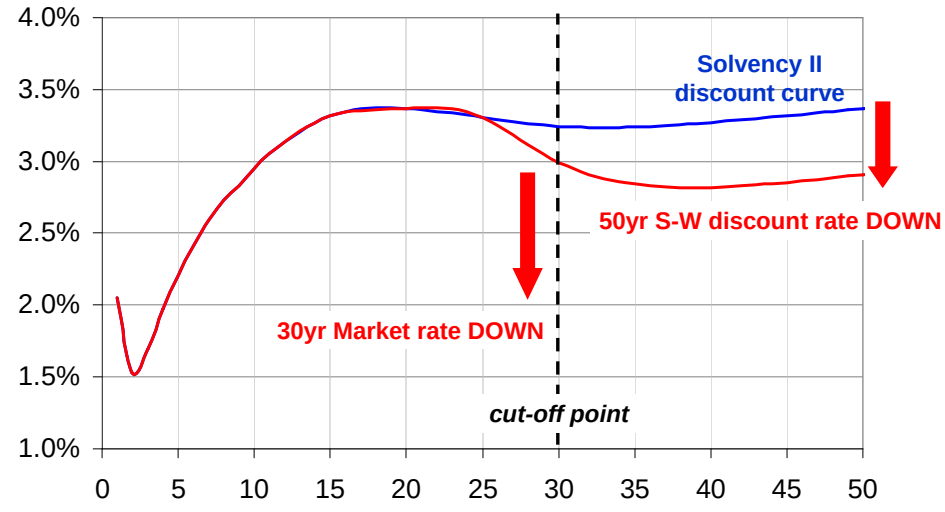
Market consistent basis



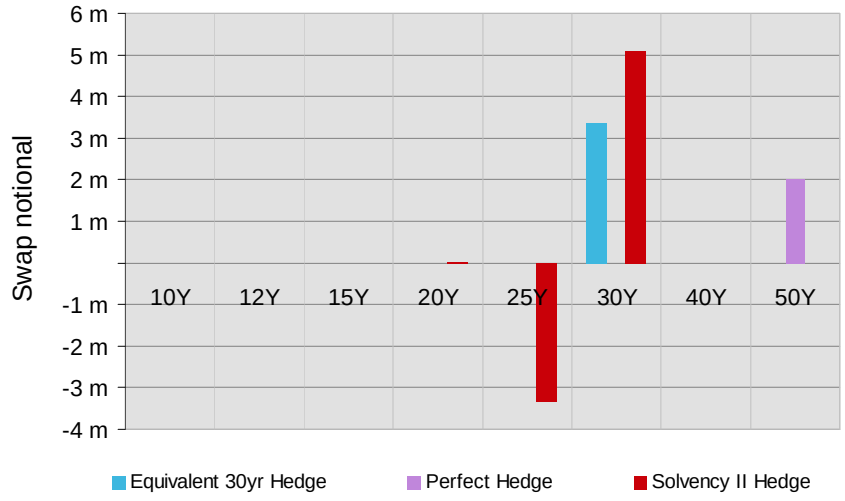
Slope of market curve prior to cut-off point (1)



Slope of market curve prior to cut-off point (2)



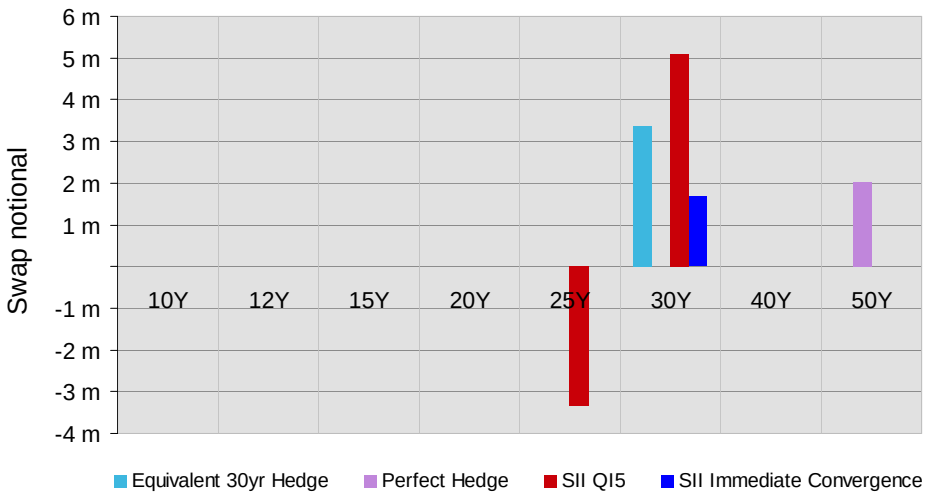
Solvency II hedge



In extremis …

- What happens if we converge to the UFR immediately?

