

The background of the slide features the coat of arms of the Government of Nunavut. It is a shield divided into four quadrants. The top-left quadrant shows a yellow diagonal cross on a white background. The top-right quadrant depicts a white caribou head with large antlers on a yellow background. The bottom-left quadrant shows a white sailing ship on a yellow background. The bottom-right quadrant features a white eagle with spread wings on a yellow background. Above the shield is a crown with four white maple leaves. A white banner at the bottom contains the text "ANE FOR A'".

## **Agenda Item 6**

# **Investment Strategy Update**

**Falkirk Council**

**Subject: Investment Strategy Update**

**Meeting: Joint Meeting of Pensions Committee and Pension Board**

**Date: 6 December 2018**

**Submitted by: Director of Corporate and Housing Services**

**1. Purpose of Report**

- 1.1 The purpose of this report is to provide Committee and Board with details of the conclusions from the Fund's review of investment strategy and to ask Committee to approve the strategy.
- 1.2 The proposed strategy is essentially unchanged from the current strategy. However, going forward, it is proposed to closely monitor the impact of bond yields on the funding level. Opportunities to reduce risk will be considered if bond yields and funding levels increase significantly.
- 1.3 The review of strategy has been undertaken in collaboration with Lothian and Fife Pension Funds, working with the Joint Investment Strategy Panel and with the support of Hymans Robertson. The review aims to define high-level strategy in terms common to each of the three funds in order to facilitate greater collaboration and efficiency in the implementation of the strategy.

**2. Recommendations**

- 2.1 **The Pensions Committee and Pension Board are asked to note the proposed investment strategy as set out in paragraphs 8.1 to 8.3.**
- 2.2 **The Pensions Committee is asked to agree the proposed investment strategy as set out in paragraphs 8.1 to 8.3.**

**3. Background**

- 3.1 Following the completion of the 2017 actuarial valuation an in-depth review of investment strategy has been undertaken.
- 3.2 The investment strategy of a pension fund has a significant impact on its investment performance, funding level and employer contribution rates. Setting strategy is therefore a major consideration for the Pensions Committee.
- 3.3 The review has been undertaken in collaboration with the Lothian and Fife Pension Funds, working with the Joint Investment Strategy Panel. A training event was held for the Committees and Boards of the three funds on 19 November to provide background information on the review and a forum for discussion.

- 3.4 Committee and Board will recall that the three funds have previously agreed similar governance arrangements, including the operation of the Joint Investment Strategy Panel. Under these arrangements:
- the Pensions Committee of each Fund decides on its investment strategy based on the funding position and Committee's appetite for risk;
  - the Pensions Committee delegates the implementation of investment strategy to the Chief Finance Officer taking advice from the Joint Investment Strategy Panel;
  - the Chief Finance Officer works with Fund officers to implement the strategy and reports to Committee and Board at quarterly meetings; and
  - the Pensions Committee retains overall responsibility and monitors the implementation of strategy and its degree of success.
- 3.5 Advice on investment strategy is available to the three Pensions Committees from the Joint Investment Strategy Panel, which consists of two FCA accredited members of the Lothian team and two independent advisers, Scott Jamieson and Gordon Bagot. In considering the current strategic options, support has also been provided by Hymans Robertson, in the shape of an asset liability modelling exercise. Scott Jamieson, one of the advisers, is attending today's meeting and will be available to comment further on the proposed strategy.
- 3.6 In considering alternative strategies, it should be noted that strategies which target higher returns are likely to require lower employer contributions. However, such strategies will be accompanied by a more volatile funding pattern with a higher risk of poor funding outcomes and the need for increased employer contributions if the investments do not perform as expected.
- 3.7 Anticipated outcomes of this review for the three funds are:
- a set of common investment beliefs (these will be brought to a future meeting of the Committee as part of a revised version of the Statement of Investment Principles); and
  - a common naming convention for high level asset classes (so that the three Funds are using the same terminology)
- 3.8 The current and long term strategic asset allocations for the Falkirk Fund are as follows:

<b>Asset Category</b>	<b>Current Strategic Allocation %</b>	<b>Projected Long Term Strategic Allocation %</b>
Equities	55	25
Multi Asset	10	10
Property	10	15
Bonds	10	20
Private Debt	5	5
Infrastructure	9	9
Affordable Housing	1	1
Other Real Income Assets	-	15
<b>Total</b>	<b>100</b>	<b>100</b>

- 3.9 The most recent review of strategy took place in 2015 at which time the Fund set itself the long term goals of seeking to reduce its exposure to equities whilst striving to maintain contribution affordability for employers. The immediate short term impact was to remove the allocation to private equity and to increase / initiate allocations to infrastructure and private debt.

## 4. Funding Position

- 4.1 As outlined in the earlier Funding Update report, Falkirk's funding position past and present is as follows:

	Valuation at 31/03/2014	Valuation at 31/03/2017	Estimate at 31/10/2018
Fund Assets	£1,577m	£2.219m	£2,420m
Fund Liabilities	£1,860m	£2,403m	£2,566m
Surplus/ (Deficit)	(£283m)	(£184m)	(£146m)
Discount Rate	Gilts+1.6%	Gilts+1.8%	Gilts+1.8%
<b>Funding Level</b>	<b>85%</b>	<b>92%</b>	<b>94%</b>

- 4.2 The current investment review is based on the results of the 2017 actuarial valuation and the latest funding update at October 2018.
- 4.3 Committee and Board will recall that in the interests of maintaining stable contributions rates, a Contribution Stability Mechanism has been in place for a number of years. Under this mechanism, the most financially secure employers in the Fund have been allowed to pay contributions below the rate implied by their respective funding positions. This has been on the basis that those employers have agreed to increase their contributions over the valuation cycle – usually by 0.5% per year.
- 4.4 The table below shows the cashflows into and out of the Fund. It illustrates the reducing net cashflow position and the steadily maturing nature of the Fund's liabilities.

Cash Flow Table – Net (withdrawals) / additions from dealing with members					
	2008-09	2011-12	2013-14	2017-18	
	in'000	in'000	in'000	in'000	Trend
Income	66,287	76,927	79,749	83,880	Increasing
Expenditure	38,420	55,513	62,570	74,918	Increasing
<b>Net Cash Flow</b>	<b>£27,867</b>	<b>£21,414</b>	<b>£17,179</b>	<b>£8,962</b>	<b>Falling</b>

- 4.5 Whilst the Fund is still cashflow positive, the trend suggests that in time it will require to adopt a more income oriented strategy. This may be hastened should the financial climate in local government result in a shrinking of paybills and a corresponding reduction in the contribution intake. Work to model the impact of this type of scenario is being undertaken by the Actuary.

## 5. Asset Liability Modelling

- 5.1 Asset Liability Modelling is a tool which projects how the Fund's assets and liabilities might perform in the long-term. It therefore provides a framework to understand how likely the Fund is to achieve its objectives under different investment strategies. Under the Hymans Robertson Asset Liability Model 5,000 separate economic scenarios are tested.

- 5.2 Asset Liability Models make many assumptions about how the economy and investment markets might change in the future. As such, the modelling assumptions themselves need to be considered along with the results. At present, the assumption for future gilt yields is the most critical, given the impact of low yields on Fund liabilities (i.e. pushing them higher).
- 5.3 Hymans Robertson's asset liability model assumes, on average, that index-linked gilts will return -0.3% p.a. over the next 20 years, with real yields increasing to +0.8%. This compares with the real yield as at 31 October 2018 of -1.68%. The modelling therefore assumes a material rise in gilt yields over the 20 year assessment period.

## 6. The Results

- 6.1 The Fund's agreed objective is to have a funding level of 100% within a 20 year period. As such, it is expected that it would wish to set its investment strategy so as to:
- have a very good chance of achieving the 100% objective (e.g. a 3 in 4 chance would be reasonably prudent);
  - take as little investment risk as possible (e.g. by reducing exposure to equities where possible); and
  - keep employer contributions at an affordable level.
- 6.2 The Hymans model compares the likelihood of the 100% funding objective being achieved based on:
- the Fund's existing strategy (deemed to be 60% Equities, 20% Bonds and 20% Other Real Assets);
  - various alternative strategies containing fewer equities.
  - employer contributions being paid at a lower level; and
  - the Fund targeting a funding level of up to 110% with a view to creating a buffer to protect against future adverse outcomes.
- 6.3 The probabilities are set out in the table below:

	Based on employer contribution rate of 25% (i.e. current position)		Based on employer contribution rate of 20% (i.e. alternative position)	
Strategy Options	Chances of being 100% Funded by 2037*	Chances of being 110% Funded by 2037*	Chances of being 100% Funded by 2037*	Chances of being 110% Funded by 2037*
<b>Current Strategy (60% Equities / 20% Bonds / 20% Other Real Assets)</b>	84%	79%	79%	74%
<b>5% de-risk from equities</b>	85%	80%		
<b>10% de-risk from equities</b>	83%	77%		
<b>15% de-risk from equities</b>	81%	75%		
<b>20% de-risk from equities</b>	81%	74%		

\* 20 years on from 2017 Actuarial Valuation

- 6.4 The modelling shows that if contributions and investment strategy remain at their current level, the Fund would have an 84% chance of being fully funded in 20 years. De-risking from equities by 20% (i.e. from 60% to 40%) would only marginally reduce the chances of a successful funding outcome - to a 81% chance.
- 6.5 If the Fund wished to accommodate lower employer contributions then it could maintain its current strategy and still have a 79% chance of a satisfactory funding outcome.
- 6.6 Other results from the modelling show that with the current strategy:
- the Fund has a 50% chance of achieving 100% funding level by 2026
  - there is a 1 in 20 chance (5% likelihood) that the funding deficit in 2020 will be almost £1 billion.
- 6.7 Whilst the option of building a buffer by targeting a higher funding level is a worthy ambition, it is felt that in the current climate, where employer finances are under severe pressure, this should not be pursued at present. There is arguably sufficient prudence built into the funding model as it stands and in any event, the Fund's capacity to set a higher funding target would be re-visited at each three yearly valuation.
- 6.8. Overall, the results indicate that there is some scope for the Fund to reduce its level of investment risk by trimming its exposure to equities. However, there are several reasons why the Fund might not wish to do so;
- the Hymans numbers assume that over 20 years, gilt yields will revert to a historical norm, thus reducing the value of Fund liabilities . If this does not happen, then the success levels drop by around 10 – 15%
  - if the Fund wishes to have the flex to offer more accommodative employer contribution rates and funding levels remain as they are then it will most likely need to maintain its strategy (and equity exposure) at its current level
  - the financial pressures faced by fund employers may result in a fall in contribution income through declining payrolls. In that scenario, the return target for the Fund would have to increase to compensate for the fall in income with the likelihood of equity exposure having to be maintained.
- 6.9 The conclusion from the modelling and from the caveats outlined in 6.8 is that the Fund should maintain its current investment strategy whilst continuing to closely monitor the impact of bond yields. Opportunities to reduce risk, by reducing equities or (by changing the type of equities held) should be considered if bond yields and funding levels increase significantly.
- 6.9 The modelling indicates that maintaining the current investment strategy equates to the Fund targeting a return of gilts plus 2.8% p.a.
- 6.10 The results of the Hymans modelling are attached as an appendix to this report.

