East Sussex Pension Fund

Investment Strategy Review

Initial modelling results

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HYMANS ROBERTSON

Addressee and scope

- This presentation is addressed to the Pensions Committee of the East Sussex Pension Fund ("the Fund"). It should not be disclosed to any other third parties without our prior written permission and then only in full. We accept no liability to third parties unless expressly accepted in writing.
- Our work in connection with the investment strategy review complies with Technical Actuarial Standard 100: Principles for Technical Actuarial Work.
- The assumptions and limitations in our analysis and modelling are contained within the Appendix to this presentation.

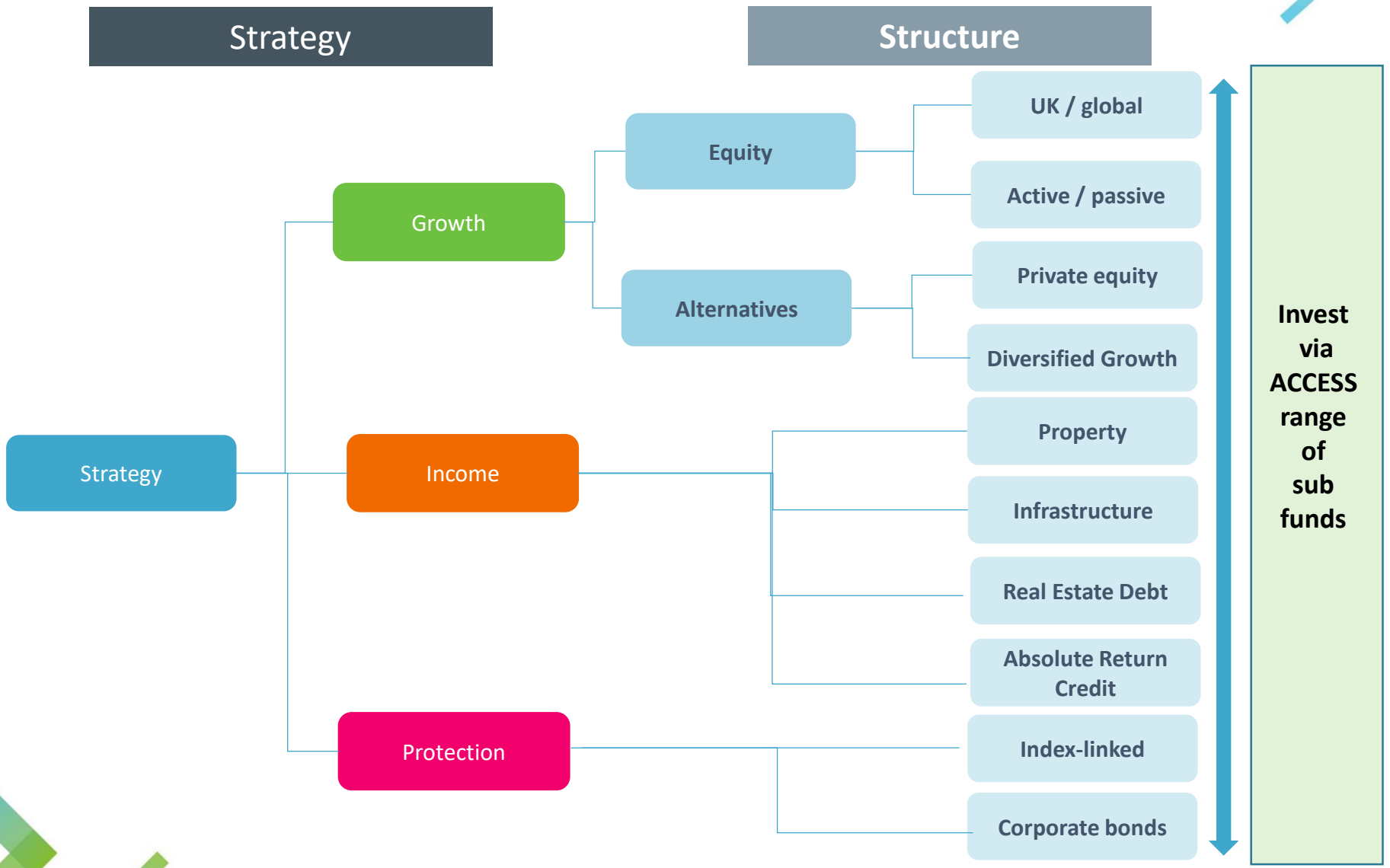
Agenda

- Background to setting investment strategy
- Asset liability modelling
- Analysis and results
- Initial conclusions

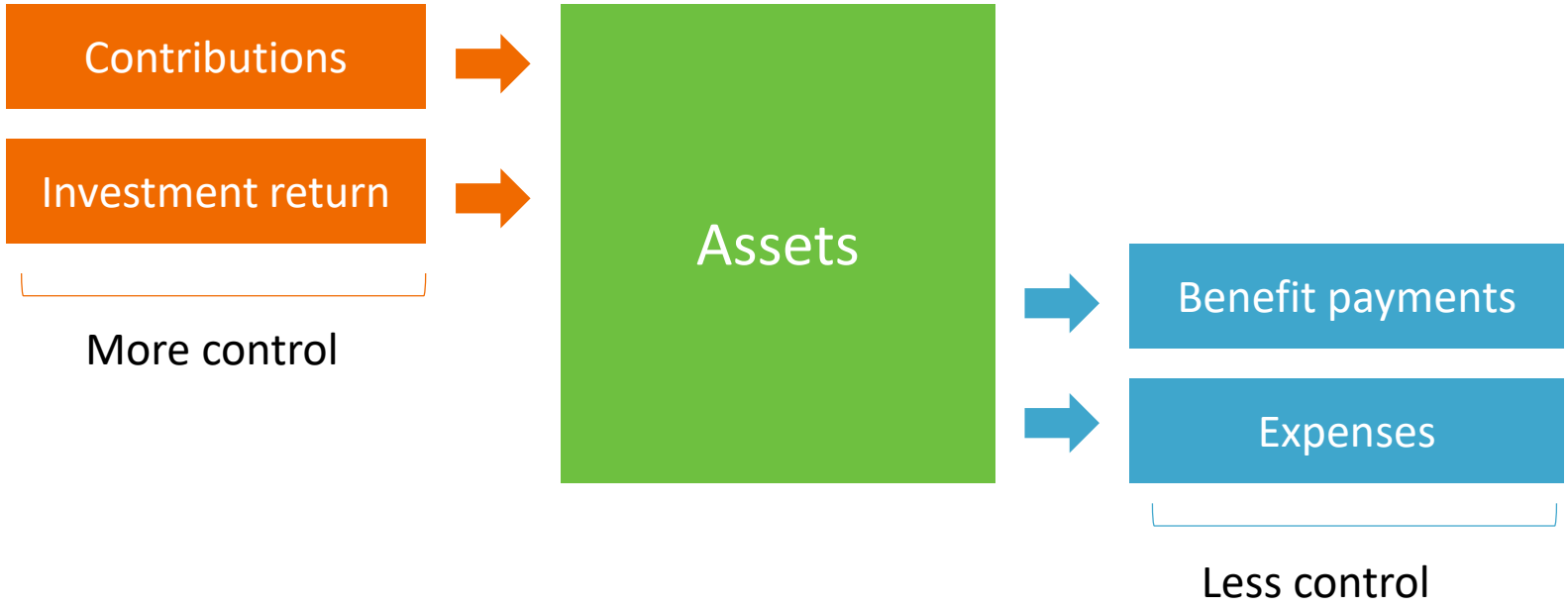
Setting the investment strategy

- **Stage 1 - high level decision**
  - Establishes broad level of risk and expected return
  - Based on long term funding objectives
  - Consistency with contribution strategy
  - Growth / Income versus Protection
  - Most important investment decision with the greatest impact on the Fund
- **Stage 2 – detailed allocations / mandates**
  - Specific allocations within each component of the Fund
  - Potential allocations to new asset classes
  - Use of active and passive management
  - Nature of investment manager mandates
  - Liaison with ACCESS on fund launches