Hedge with immediate convergence



Key observations

Current framework

- Liability value in no way related to 50yr market swap rate
- Extrapolation sensitive to slope of curve preceding cut-off point
- Can lead to unusual looking hedges

Potential for change?

- Industry lobbying to shorten convergence period
  - Less exposure to slope
- Bayesian approach?

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Hedging the liquidity premium

What is a liquidity premium?

- Spread = credit risk premium + liquidity premium

Methods:

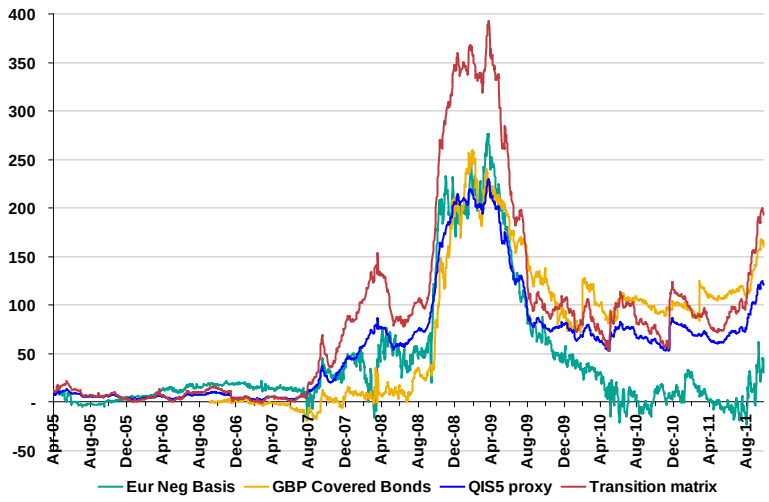
- Negative basis
- Covered bonds
- Structural models
- Transition matrix

How are LPs currently used

- **Solvency I**
  - Transition matrix approach
- **ICA**
  - Range of methods including structural methods but based on actual portfolio
- **MCEV**
  - *Reference rate should be the swap yield curve with the inclusion of a liquidity premium, where appropriate*
- **Pricing**
  - Passed on to policyholders

23

Tracking the liquidity premium



24

Solvency II and LP

- QIS 5 = 50% (iBoxx spread – 40bps)
- 3 liability buckets: 100%, 75%, 50%

QIS 5 Liquidity premium			
Currency	**Cut off**	**31 Dec 09**	**31 Dec 10**
GBP	30 yrs	82 bps	89 bps
EUR	15 yrs	53 bps	45 bps
USD	30 yrs	71 bps	66 bps

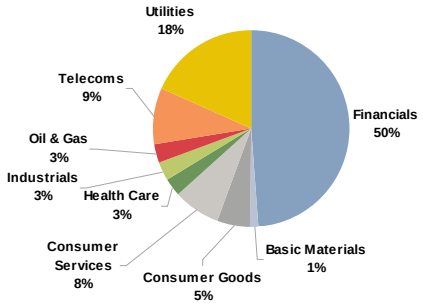
Capital

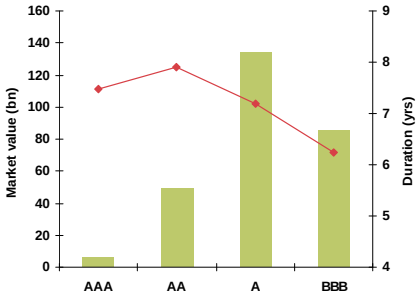
- SCR includes stress to liquidity premium
- -50% correlation with spread risk module

25

£ iBoxx corporate index

- **> 600 constituents: Market cap - £ 275 bn**





High financial weighting

80% A, BBB
7 year duration

26

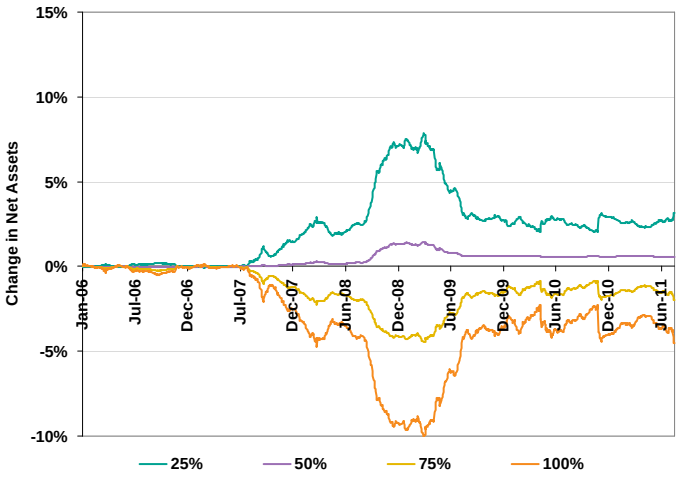
Analysis – Rolling liability matched duration