## 7. Policy Groups (i.e. High Level Asset Classes)

- 7.1 The Joint Investment Strategy Panel recommends that the Committee defines the Fund's high-level asset classes in terms of groups of assets with similar characteristics (i.e. "policy groups"). These groups are the key determinants of risk and return for the Fund and thus the modelling of strategy outcomes has been based around these categories. Details of the asset return and volatility assumptions used in the modelling are contained in the appendix.
- 7.2 The Joint Investment Strategy Panel has recommended five Policy Groups which condense the array of investment choices into a manageable number of categories. The proposed Policy Groups are shown in the table below:

Policy Groups	Objective	Permitted Assets
<b>Equities</b>	The principal driver of the Fund's growth which, in the long term, are expected to outperform liabilities, albeit with periods of volatility.	Listed equities; private equity; forward currency contracts; equity futures
<b>Other Real Assets</b>	Real returns with an income stream, in some way linked to inflation. Likely to deliver diversification from equities.	Property; infrastructure; timberlands; agriculture; commodities
<b>Gilts</b>	Assets offering strategic funding level protection.	Index linked gilts; nominal gilts; overseas sovereign bonds; forward currency contracts; gilt/bond futures
<b>Non Gilt Debt</b>	Assets offering strategic funding level protection and/or delivering a superior yield to that available on gilts (where returns may have a positive correlation to bonds).	Investment grade bonds; high yield bonds; loans; private credit; emerging market debt
<b>Cash</b>	Liquidity function avoiding (mostly) credit and duration risk premia.	UK Treasury assets; overseas treasury assets; local authority loans; bank/building society deposits (all short term)

- 7.3 The proposed Policy Groups are the same for the Falkirk, Fife and Lothian funds and are designed to facilitate joint working by introducing common terminology, controls and constraints to deliver efficiencies.
- 7.4 Under the governance structure of all three Funds, the implementation of the investment strategy within these Policy Groups is delegated by the Pensions Committees to nominated officers with advice from the Joint Investment Strategy Panel.
- 7.5 The modelling results show that the level of equities is the key driver of investment risk and return. Variation in the types of investment managers within each Policy Group is therefore of much less significance to the overall risk and return profile than the high level allocation to the policy groups.

## 8. Recommended Strategy

- 8.1 The recommendation is for the Fund to continue with its existing strategy. This is set out in the table below, with the proposed strategic allocation reconfigured in terms of the new Policy Groups.

Policy Group	Current and Proposed Strategic Allocation %
Equities	60
Other Real Assets	20
Non Gilt Debt	15
Gilts	5
Cash	0
<b>Total</b>	<b>100</b>

8.2 It is proposed that bond yields and funding levels continue to be monitored closely to determine whether there are opportunities to reduce investment risk. Options to reduce risk within the equity allocation (through altering the type of stock held) could also be explored as an alternative to reducing the overall allocation to equities.

8.3 Ranges to limit asset allocations are also proposed. These are shown in the table below. The ranges provide limits within which the Chief Finance Officer can implement the strategy. The proposals, for example, would allow the Fund's equities to be in the range 45% to 65%. Although the spread of the limits is significant, the proposal recognises that asset values can move widely and quickly (particularly equities) and having limits that are too narrow could trigger unnecessary and potentially costly re-balancing. In addition, setting broad ranges allows for prompt tactical investment decisions to be made in response to market activity (e.g. a rise in global markets or bond yields creating the opportunity for the Fund to de-risk).

Policy Group	Minimum %	Proposed Strategy 2019 – 2024 %	Maximum %
Equities	45	60	65
Other Real Assets	10	20	25
Non Gilt Debt	0	15	25
Gilt	0	5	20
Cash	0	0	10
<b>Total</b>	<b>-</b>	<b>100</b>	<b>-</b>

8.4 It is noted that the proposed strategies for the Lothian and Fife Funds are not dissimilar to the proposed Falkirk strategy. Where differences do occur these reflect the slightly different funding level and cash flow positions of the respective Funds. A comparison of the proposed strategies is set out in the table below:

Policy Group	Falkirk Fund	Fife Fund	Lothian Fund
Equities	60	50	65
Other Real Assets	20	20	18
Non Gilt Debt	15	15	10
Gilts	5	15	7
Cash	0	0	0
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

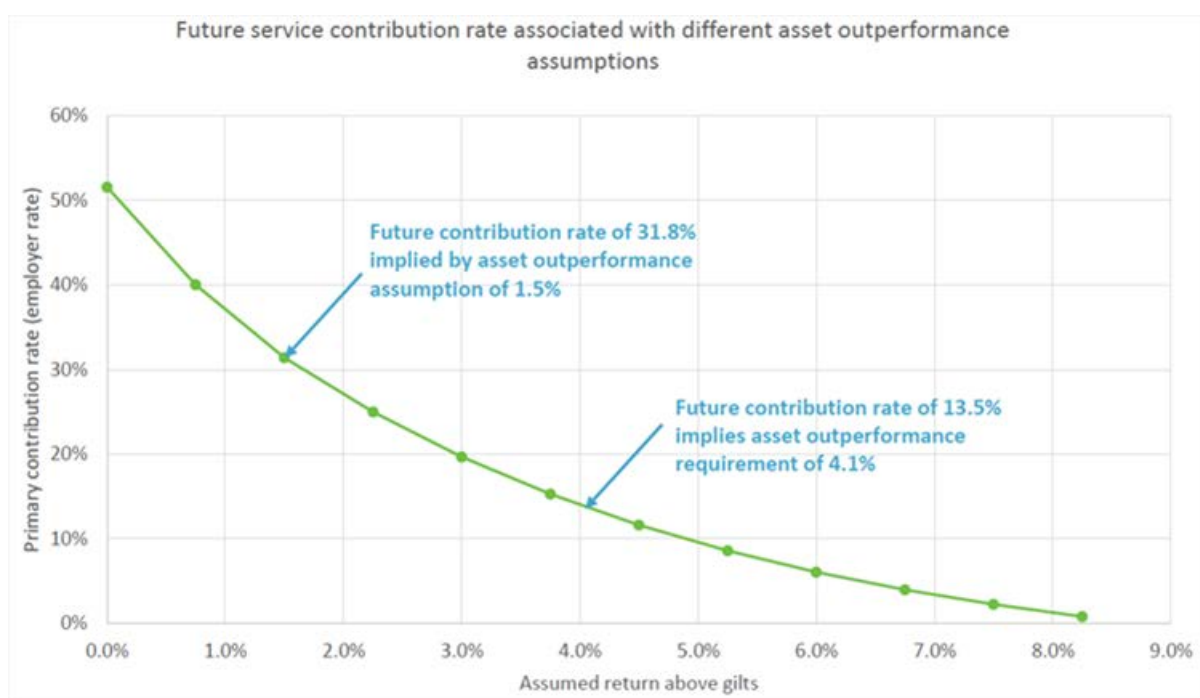


## 9. Next Steps

- 9.1 Subject to the approval of strategy reviews by the Fund and its collaborative partners, the Joint Investment Strategy Panel will work with the Funds to develop implementation options within the policy groups and monitor funding levels and bond yields to assess opportunities for risk reductions.
- 9.2 Further cashflow projections have been requested from the Fund's Actuary, to consider scenarios involving a reduction in fund membership. This will help to develop greater understanding of potential flows over the medium term and allow for the development of a cashflow strategy.
- 9.3 Updates will be provided to Committee and Board as implementation of the strategy progresses.

## 10. Measures of Success

- 10.1 The ultimate measure of success is the ability to pay pensions as they fall due. In the interim, the funding level and employers' contribution rates are key measures of success. This is because the investment return achieved by the Fund directly impacts both the funding level and employer contribution rates.
- 10.2 As mentioned earlier in this report, there is a trade-off between the target investment return and the employer contribution rate needed to fund new benefits. The relationship is illustrated in the chart below, which shows that as the target return is reduced the employer contribution rate rises sharply. In the chart, the target return is expressed as the asset outperformance above the return on gilts.