Reminder - strategy and structure



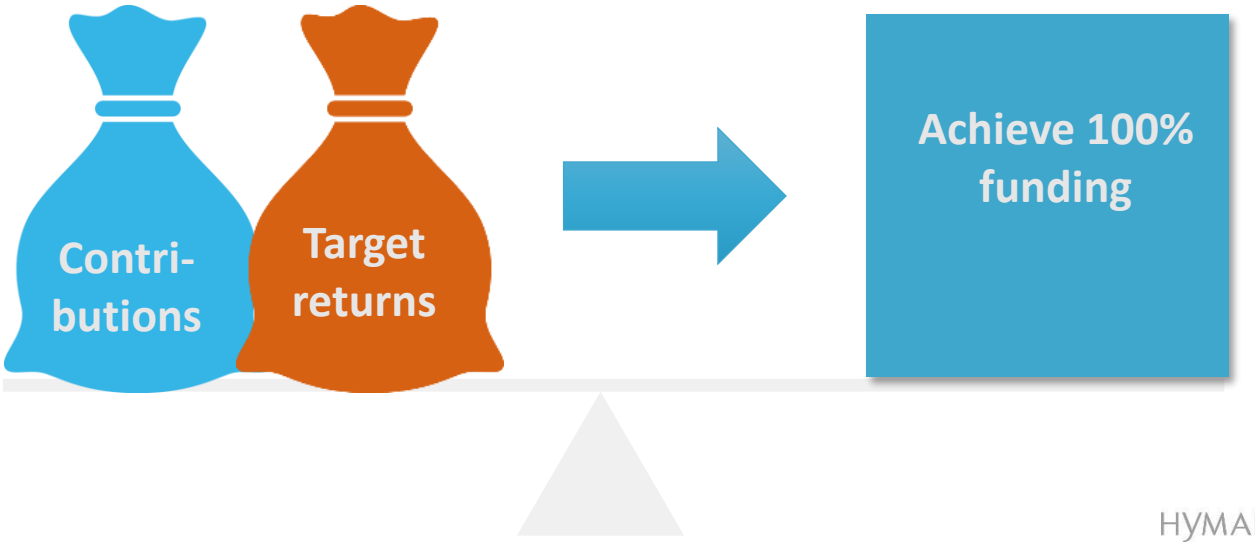
Meeting your obligations



There are only two sources of funding for meeting the benefits

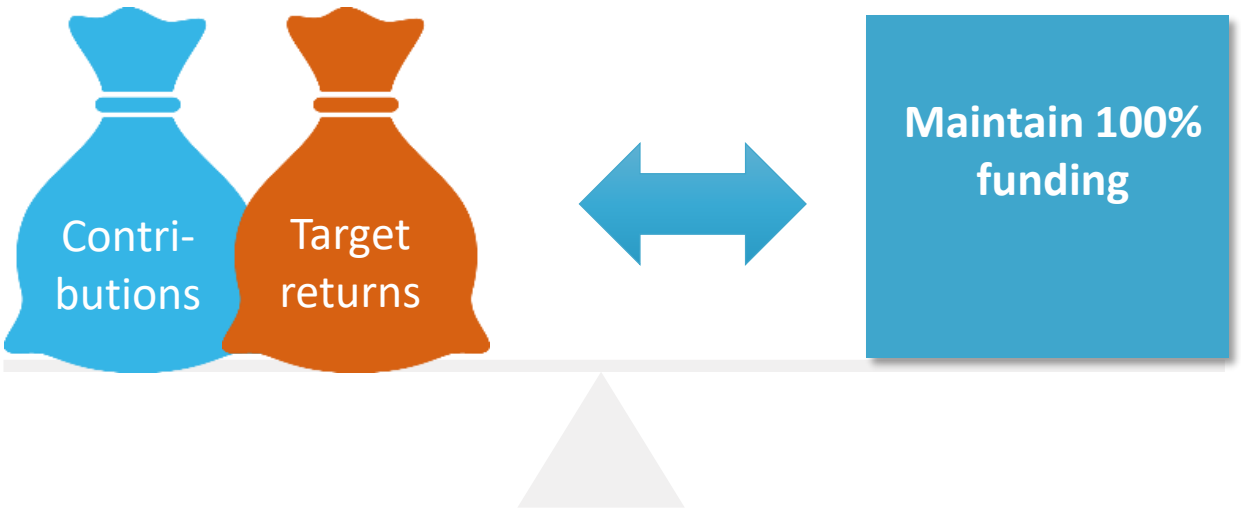
Objectives - when you have a deficit

- Your medium term objective
  - Close the deficit and get to a fully funded position
    - Pay in contributions towards the deficit
    - Take an appropriate level of investment risk
  - "To be fully funded by the year 20XX"



Objectives - when you are fully funded

- The 'steady state' is a balance between
  - An affordable level of ongoing contributions
  - An appropriate level of investment risk



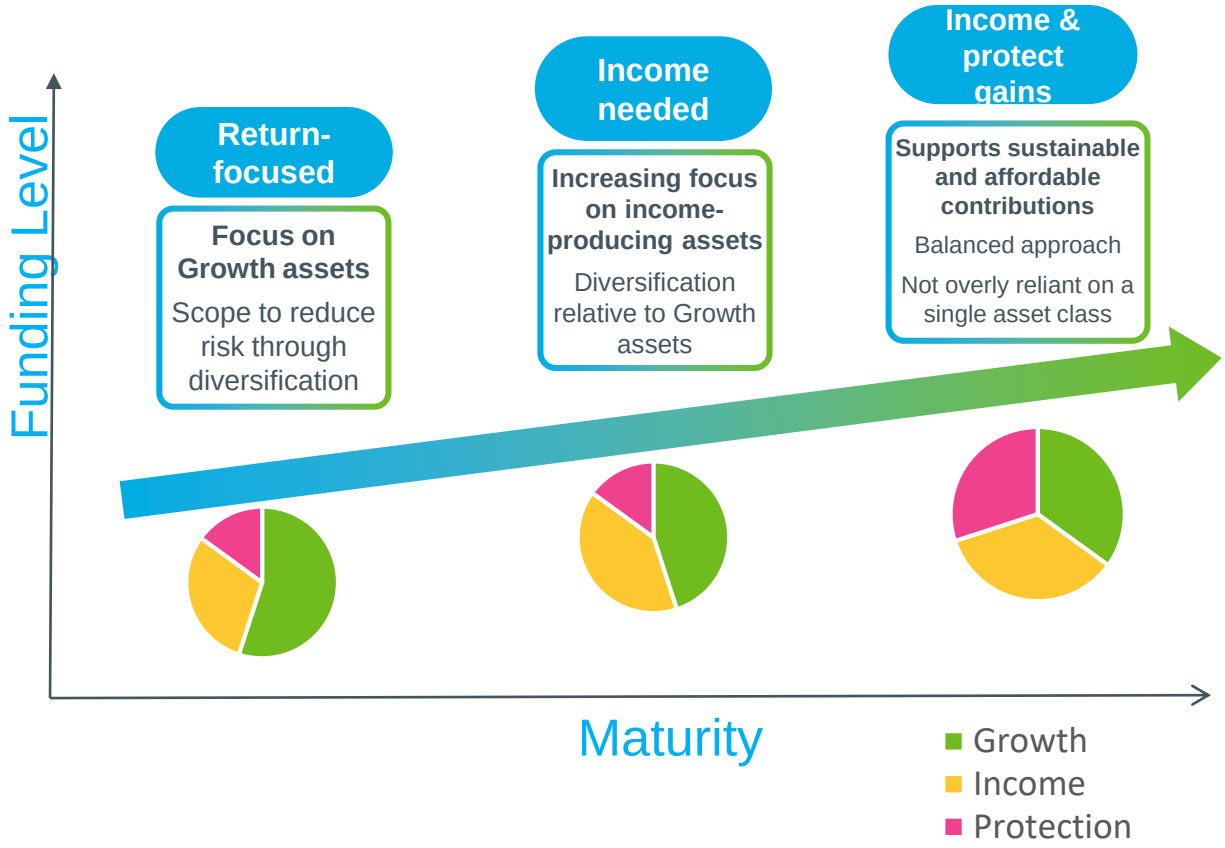
Designed to maintain the fully funded position

May involve taking less investment risk

Current investment strategy

	%
Equities	40.0
Private equity	5.5
Diversified Growth	21.0
Total Growth	66.5
Property	10.0
Infrastructure	4.0
Private Debt	3.0
Absolute Return Credit	8.0
Total Income	25.0
Corporate bonds	3.5
Index Linked Gilts	5.0
Total Protection	8.5