Liability

- Constant duration
- Duration matched

Asset

- iBoxx £ corporate
- Duration contracted through crisis



Investment in iBoxx index – remainder risk-free

27

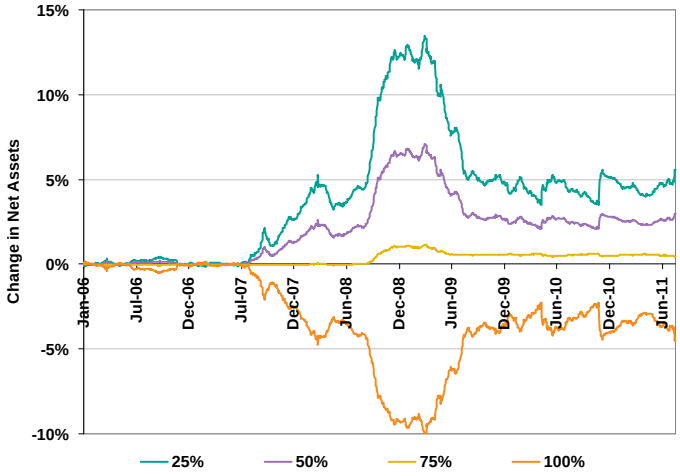
Analysis – Rolling liability longer duration

Liability

- Constant 10 year duration

Asset

- iBoxx £ corporate

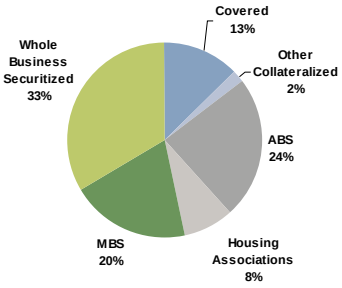


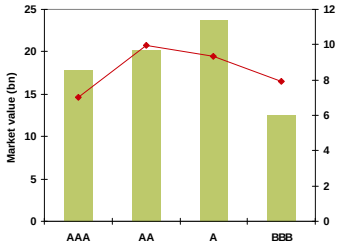
Investment in iBoxx index – remainder risk-free

28

£ iBoxx collateralised

- **200 constituents: Market cap £ 75 bn**





Covered is small market in GBP

49% A, BBB
8.7 year duration

29

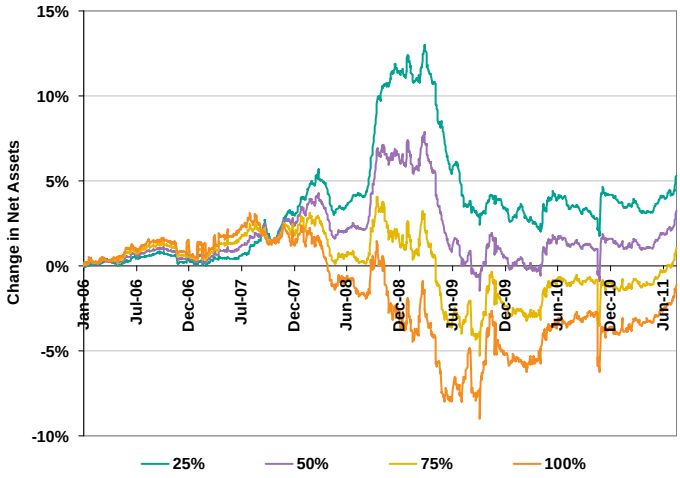
Analysis – Rolling liability with covered bonds

Liability

- Duration matched

Asset

- iBoxx £ collateralised



Investment in iBoxx index – remainder risk-free

30

Liquidity premium summary

'Simple' hedging – reference credit portfolio

- Matched duration liability: 50% investment
- Longer duration requires greater investment

Other assets

- Covered bonds
  - Greater investment
  - Basis risk

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Practical considerations

Some practical considerations

- Conflict with other metrics
- Secondary risks – basis/counterparty/liquidity/operational
- Cost vs. benefit

Liquidity premium

- Availability of suitable assets
- Capital implications
- Reinvestment risk

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Concluding thoughts

In summary …

Long-dated liabilities

- Exposure to slope of curve prior to LLP
- Industry lobbying

Liquidity premium

- Exact hedge difficult
- Capital stability vs. minimisation

Next steps for the working party …

What are your thoughts?

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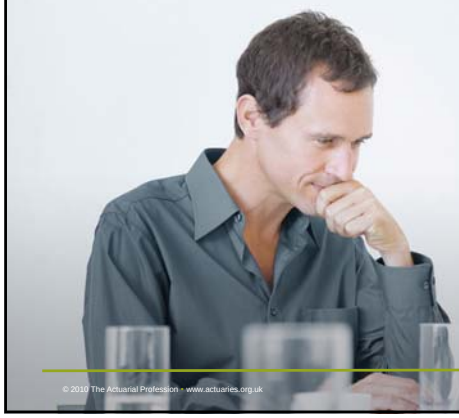

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