- 10.3 Having determined the overall return objective for the Fund (gilts plus 2.8%), which according to the graph implies an employer contribution in the 20 - 25% range, the investment strategy can be further distilled to show the long term return targets for the various policy groups. These are set out in the table overleaf and have also been expressed as the outperformance relative to gilts:

<b>Policy Group</b>	<b>Proposed Strategy 2019 - 2024</b>	<b>Long Term Expected Return</b>
<b>Equities</b>	60%	Gilts + 3.5 p.a.
<b>Other Real Assets</b>	20%	Gilts + 2.5 p.a.
<b>Non Gilt Debt</b>	15%	Gilts + 1% p.a.
<b>Gilts</b>	5%	Gilts + 0% p.a.
<b>Total</b>	<b>100</b>	<b>Gilts +2.8% p.a.</b>

- 10.4 Given the inherent volatility of the non-gilt asset classes relative to gilts, monitoring of actual returns relative to these long-term expected returns should be undertaken on a long-term basis (based on returns over 5 or more years).

## **11. Implications**

### **Financial**

- 11.1 The investment strategy has a significant impact on the investment returns of the pension fund and by extension the funding level and employer contribution rates.

### **Resources**

- 11.2 No additional resources are required as a result of this report. However, existing resources, including those available through the partnership arrangement with Lothian, will be needed in order to fully implement the agreed strategy.

### **Legal**

- 11.3 Scheme rules require that the Fund periodically reviews its asset allocation to ensure that it remains consistent with Fund objectives.

### **Risk**

- 11.4 The regular review of investment strategy is designed to ensure that the Fund's asset allocation – the key determinant of returns – is appropriate taking into account any change in the Fund's risk appetite and return requirements. Failure to set a suitable strategy may have adverse implications for Fund employers by causing untimely increases in contribution rates.

### **Equalities**

- 11.5 There are no equality issues arising from this report.

### **Sustainability/Environmental Impact**

- 11.6 There are no direct sustainability/environmental issues arising from this report. The Fund's policy of collaborating with like-minded Funds to engage with investee companies should reduce risk and enhance the sustainability of investment performance.

## **12. Conclusion**

- 12.1 A review of the Fund's investment strategy has been undertaken in conjunction with the Lothian and Fife Pension Funds, the support of the Joint Investment Strategy Panel and an investment consultant from Hymans Robertson. A training day giving details of the review process was held on 19 November and attended by various members of the Committee and Board.
- 12.2 The review recommends that the three Funds allocate their assets across five distinct "policy groups", namely equities, other real assets, gilts, non gilts debt and cash with each of these having a specific return target.
- 12.3 For the Falkirk Fund, following the completion of an asset liability modelling exercise, the review recommends that the current strategy of 60% equities, 20% Bonds and 20% Other Real Assets be maintained.

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Date: 28 November 2018

## **Appendices**

Appendix 1 – Hymans Robertson Paper – Development of Investment Strategy

### **List of Background Papers:**

None



# Development of Investment Strategy

Joint Investment Strategy Panel  
Falkirk, Fife and Lothian Pension Funds

- John Dickson, Senior Partner
- 23 November 2018

# Introduction

- This paper is addressed to the Joint Investment Strategy Panel (JISP) of the Falkirk Pension Fund, Fife Council Pension Fund and Lothian Pension Fund (the Funds).
- The purpose of this paper is to present the results of the asset liability modelling (ALM) exercise and comment on potential actions that may be taken.
- This paper may be disclosed to the respective Pension Committees of the Funds. We also accept that the paper can be part of the Committees public papers. However, the results and conclusions are not addressed to any party other than the JISP or the respective Pension Committees and no other party should rely on any of the content or advice contained in this paper. We accept no liability to any other party unless we have accepted such liability in writing.
- This paper has been prepared in accordance with the relevant professional standards (specifically the Technical Actuarial Standard, TAS 100: Principles for Technical Actuarial Work).
- Details of the Reliances & Limitations associated with this work and the assumptions made are set out as an Appendix.

# Outline of paper



Understand the role and importance of the investment strategy in context of current funding

Explain how we assess different investment strategies – asset liability modelling

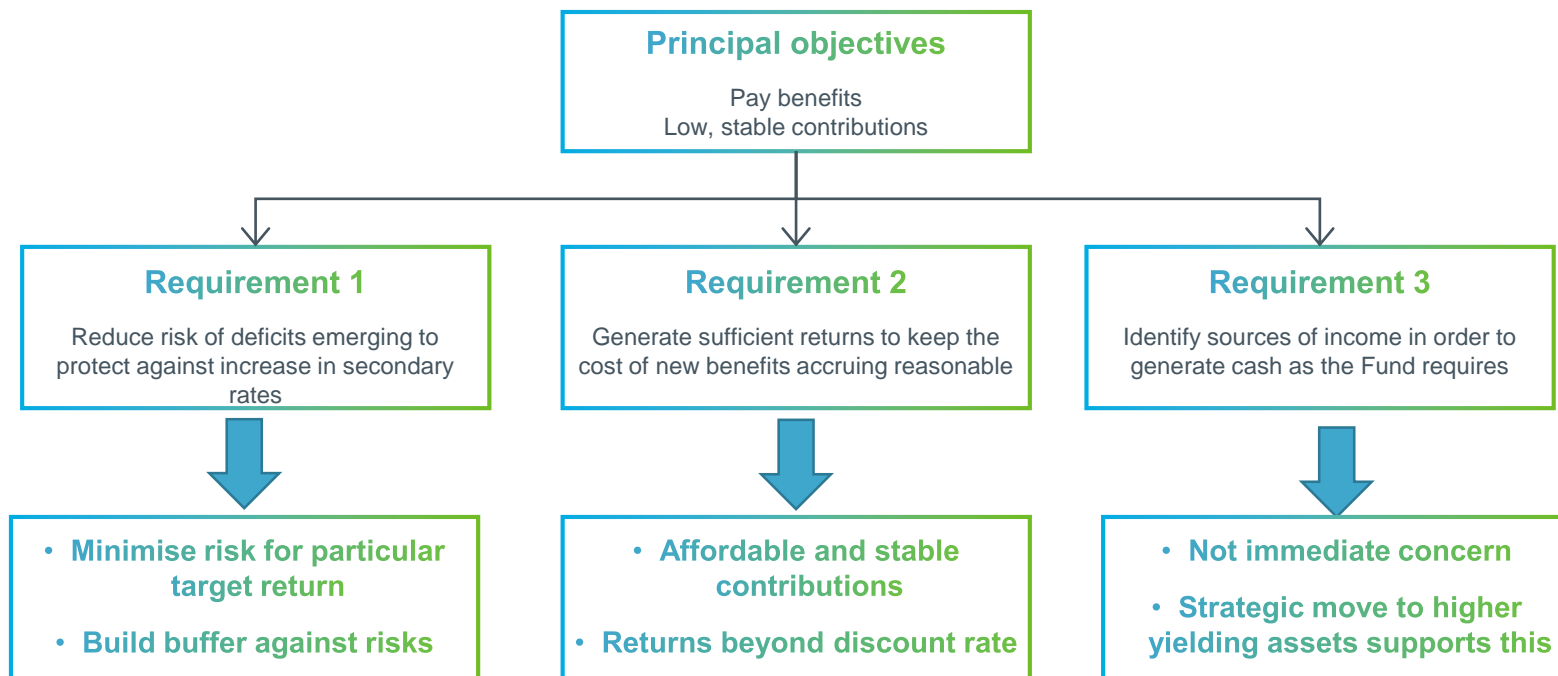
Present the results for each fund and the initial conclusions

Propose next steps to be considered

# Strategic objectives



# Strategic priorities



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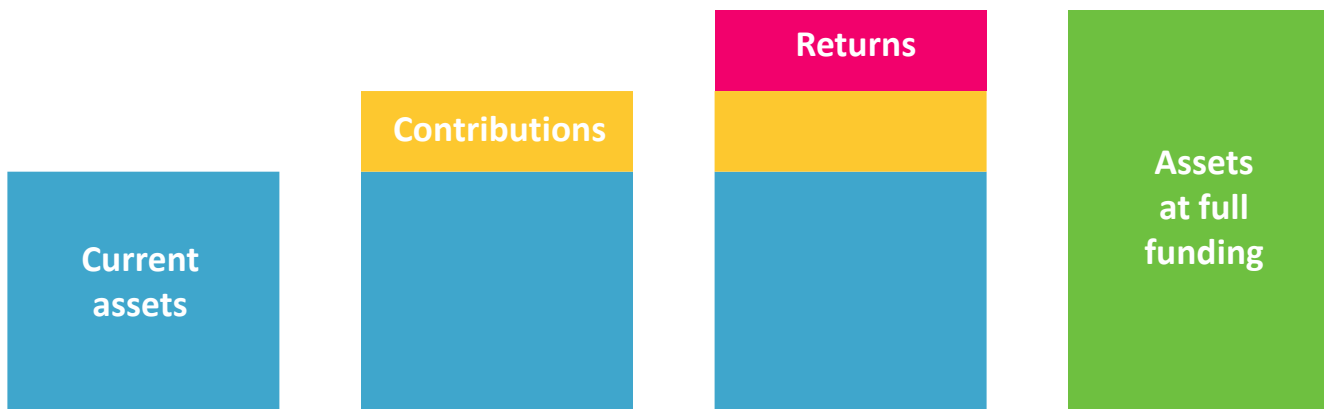
Seeking long-term affordability and stability