Likely evolution of the strategy
Seeking greater predictability over time

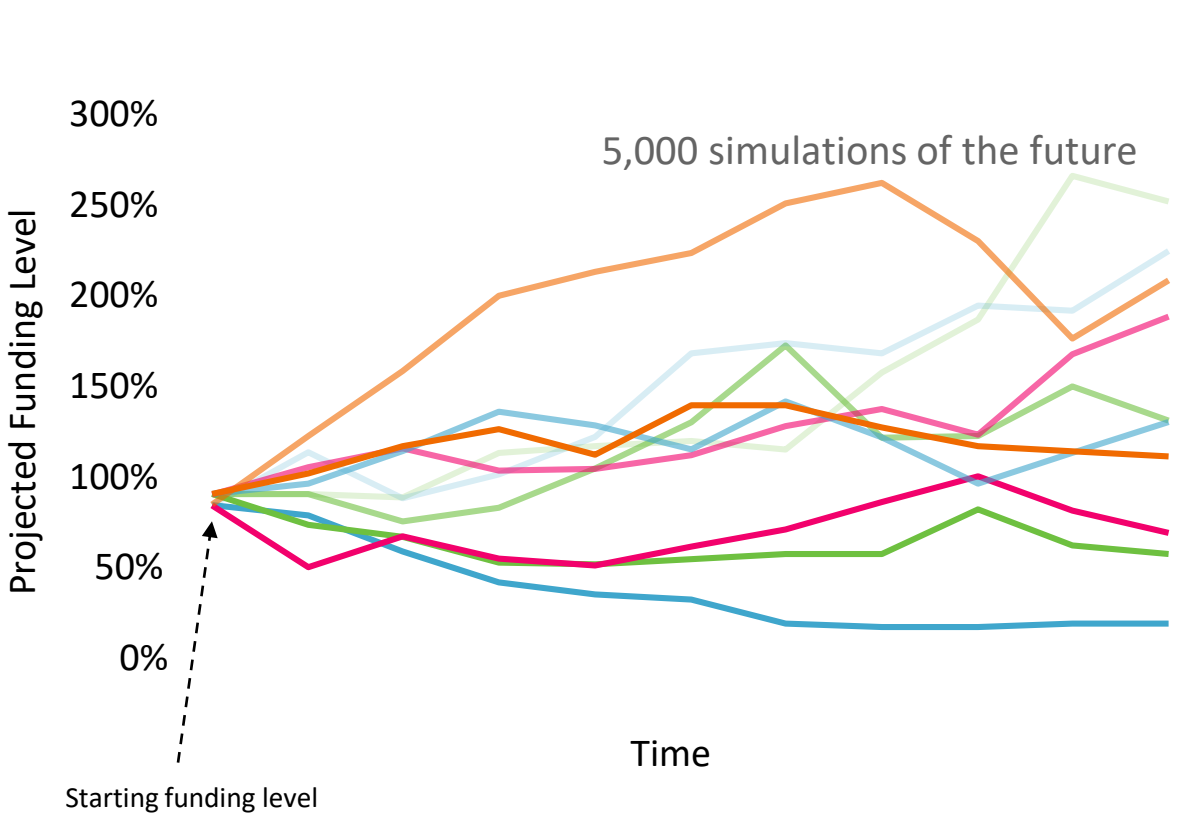


Maturity - key aspect of funding journey

Asset Liability Modelling
- a brief reminder of what it is

Asset Liability Modelling

We project forward a range of potential outcomes…. funding levels, deficits, etc.



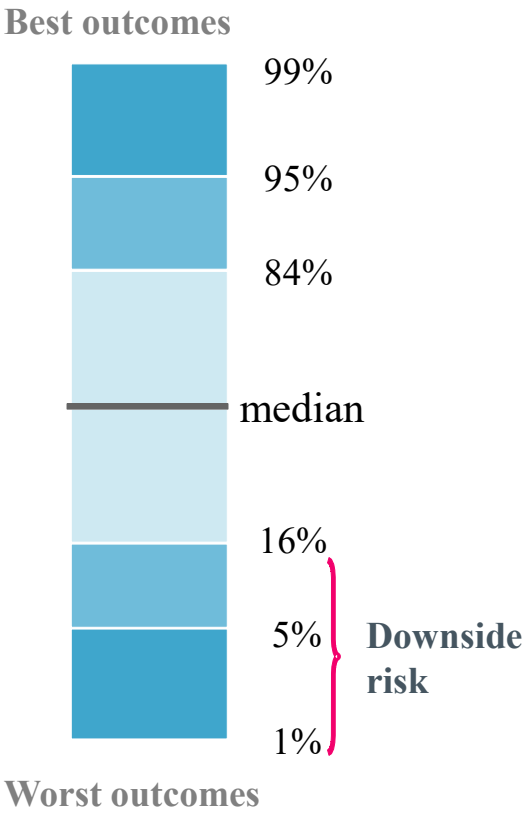
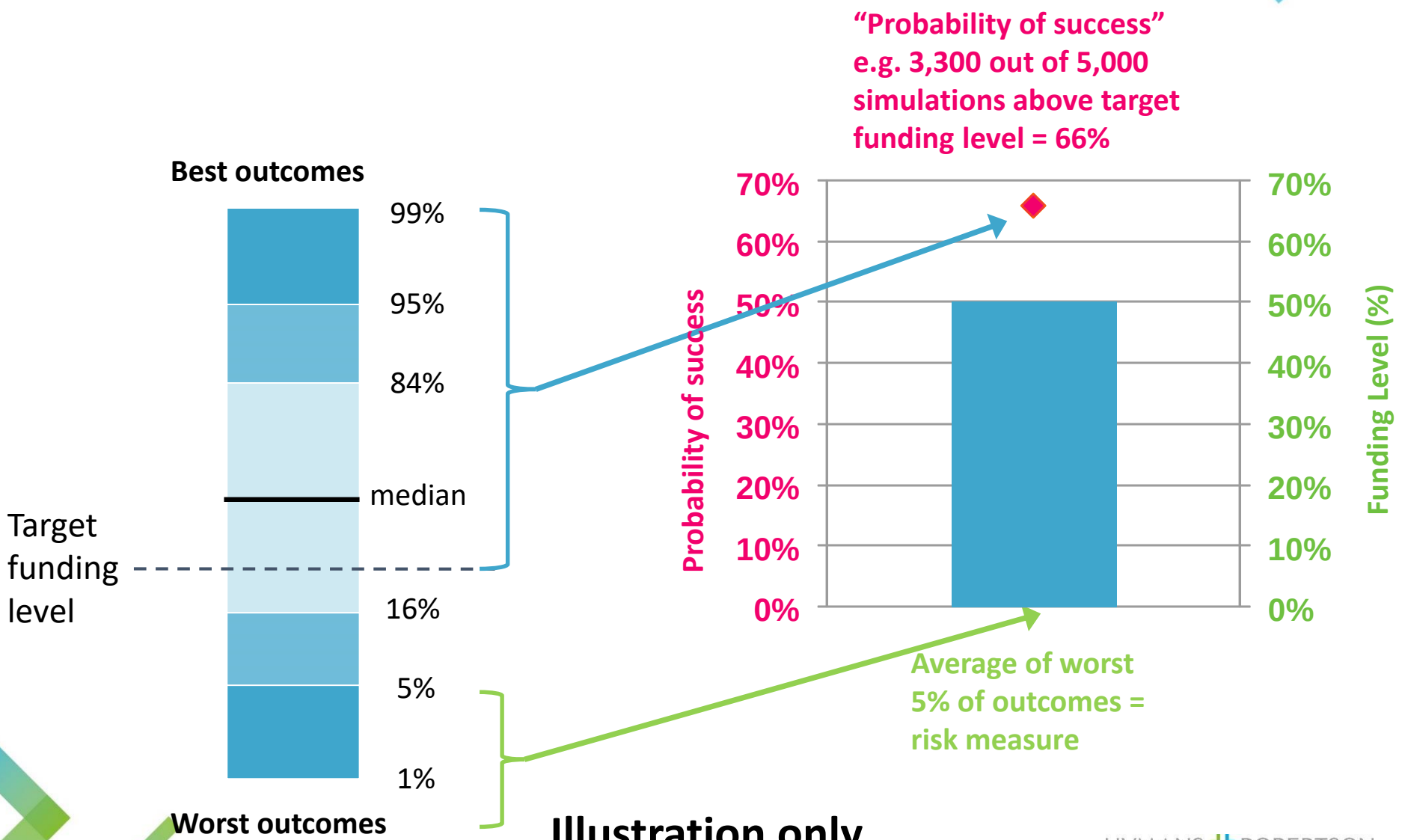


Illustration only

Presenting the results



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Investment strategies modelled