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# Achieving the objective

Past  
service

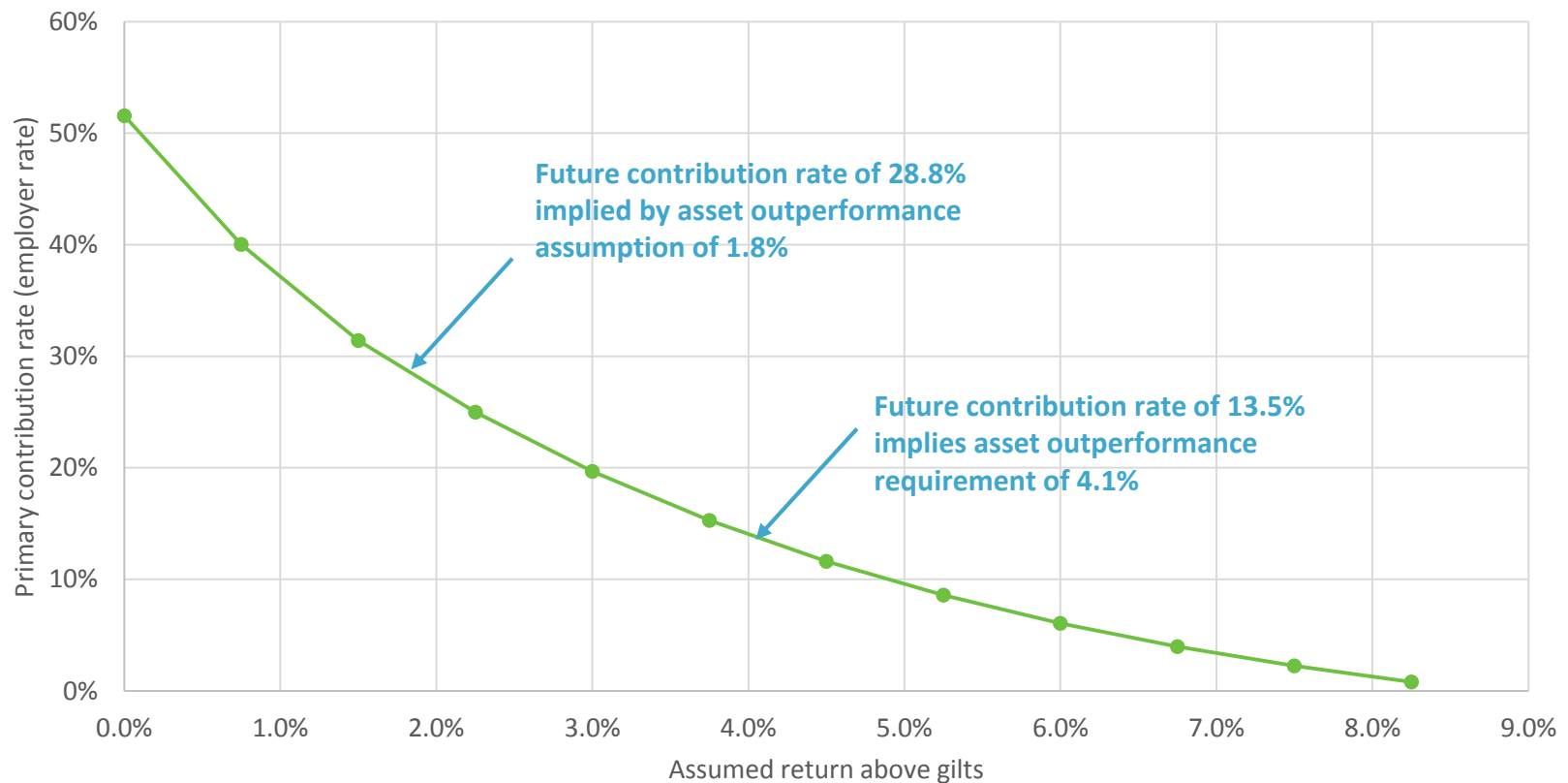


Future  
service



# Link between contributions and returns

Future service contribution rate associated with different asset outperformance assumptions



# Building towards a “steady state”

## Principal objectives:

- Provide pensions for current and future generations
- Get funding to **a steady state**
  - affordable and stable contributions
  - an appropriate level of investment risk - “target returns”

### Requirement 1

Reduce risk of deficits emerging to protect against increase in secondary rates

### Requirement 2

Generate sufficient returns to keep the cost of new benefits accruing reasonable

Getting the balance right for now and the future

# Invest to achieve objectives

## Past service benefits fully funded

- Seek to protect the strong funding positions of the Funds using suitable investments.
- Need a return in excess of the discount rate in the liabilities over the long term. **A**
  - Falkirk and Fife target at least a return of gilts + 1.8%; Lothian target gilts + 1.5%
- Generate return to bridge gap to 100% and potentially build up a buffer against adverse experience **B**
  - E.g. 110% funding level, or target 100% funded on a more prudent basis

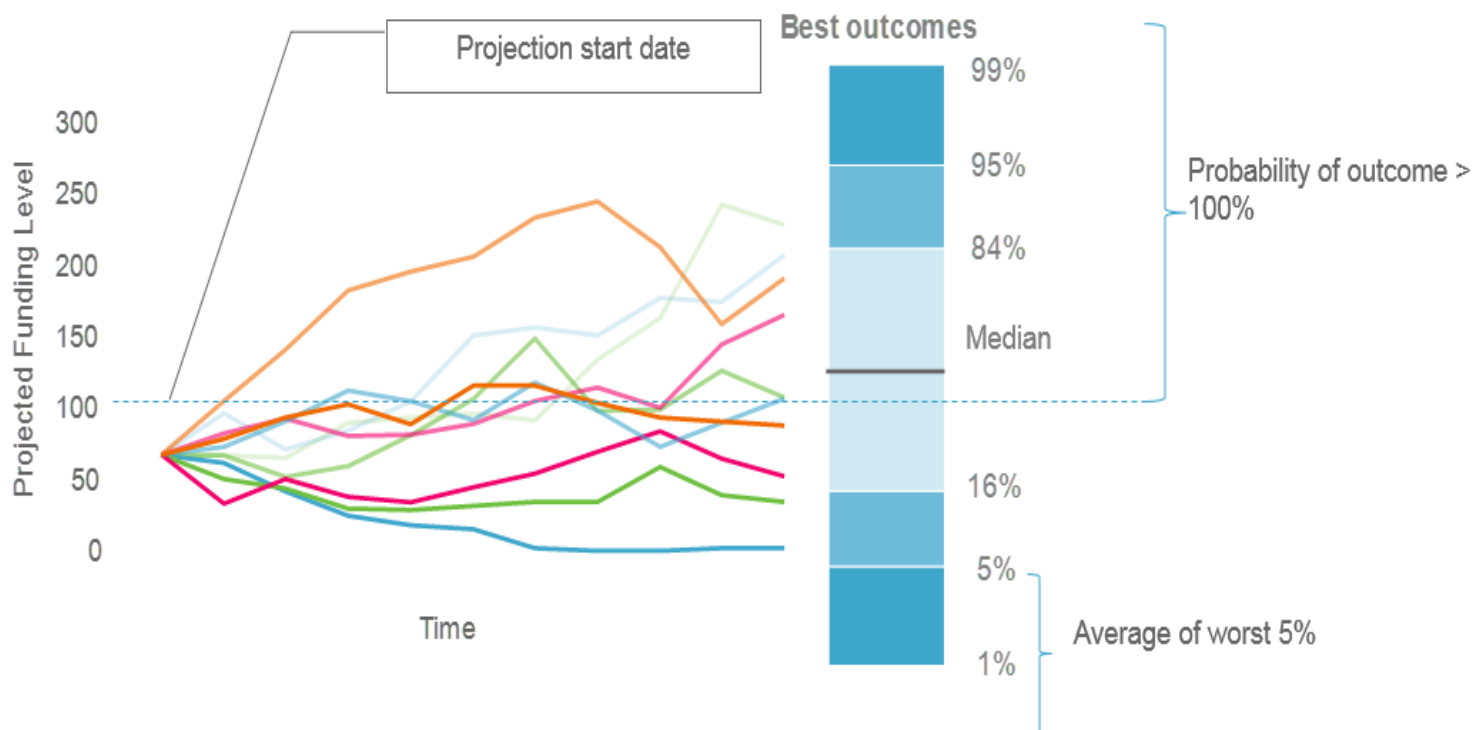
## Future service benefits need to remain affordable

- “Theoretical” future service rate at gilts + 1.8% is 28.8%; but stable affordable rate lower
- Generate return to cover gap between theoretical and affordable **C**
- Need investment strategy to generate A + B + C to achieve steady state
- Need investment strategy to generate A + C to maintain steady state

# Understanding the modelling



# Modelling the future



- We run 5,000 simulations of the future for each strategy
- The modelling uses market-consistent rates of return and volatilities and long-term characteristics of major asset classes
- Current conditions are viewed as “unusual”, particularly the low level of (real) interest rates
- Rank the 5,000 simulations from best to worst to give range of potential outcomes and focus on:
  - **Probability of success – of achieving funding level of 100% or 110% over 20 years. Target at least 2/3rds chance.**
  - **Downside risk – how bad could it get by next valuation. Consider worst outcomes over 3 years.**

# Asset allocation groups modelled

Equities	Real long term assets	Bonds	
		Higher yielding	Investment grade *
Overseas equity 80%	Infrastructure 50%	Multi-asset credit 50%	IG credit 50%
UK equity 6%	Core property 25%	Private lending 25%	Index-linked gilts 50%
EM equity 6%	Long lease property 25%	EMD 25%	
Private equity 8%			