Asset class	Current	-20% Growth to Income and Protection	-10% Growth to Income	-10% Growth to Protection	+10% equity	Income focus
Equities	40.0	30.0	35.0	35.0	50.0	40.0
Private Equity	5.5	5.5	5.5	5.5	5.5	5.5
Diversified Growth	21.0	11.0	16.0	16.0	16.0	11.0
Total Growth	**66.5**	**46.5**	**56.5**	**56.5**	**71.5**	**56.5**
Property	10.0	10.0	10.0	10.0	10.0	10.0
Infrastructure	4.0	7.0	7.0	4.0	4.0	8.0
Real Estate Debt	3.0	8.0	8.0	3.0	3.0	9.0
Absolute Return Credit	8.0	10.0	10.0	8.0	3.0	8.0
Total Income	**25.0**	**35.0**	**35.0**	**25.0**	**20.0**	**35.0**
UK Corporate Bonds	3.5	8.5	3.5	8.5	3.5	3.5
Index Linked Gilts	5.0	10.0	5.0	10.0	5.0	5.0
Total Protection assets	**8.5**	**18.5**	**8.5**	**18.5**	**8.5**	**8.5**

These detailed allocations do not represent recommendations – they are used at this point to help assess the impact of high level changes to the shape of the Fund

Contributions

- Future contribution rates will be set by the Actuary – we have not modelled the expected future movement in contributions

- But using fixed contribution rates allows us to consider the implications of different investment strategies - under varying contribution burdens on employers - over the longer term

- We have modelled three levels of fixed long term contribution rates:-

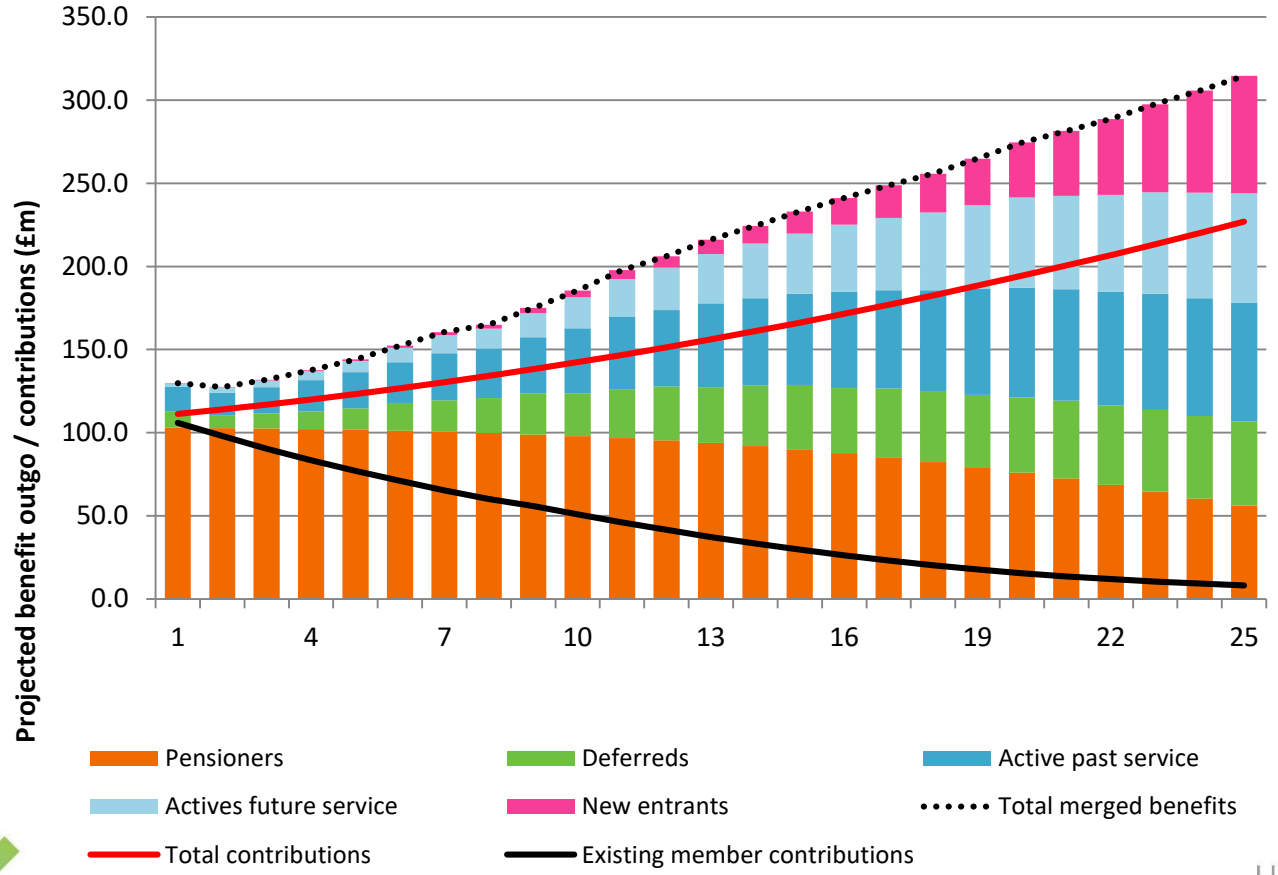
	Fixed rate (as a % of payroll)		
Employer	20.3%	18.3%	16.3%

These contribution rates do NOT represent options from the 2019 Actuarial Valuation

These long term fixed rates could represent relatively high rates by the end of the 20 year projection period

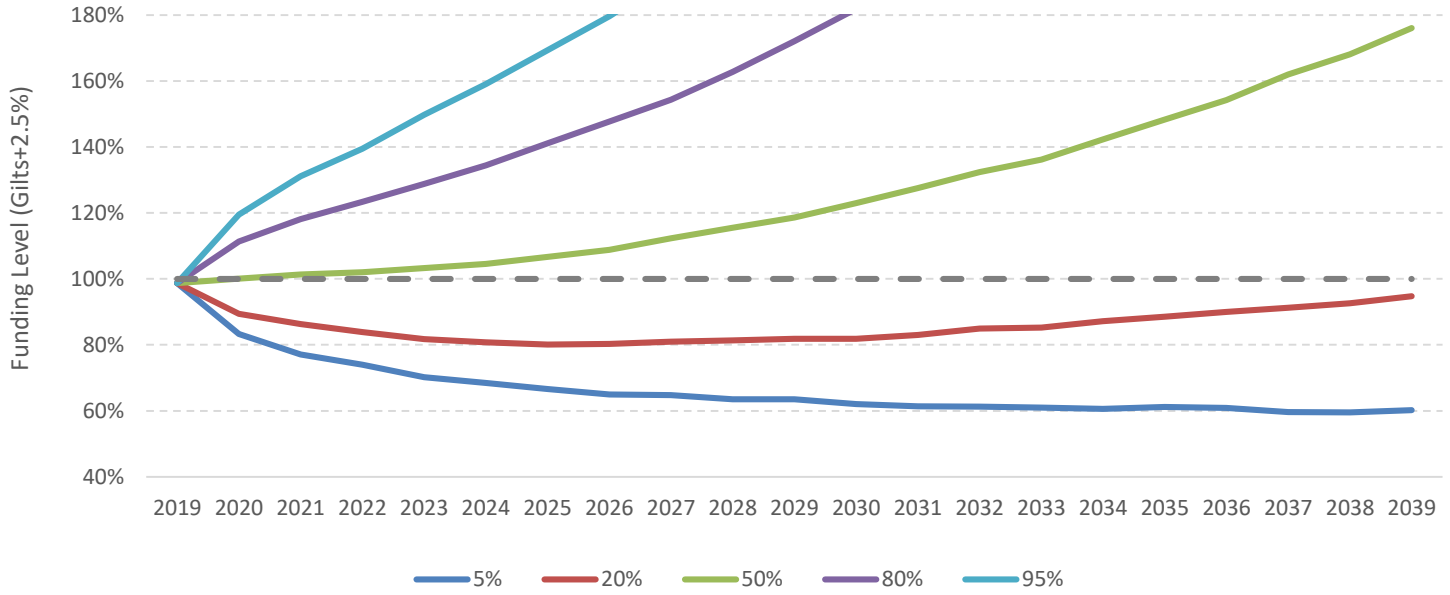
Potential evolution of cash flow

- Under the current contribution rate (fixed), the cash flow position remains negative but does not deteriorate markedly for a number of years
  - Ignores any pre-payment of contributions



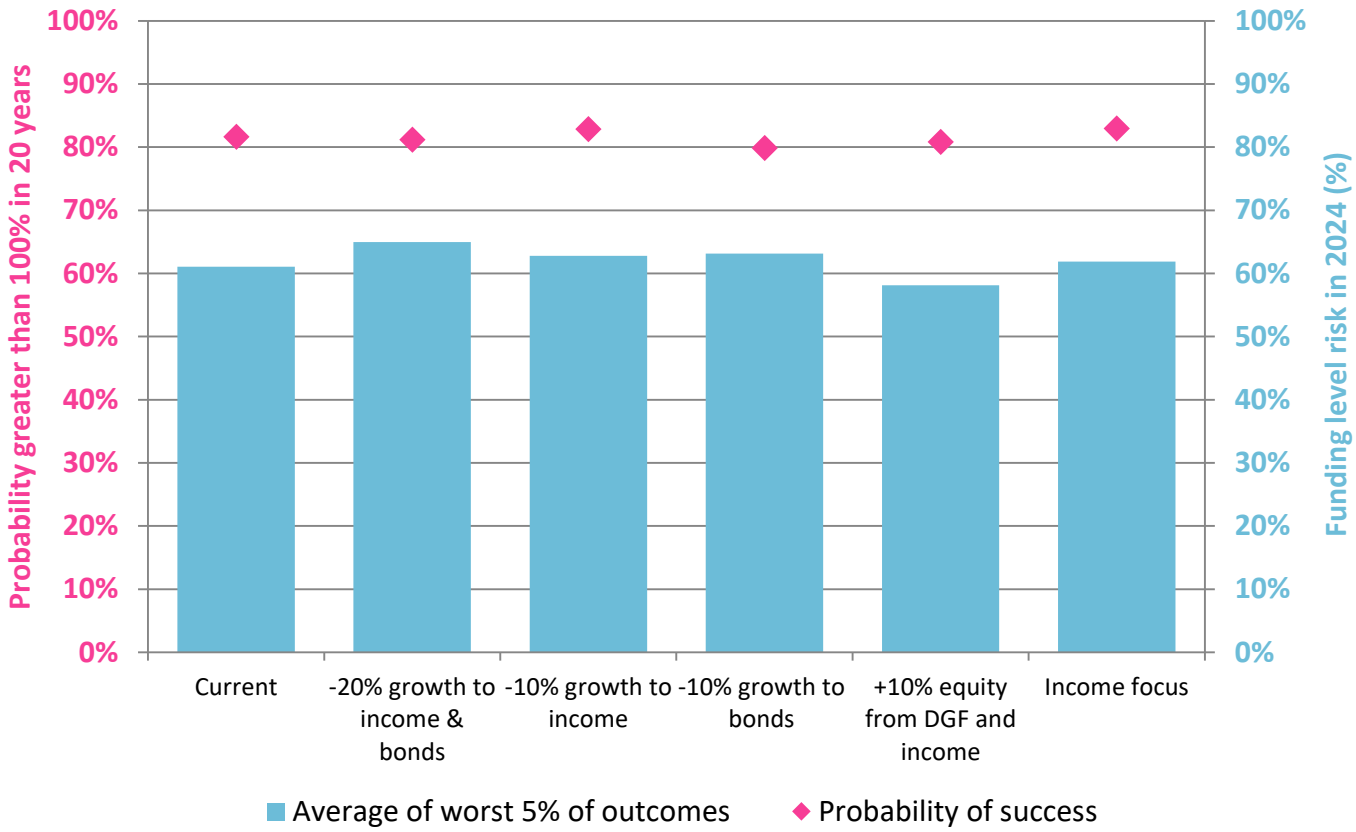
Analysis and results

Projected Funding Level



- Modelling based on the 4% discount rate agreed as part of the actuarial valuation
- Current asset allocation
- Fixed contributions: 20.3%

Fixed contributions of 20.3%



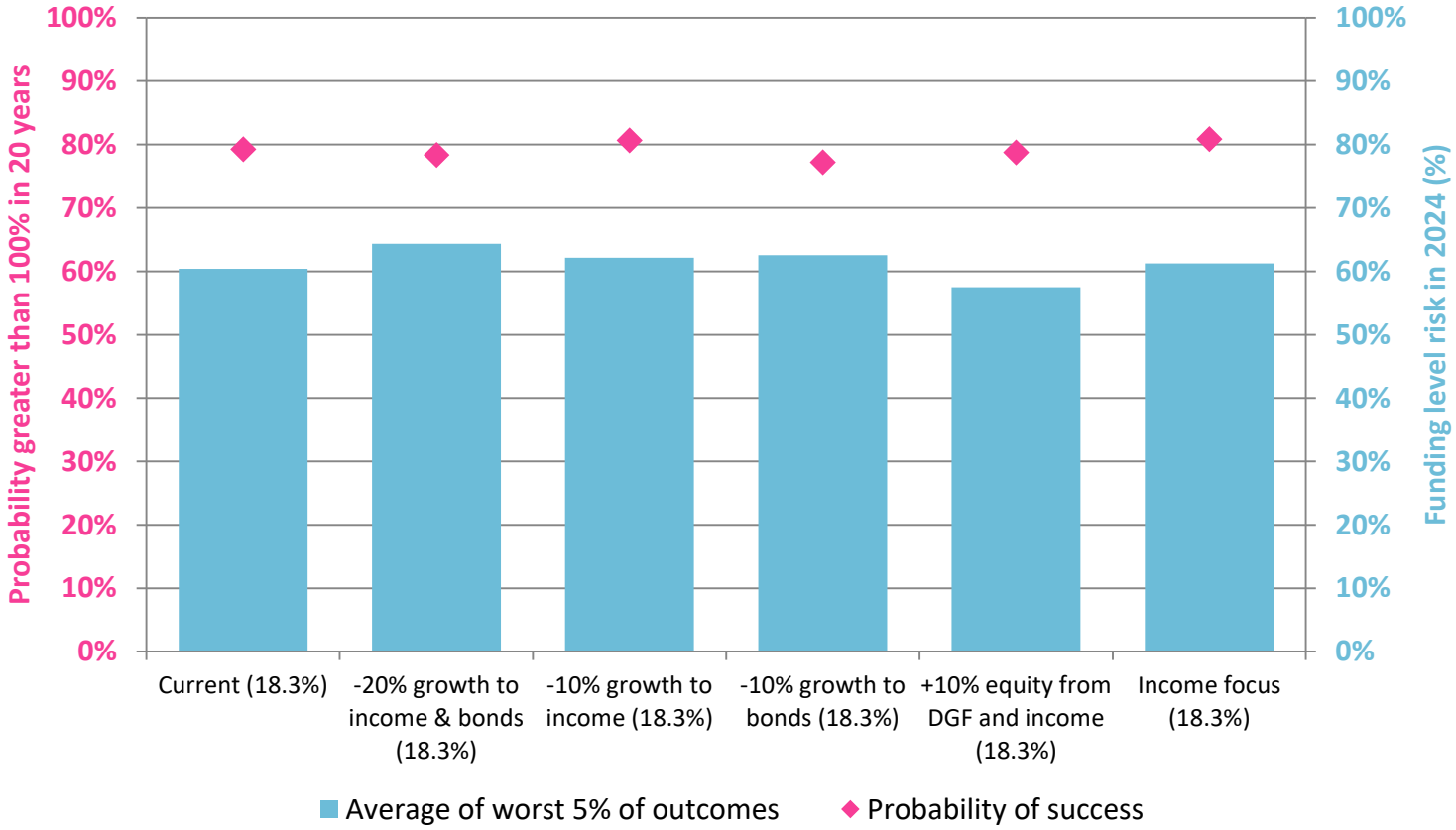
- Modelling based on the 4% discount rate agreed as part of the actuarial valuation

Initial comments

- The funding level is expected to increase over time (median)
- Maintaining the current level of contributions over the whole projection period gives a high chance of ‘success’ under all strategies
- This is not surprising as it represents a very large amount of cash being paid into the Fund with much less reliance on investment returns
- Switches from growth to income assets improve both the probability of being fully funded in future and the level of downside risk
- This reflects the benefits of diversification and expected returns from the income assets
- Switches into low risk bonds reduce the probability of being fully funded but provide slightly more downside protection