*\*Note that investment grade bond portfolios have been allowed to vary by Fund*

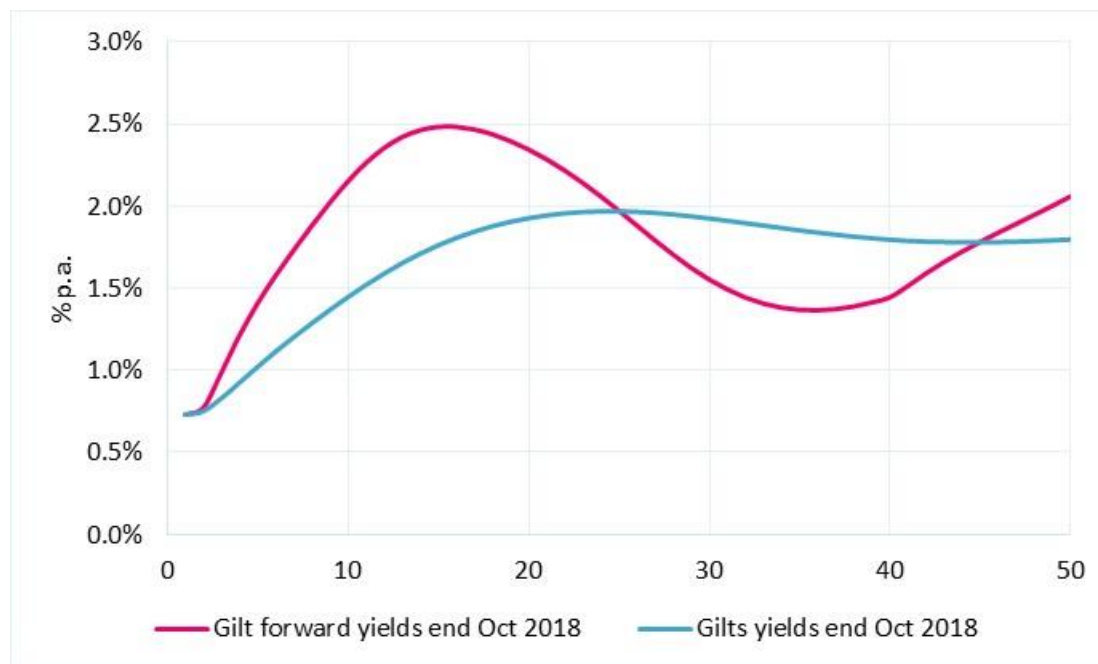
- Note that the exact asset mix of each fund does not precisely map across to these allocations...
- ...however, these building blocks are sufficient for comparison of different levels of investment risk.
- Use a range of mixes of these building blocks to consider a range of different investment strategies.

# Assumptions (see also Appendix)

	Asset Class	20 year median return	1 year volatility
Equities	Overseas Equity	6.0%	17%
	UK Equity	5.9%	17%
	Emerging Market Equity	6.4%	25%
	Private Equity	7.0%	28%
Real Long Term Assets	Infrastructure Equity	6.2%	20%
	Core Property	4.5%	14%
	Long Lease Property	4.5%	14%
High yielding bonds	Multi asset credit	5.3%	7%
	Private lending	5.6%	6%
	Emerging Market Debt	4.2%	12%
IG bonds	IG credit	2.1%	10%
	Index-linked gilts	-0.3%	9%



# Key assumption on gilt yields



- In our modelling we assume that the yield on government bonds will increase over time to higher levels than currently implied by markets.
- This impacts the probability of being fully funded in 20 years as we assume that some of the improvement comes from liabilities being valued at a higher discount rate.
- As part of our analysis, we have therefore also looked at scenarios where the impact of “yield reversion” is lower, i.e. the Funds get less of a “boost” from yields rising.

# ALM results: Falkirk

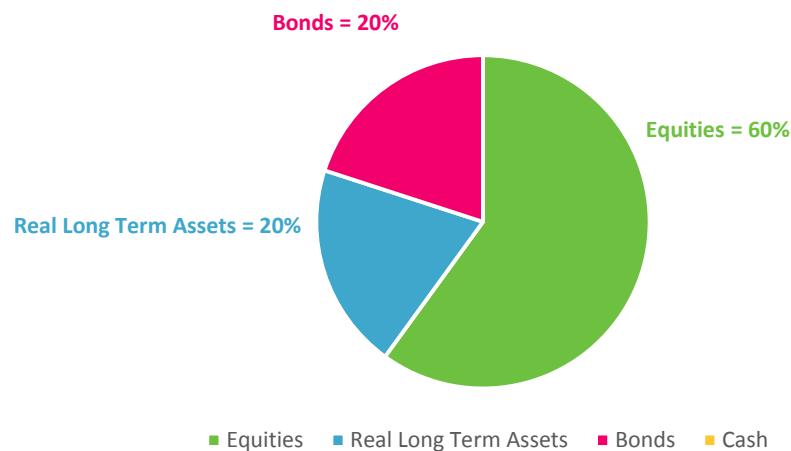
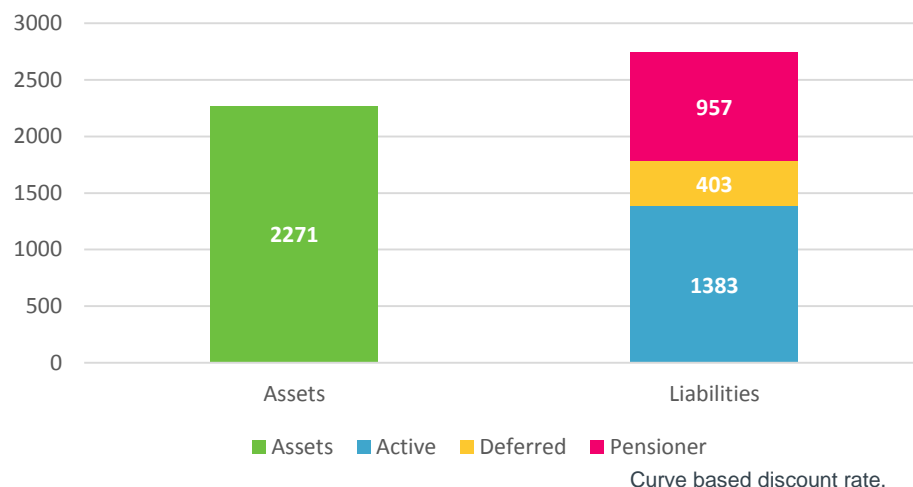


# Starting point: Assets and liabilities

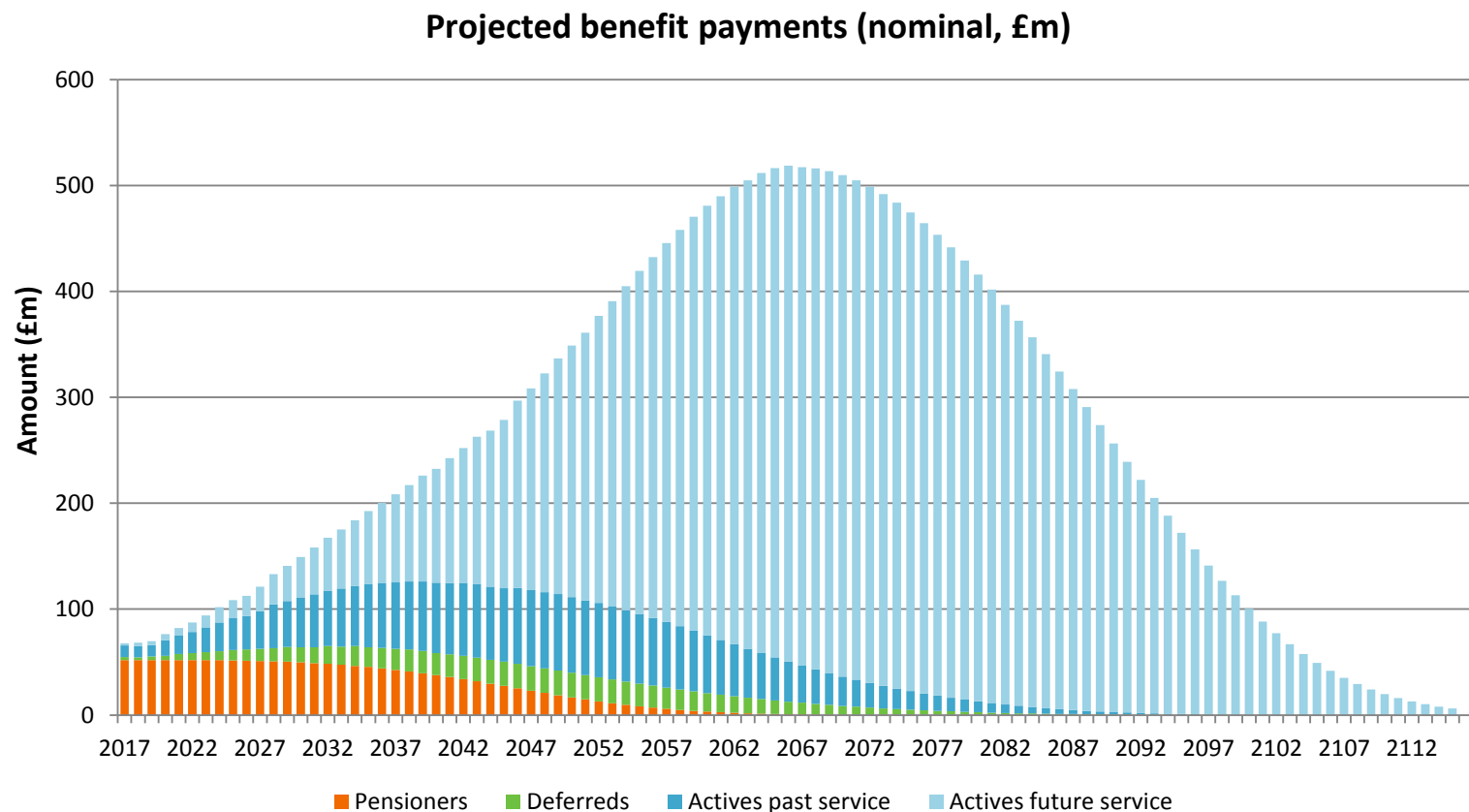
## Current strategy

- Equities currently account for the majority of the Fund's target allocation.
- Real long term assets portfolio is a combination of Property and Infrastructure.
- Bond portfolio is a combination of high yield credit, investment grade corporate bonds and gilts.
- The diversified growth fund (DGF) allocation is assumed to be 50% equity, 50% bonds for modelling purposes.