Targeting lower contribution rates

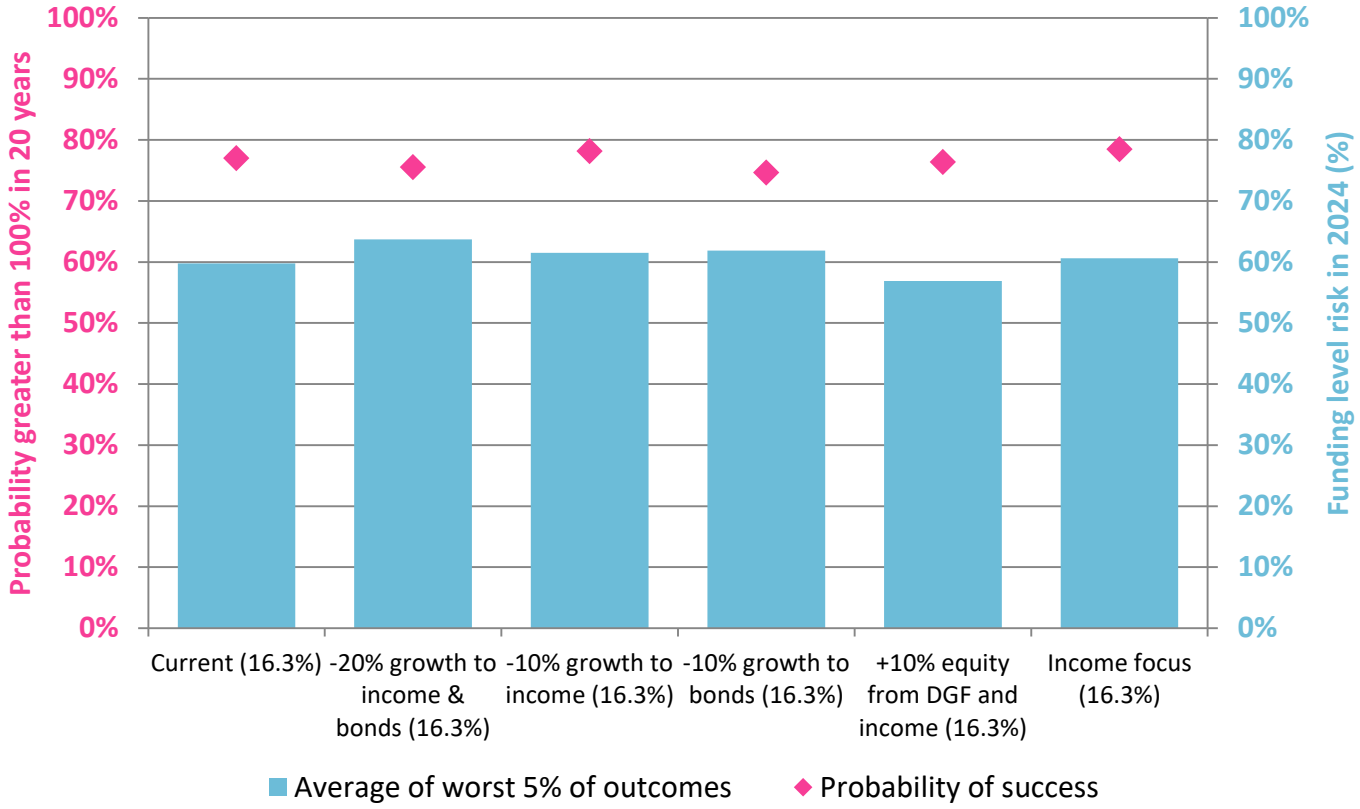
Fixed contributions of 18.3%



- Modelling based on the 4% discount rate agreed as part of the actuarial valuation

Targeting lower contribution rates

Fixed contributions of 16.3%



- Modelling based on the 4% discount rate agreed as part of the actuarial valuation

Initial conclusions

- As lower levels of contribution rate are targeted, the chances of being fully funded in future reduce for all strategies – as less cash is being paid in
- Even under a fixed long term contribution rate of 16.3%, the probability of success under all scenarios is at least 70%

- Switches into Income assets are generally most attractive from a risk / return perspective – improving downside risk and maintaining high chances of success
  - However, the illiquidity of some of the Income Assets – and the constraints and sensitivities inherent in modelling newer asset classes - need to be considered

- At higher funding levels, there may be some attraction in de-risking – into low risk bonds

Climate change analysis

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Modelling scenarios

- The analysis is based on three scenarios representing how governments and businesses might respond to climate risk in future. We also allow for the potential impact on longevity according to our Club Vita analysis. For each scenario we consider how future economic variables (inflation, interest rates, investment returns, etc) could differ to our current default assumptions, and show the resulting evolution of the funding level.
- **Head in the Sand**
- A range of disastrous outcomes resulting from a total lack of response to climate risk - Global crop failures, influx of new diseases, severe temperature fluctuations resulting in harsh flu epidemics. Antibiotic resistance rises as new discoveries are limited.
- **Challenging times**
- Some adaptation achieved - "Peak oil flow" is reached constraining economies of the future. Increasing fuel prices, constrained government finances, difficulty obtaining access to imported foods. More/less severe for lower/higher socio-economic groups.
- **Green revolution**
- Rapid technological advances leading to positive adaption to climate change. Healthier lifestyles prevail (walking, cycling, etc), diets improve with less processed food consumption, homes protected against extreme temperatures.

In the following charts we show the scenarios that reflect each of these environments based on the ALM analysis from the earlier section of this report. This is based on the current investment and contribution strategy. We have then summarised the potential impact on funding level based on each of the 3 sets of climate related scenarios.

Economic, financial and longevity impacts

Head in the sand

	3 years	10 years	20 years
GDP growth	↑	↓	↓↓
Inflation	↔	↑	↑
Global equity returns	↑	↓	↓↓
Credit spreads	↔	↑	↑↑
Nominal gilt yield	↑	↔	↓
Real gilt yield	↑	↓	↓↓

Longevity impact

Challenging times

	3 years	10 years	20 years
GDP growth	↔	↓	↓
Inflation	↔	↑	↑
Global equity returns	↑	↓↓	↓
Credit spreads	↔	↑↑	↑
Nominal gilt yield	↑	↓	↓
Real gilt yield	↔	↓↓	↓

Longevity impact

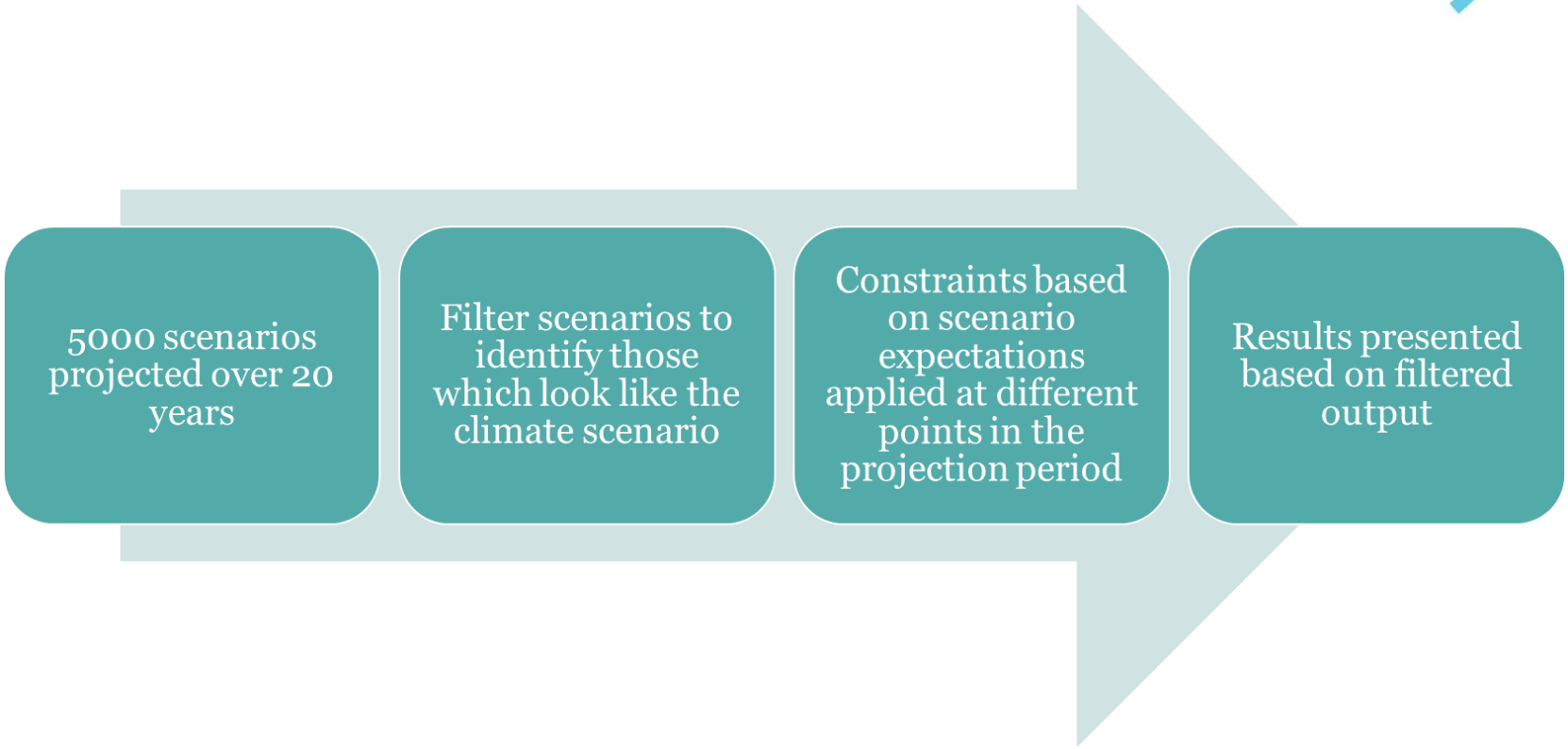
Green revolution

	3 years	10 years	20 years
GDP growth	↓	↔	↔
Inflation	↑	↑	↔
Global equity returns	↓↓	↔	↑
Credit spreads	↑↑	↑	↔
Nominal gilt yield	↑	↑	↔
Real gilt yield	↔	↔	↔

Longevity impact

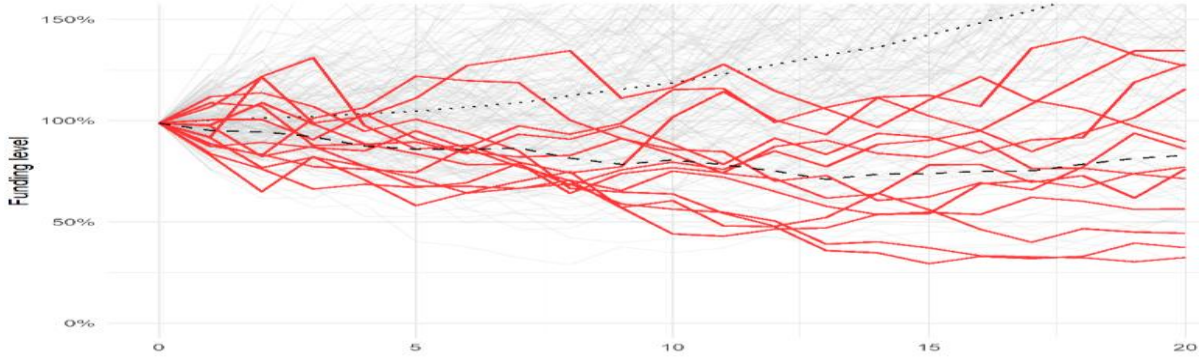
Source for longevity impact: Club Vita- Hot and Bothered?

Modelling approach

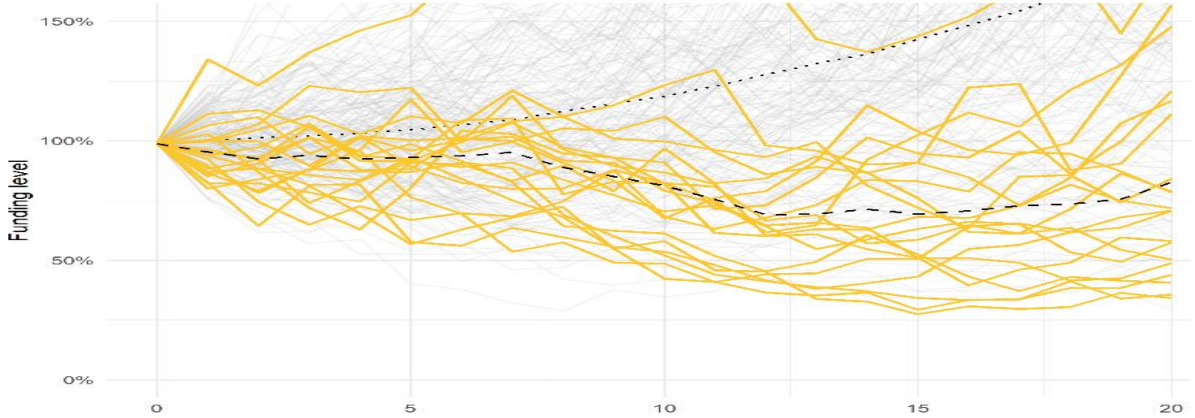


Designed to facilitate discussion

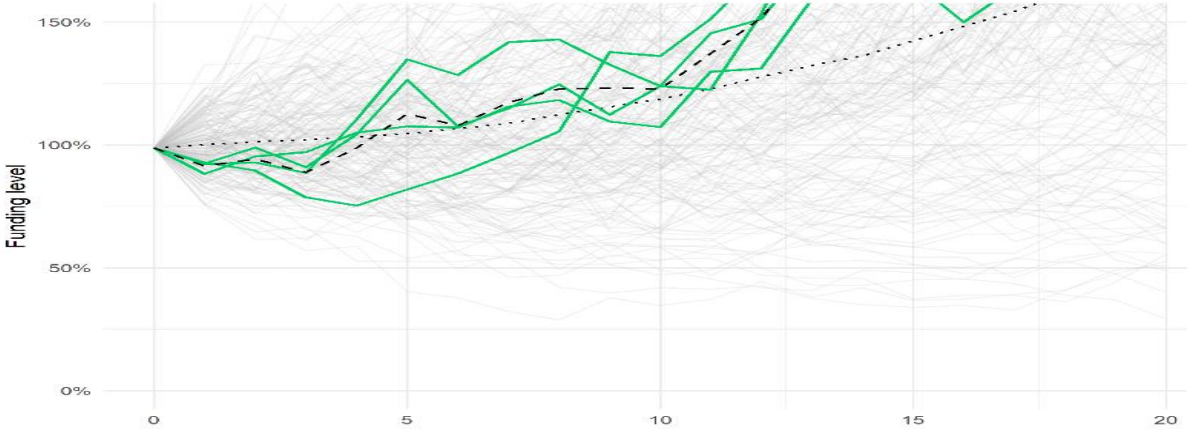
Results



Head in the sand



Challenging times



Green revolution

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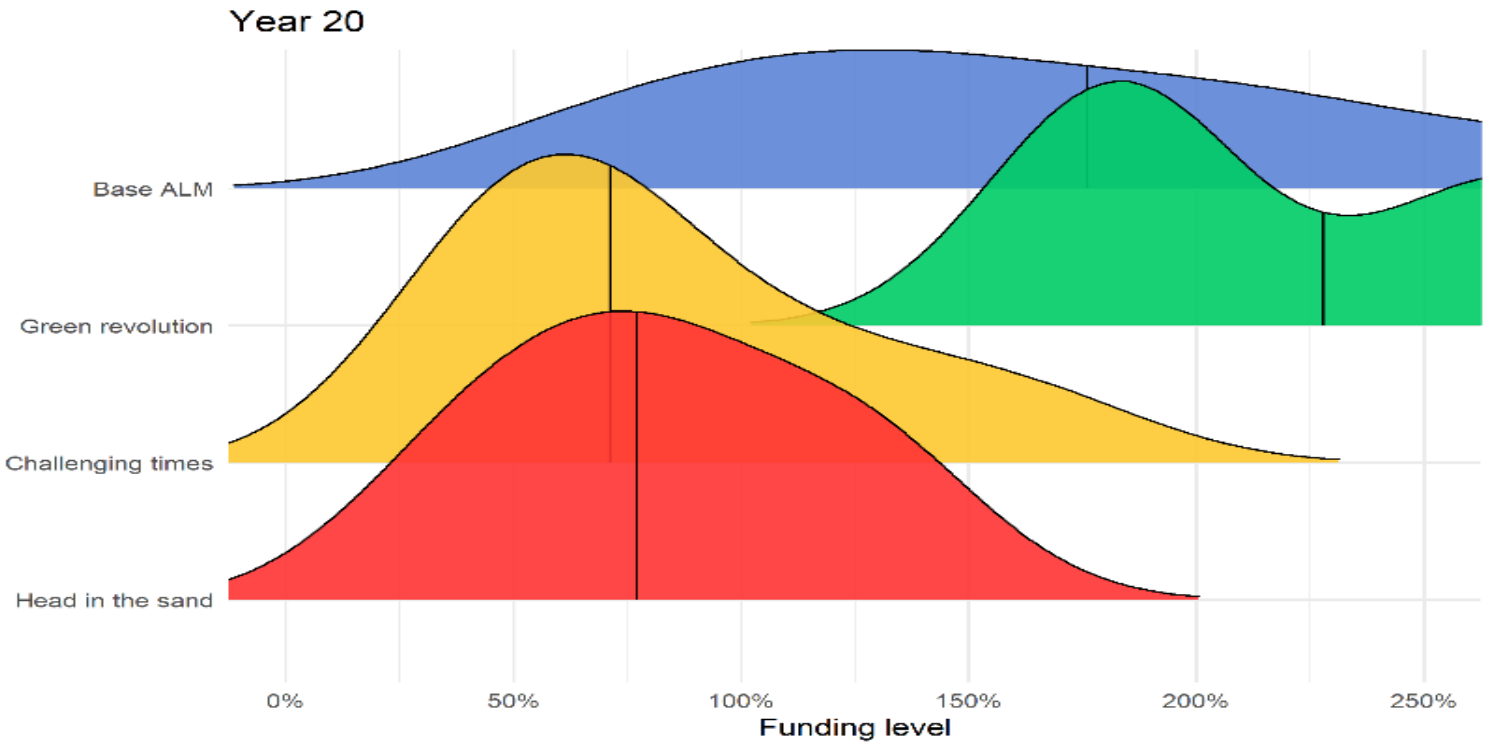
Results