## Breakdown of funding position at 31 March 2018

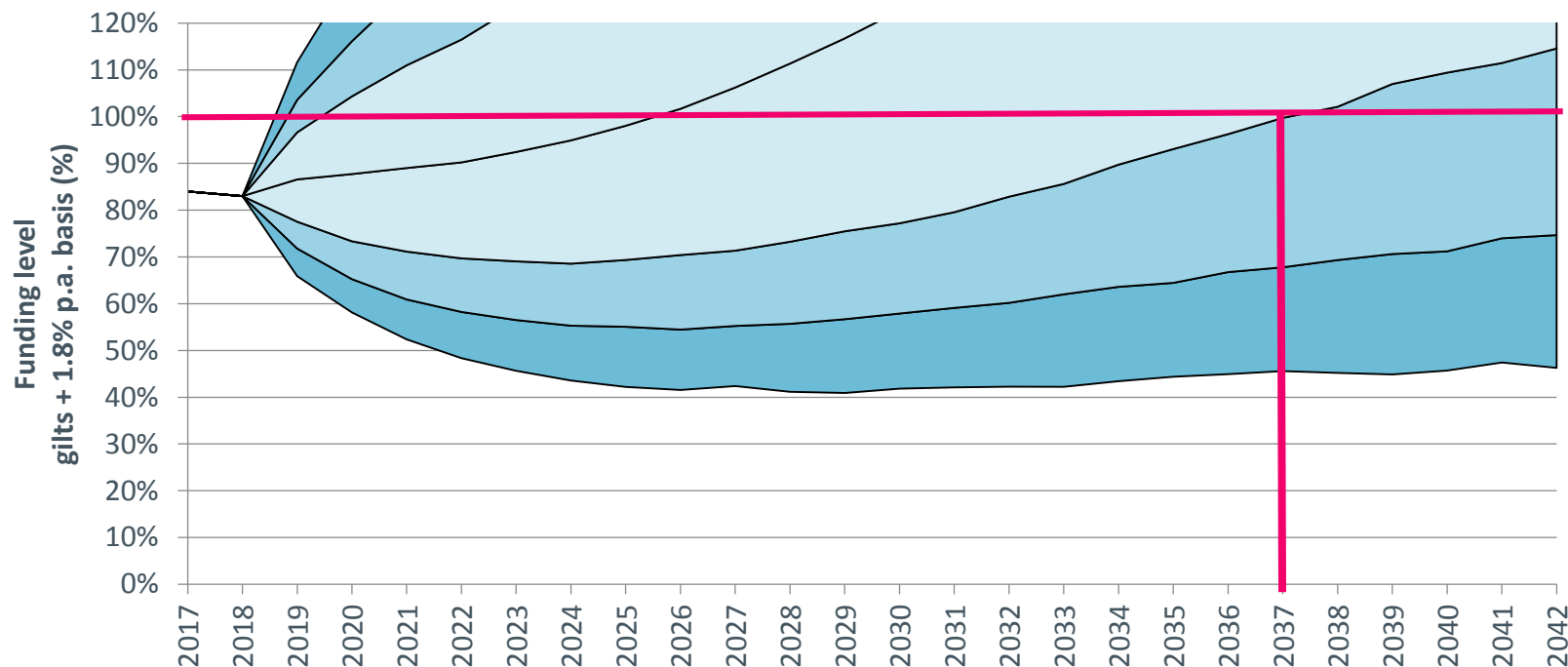


# Cashflow profile



*Note: Active future service includes benefit payments in respect of assumed future new entrants*

# Projecting the current position



- Observations
  - Assumes a discount rate of gilts + 1.8% p.a.
  - Based on current contribution schedule.
  - There is comfortably a greater than 50% chance of achieving full funding by 2037 i.e. 20 years from the valuation date. The median expectation is that the Fund will reach full funding by 2026.

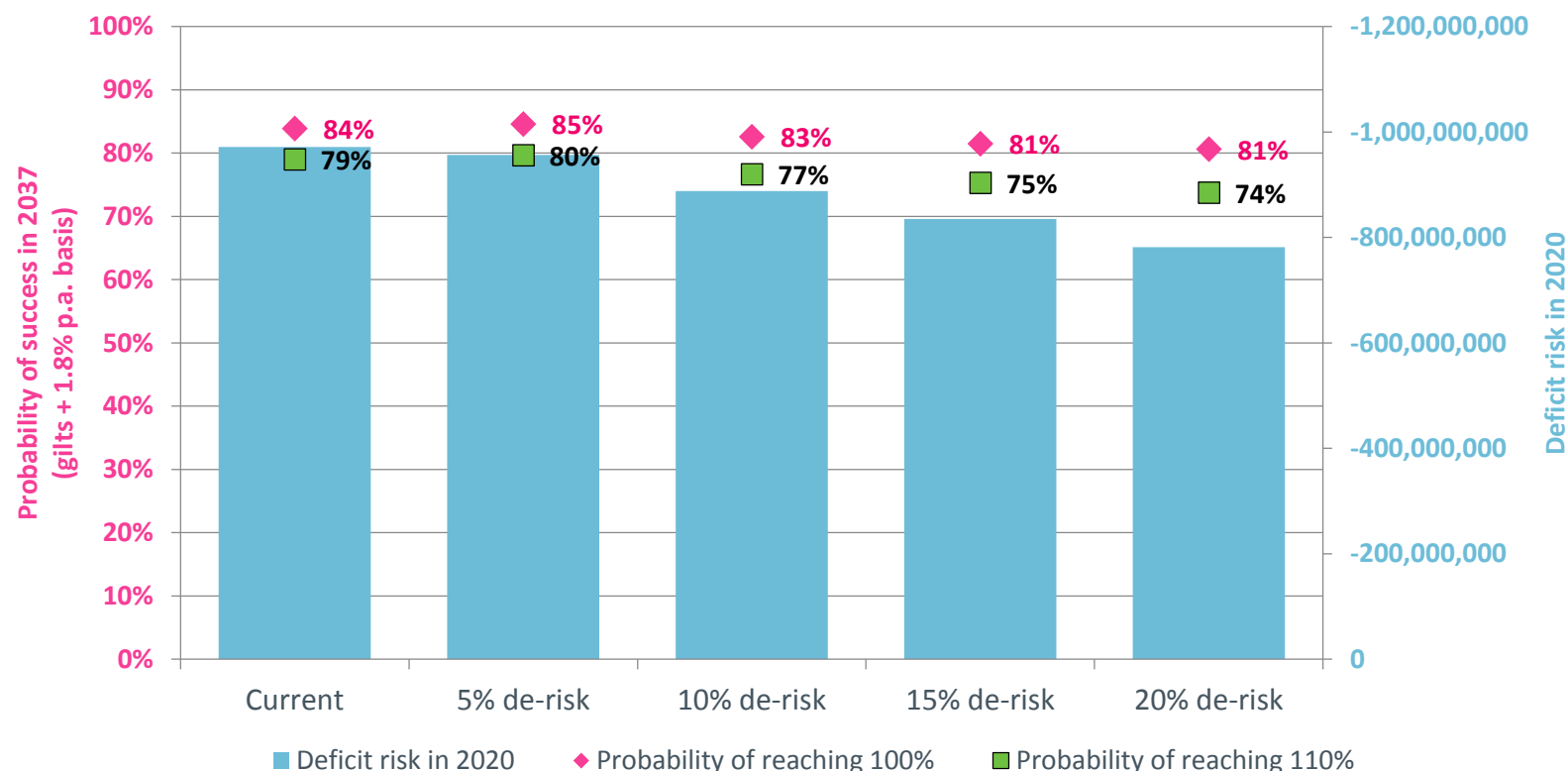
# Range of strategies considered

We modelled a number of alternative investment strategies. The four investment strategies we would like to focus on are illustrated in the table below.

- **Strategy 1: 5% De-risking** – switching 5% from equities into real long term assets
- **Strategy 2: 10% De-risking** – switching 10% from equities into real long term assets (5%) and bonds (5%)
- **Strategy 3: 15% De-risking** – switching 15% from equities into real long term assets (5%) and bonds (10%)
- **Strategy 4: 20% De-risking** – switching 20% from equities into real long term assets (5%) and bonds (15%)

	Current	Strategy 1	Strategy 2	Strategy 3	Strategy 4
Equities	60%	55%	50%	45%	40%
Real Long Term Assets	20%	25%	25%	25%	25%
Bonds (of which credit)	20% (15%)	20% (15%)	25% (15%)	30% (17.5%)	35% (20%)
Cash	0%	0%	0%	0%	0%

# Impact of de-risking



## • Observations

- Assumes a discount rate of gilts + 1.8% p.a. and current contribution schedule.
- The chart shows that there is some scope de-risk and reduce the downside risk without materially impacting the probability of success.
- As an example, the Fund has scope to switch 10% from equities and reduce downside risk by c.£100m (in 3 years) without a material impact on the probability of success.

# Impact of flex in contributions

	Theoretical	30% of pay	25% of pay	20% of pay	15% of pay	10% of pay
Probability of being at least <b><u>100%</u></b> funded in 2037	84%	87%	83%	79%	74%	68%
Probability of being at least <b><u>110%</u></b> funded in 2037	79%	83%	79%	74%	69%	63%
Deficit Risk in 2020 (Median – Tail VaR)	<b>-£970m</b>					

- Observations
  - Assumes a discount rate of gilts + 1.8% p.a.
  - Based on the current investment strategy
  - Fixing contribution levels below 25% after 2020 has a significant impact on the probability of being fully funded by 2037.
  - The deficit at risk in 2020 is £970m based on the current agreed contribution schedule which is subject to change at the next actuarial valuation.



# Impact of yield reversion

	Current	Strategy 1	Strategy 2	Strategy 3	Strategy 4
Probability of reaching <u>100%</u> in 2037	84%	85%	83%	81%	81%
Probability of reaching <u>100%</u> in 2037 - Lesser impact of yield reversion	73%	74%	72%	70%	69%
Probability of reaching <u>110%</u> in 2037	79%	80%	77%	75%	74%
Probability of reaching <u>110%</u> in 2037 - Lesser impact of yield reversion	67%	67%	64%	62%	60%

- Comments

- Assumes a discount rate of gilts + 1.8% p.a. and based on current contributions
- To assess the impact of our assumption that, on average, gilt yields will rise by more than is currently implied by markets we have considered results which only include the 4<sup>th</sup> and 5<sup>th</sup> quintiles of real yields in 20 years. This equates to a median yield of -0.9% p.a.
- Taking a lower level of advance credit for yield reversion reduces the likelihood of success by 10-15%.