- Based on 4% discount rate, current asset allocation, fixed contributions: 20.3%
- Significant downside risk to funding under some scenarios
- Designed to facilitate discussion

Appendix

Details of approach taken within the modelling (1)

The ALM combines the scheme's cashflows, an investment strategy including any hedging, contributions into the scheme and stochastic economic scenarios from our economic model (ESS) to create stochastic projections of the scheme's funding positions.

In projecting forward the evolution of the Scheme, we have used estimated cashflows generated using our actuarial valuation system, based on information provided as part of the 2019 actuarial valuation of the scheme including the scheme rules.

Except where stated, we do not allow for any variation in actual experience away from the demographic assumptions underlying the cashflows. Variations in demographic assumptions (and experience relative to those assumptions) can result in significant changes to the funding level and contribution rates. We allow for variations in inflation (RPI or CPI as appropriate), inflation expectations (RPI or CPI as appropriate), interest rates and asset class returns. Cashflows into and out of the Scheme are projected forward in annual increments, are assumed to occur in the middle of each year and do not allow for inflation lags. Investment strategies are assumed to be rebalanced annually.

We have estimated future service benefit cashflows and projected salary roll for new entrants after the valuation date such that payroll remains constant in real terms (i.e. full replacement). There is a distribution of new entrants introduced at ages between 25 and 65, and the average age of the new entrants is assumed to be 40 years. All new entrants are assumed to join and then leave service at SPA, which is a much simplified set of assumptions compared with the modelling of existing members. The base mortality table used for the new entrants is an average of mortality across the LGPS and is not client specific, which is another simplification compared to the modelling of existing members. Nonetheless, we believe that these assumptions are reasonable for the purposes of the modelling given the highly significant uncertainty associated with the level of new entrants.

In modelling some of the LGPS benefits, we have assumed;

- Salary growth is assumed to have a floor of 0% and to be modelled in line with inflation plus (or minus) any additions applied.
- S148 salaries / national average earnings is assumed NOT have a floor and is projected in line with our projections of national average earnings and valued in line with inflation plus any additions applied.
- Non-accruing and accruing CARE benefits increase in line with CPI (no floor).

Details of approach taken within the modelling (2)

ESS

The distributions of outcomes depend significantly on the Economic Scenario Service (ESS), our (proprietary) stochastic asset model. This type of model is known as an economic scenario generator and uses probability distributions to project a range of possible outcomes for the future behaviour of asset returns and economic variables. Some of the parameters of the model are dependent on the current state of financial markets and are updated each month (for example, the current level of equity market volatility) while other more subjective parameters do not change with different calibrations of the model.

Key assumptions include:-

- The average excess equity return over the risk free asset and its volatility which affects growth asset returns
- The level and volatility of yields, credit spreads, inflation and expected (breakeven) inflation, which affect the projected value placed on the liabilities and bond returns.
- The gap between CPI and RPI. The market for CPI linked instruments is not well developed; this is based on our judgement.
- The output of the model is also affected by other more subtle effects, such as the correlations between economic and financial variables.
- We expect that long term real interest rates will gradually rise from their current low levels. Higher long-term yields would mean a lower value placed on liabilities and hence an improvement in the current funding position unless the scheme is fully hedged.

While the model allows for the possibility of scenarios that would be extreme by historical standards, including very significant downturns in equity markets, large systemic and structural dislocations are not captured by the model. Such events are unknowable in effect, magnitude and nature, meaning that the most extreme possibilities are not necessarily captured within the distributions of results.

A summary of economic simulations used is included further on in this document. We would be happy to provide fuller information about the scenario generator, and the sensitivities of the results to some of the parameters, on request.

Details of approach taken within the modelling (3)

Investment strategy and contributions

The investment strategies and contributions modelled have been agreed as part of the scoping process. The most important assumption for the assets is which asset class to use for each of the assets.

Investment strategy is likely to change with significant changes in funding level, but unless stated otherwise we have not considered the impact of this in order to focus on the high level investment strategy decision.

The returns that could be achieved by investing in any of the asset classes will depend the exact timing of any investment/disinvestment, the costs associated with buying or selling these assets and liquidity of the asset classes. The model implicitly assumes that all returns are net of fees and ignores these other factors.

Unless stated otherwise, we have assumed that all contributions are made and not varied throughout the period of projection irrespective of the funding position. In practice the contributions are likely to vary especially if the funding level changes significantly.

Expected rates of return and volatilities 30 November 2019

The following figures have been calculated using 5,000 simulations of the Hymans Robertson Economic Scenario Service, calibrated using market data as at 30 November 2019. All returns are shown net of fees. Percentiles refer to percentiles of the 5,000 simulations and are the annualised total returns over 5, 10 and 20 years, except for the yields which refer to the (simulated) yields in force at that time horizon.

		Annualised total returns													
		Index Linked Gilts (medium)	Fixed Interest Gilts (medium)	UK Equity	Overseas Equity	Private Equity	Property	Infrastructure Equity	Diversified Growth Fund	Absolute Return Bonds (inv grade)	Senior Loans (sub inv grade)	Corporate bonds (median)	Inflation	17 year real yield	17 year yield
5 years	16th %'ile	-2.6%	-2.6%	-3.7%	-3.9%	-7.0%	-3.5%	-4.5%	-2.1%	1.2%	1.3%	-2.6%	1.5%	-2.7%	0.5%
	50th %'ile	0.3%	0.1%	4.0%	4.3%	5.2%	2.3%	4.3%	3.2%	2.3%	3.8%	0.4%	3.1%	-1.8%	1.6%
	84th %'ile	3.3%	2.9%	12.3%	12.4%	19.0%	8.9%	14.1%	8.7%	3.2%	5.8%	3.4%	4.6%	-0.9%	2.9%
10 years	16th %'ile	-2.2%	-1.4%	-1.4%	-1.4%	-2.8%	-1.6%	-1.7%	-0.4%	1.2%	1.8%	-1.2%	1.5%	-2.2%	0.8%
	50th %'ile	-0.1%	0.0%	4.3%	4.5%	5.6%	2.8%	4.6%	3.4%	2.4%	3.8%	0.5%	3.1%	-1.0%	2.3%
	84th %'ile	2.1%	1.4%	10.4%	10.5%	14.9%	7.4%	11.3%	7.3%	3.6%	5.6%	2.2%	4.9%	0.3%	4.0%
20 years	16th %'ile	-1.3%	-0.1%	0.9%	1.0%	0.2%	0.4%	0.9%	1.5%	2.0%	3.1%	0.3%	1.6%	-1.6%	1.2%
	50th %'ile	0.4%	0.7%	5.5%	5.5%	6.6%	3.8%	5.7%	4.3%	3.5%	4.8%	1.4%	3.1%	0.1%	3.2%
	84th %'ile	2.0%	1.5%	10.1%	10.0%	13.6%	7.4%	10.6%	7.3%	5.1%	6.8%	2.4%	4.7%	1.9%	5.7%
	Volatility (Disp) (1 yr)	7%	7%	17%	17%	29%	14%	20%	12%	2%	5%	9%	1%		

The calibration of the model indicates that a period of outward yield movement is expected. For example, over the next 20 years our model expects the 17 year maturity annualised real (nominal) interest rate to rise from -2.2% (1.1%) to 0.1% (3.2%).

Thank you

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