# ALM results: Fife

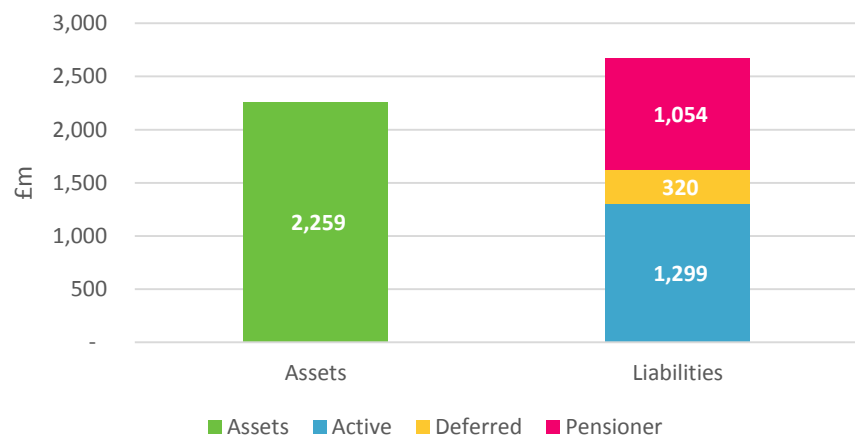


# Starting point: assets and liabilities

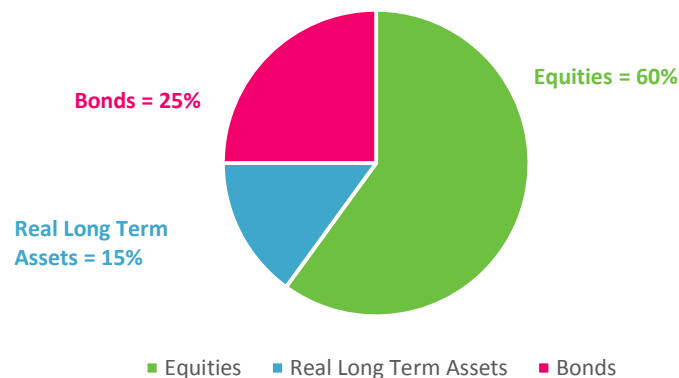
## Current strategy

- Equities currently account for the majority of the Fund's target allocation.
- Real long term assets portfolio is a combination of Property and Infrastructure.
- Bond portfolio is a combination of Investment Grade Credit and Index-linked gilts.
- The Diversified Growth Fund (DGF) allocation is assumed to be 50% equity, 50% bonds for modelling purposes.

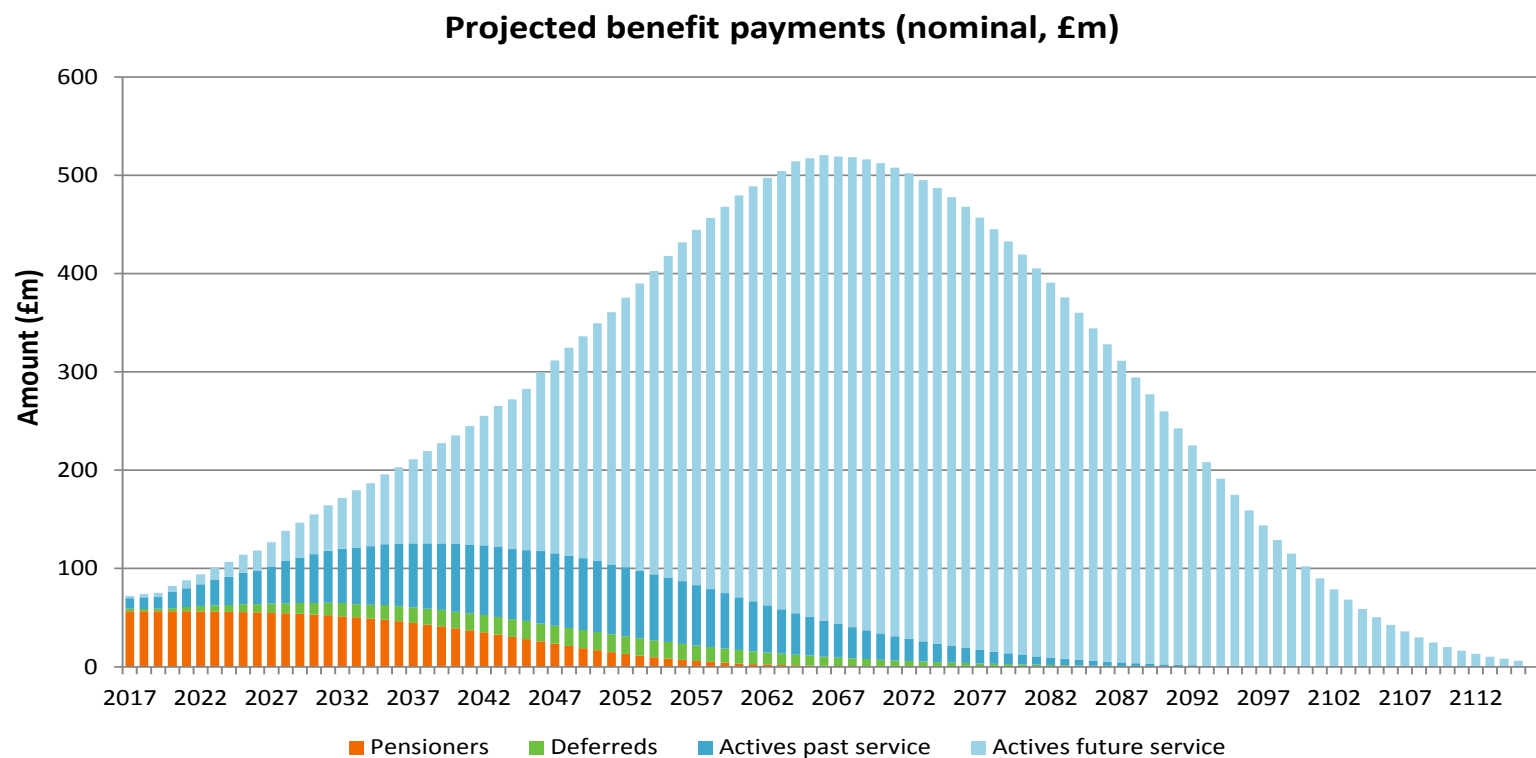
## Breakdown of funding position at 31 March 2018



Curve based discount rate.

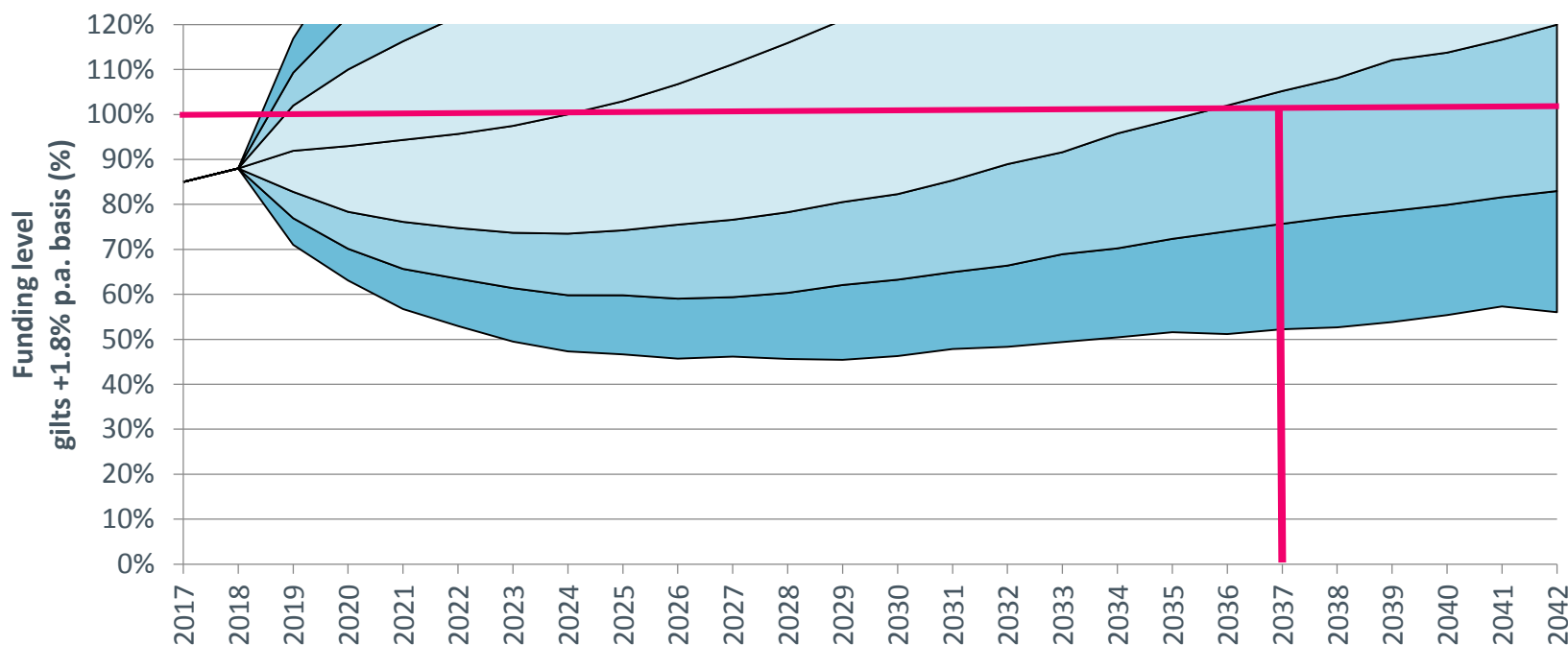


# Cashflow profile



*Note: Active future service includes benefit payments in respect of assumed future new entrants*

# Projecting the current position



- Observations
  - Assumes a discount rate of gilts + 1.8% p.a.
  - Based on current contribution schedule.
  - There is comfortably a greater than 50% chance of achieving full funding by 2037 i.e. 20 years from the valuation date. The median expectation is that the Fund will reach full funding by 2024.

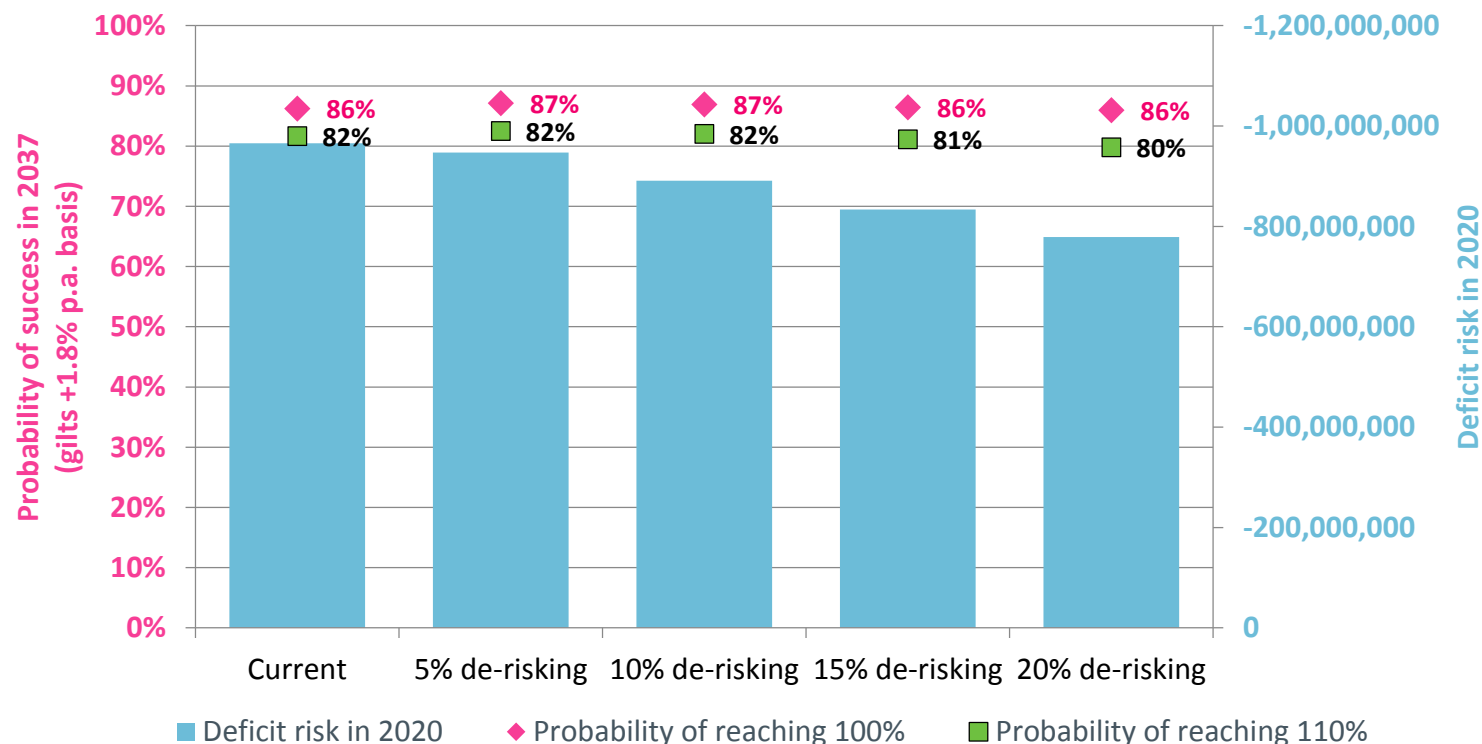
# Range of strategies considered

We modelled a number of alternative investment strategies. The four investment strategies we would like to focus on are illustrated in the table below.

- **Strategy 1: 5% De-risking** - switching 5% from equities into real long term assets
- **Strategy 2: 10% De-risking** – switching 10% from equities into real long term assets (5%) and bonds (5%)
- **Strategy 3: 15% De-risking** – switching 15% from equities into real long term assets (5%) and bonds (10%)
- **Strategy 4: 20% De-risking** – switching 20% from equities into real long term assets (5%) and bonds (15%)

	Current	Strategy 1	Strategy 2	Strategy 3	Strategy 4
<b>Equities</b>	60%	55%	50%	45%	40%
<b>Real Long Term Assets</b>	15%	20%	20%	20%	20%
<b>Bonds</b> (of which credit)	25% (15%)	25% (15%)	30% (17.5%)	35% (20%)	40% (22.5%)
<b>Cash</b>	0%	0%	0%	0%	0%

# Impact of de-risking



- Observations
  - Assumes a discount rate of gilts + 1.8% p.a.
  - The chart shows that there is scope to reduce the downside risk without materially impacting the probability of reaching full funding (or 110%) in 2037.
  - As an example, the Fund has scope to switch 20% from equities and reduce the downside risk by £190m (in 3 years) whilst maintaining the same probability of success.

# Impact of flex in contributions

	Theoretical	30% of pay	25% of pay	20% of pay	15% of pay	10% of pay
Probability of being at least <b><u>100%</u></b> funded in 2037	86%	87%	83%	78%	73%	67%
Probability of being at least <b><u>110%</u></b> funded in 2037	82%	83%	79%	74%	68%	62%
Deficit Risk in 2020 (Median deficit – Tail deficit)	-£965m					

- Observations
  - Assumes a discount rate of gilts + 1.8% p.a. based on the current investment strategy.
  - Reducing the contribution levels has a significant impact on the probability of being fully funded by 2037.



# Impact of yield reversion

	Current	Strategy 1	Strategy 2	Strategy 3	Strategy 4
Probability of reaching <u>100%</u> in 2037	86%	87%	87%	86%	86%
Probability of reaching <u>100%</u> in 2037 - Lesser impact of yield reversion	77%	79%	78%	77%	77%
Probability of reaching <u>110%</u> in 2037	82%	82%	82%	81%	80%
Probability of reaching <u>110%</u> in 2037 - Lesser impact of yield reversion	71%	72%	71%	70%	68%

- Comments

- Assumes a discount rate of gilts + 1.8% p.a. and based on current contributions
- To assess the impact of our assumption that, on average, gilt yields will rise by more than is currently implied by markets we have considered results which only include the 4<sup>th</sup> and 5<sup>th</sup> quintiles of real yields in 20 years. This equates to a median yield of -0.9% p.a.
- Taking a lower level of advance credit for yield reversion reduces the likelihood of success by 10-15%.

# ALM results: Lothian

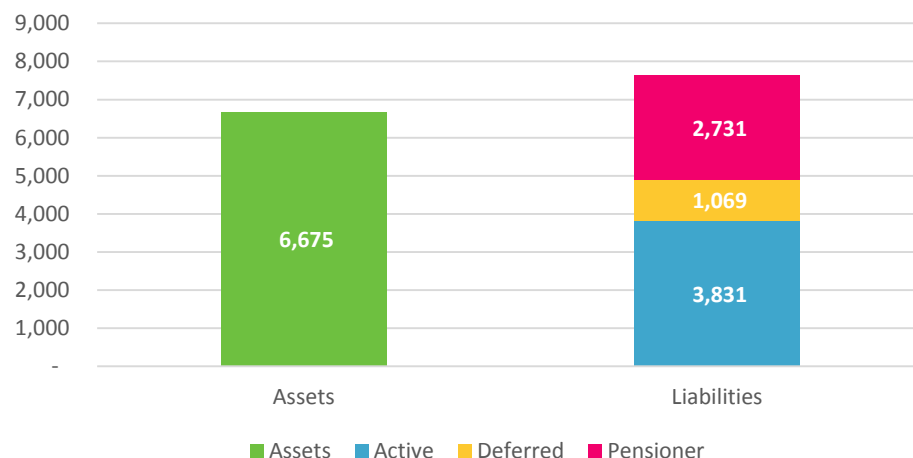


# Starting point: assets and liabilities

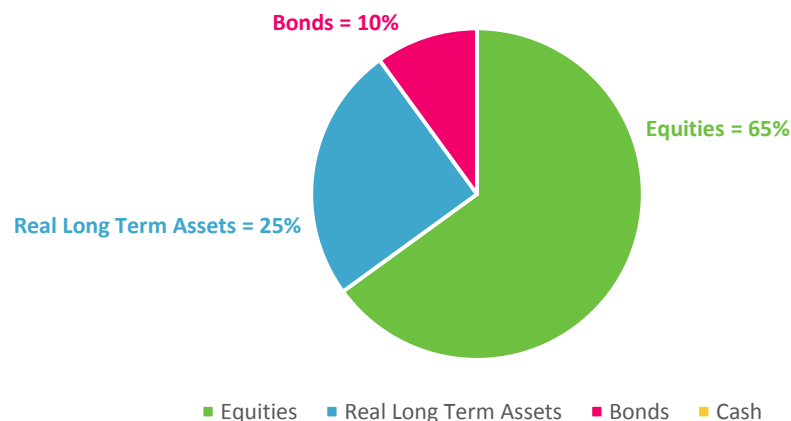
## Current strategy

- Equities currently account for the majority of the Fund's target allocation.
- Real long term assets portfolio is a combination of Property and Infrastructure.
- Bond portfolio is invested in index-linked gilts together with some credit exposure

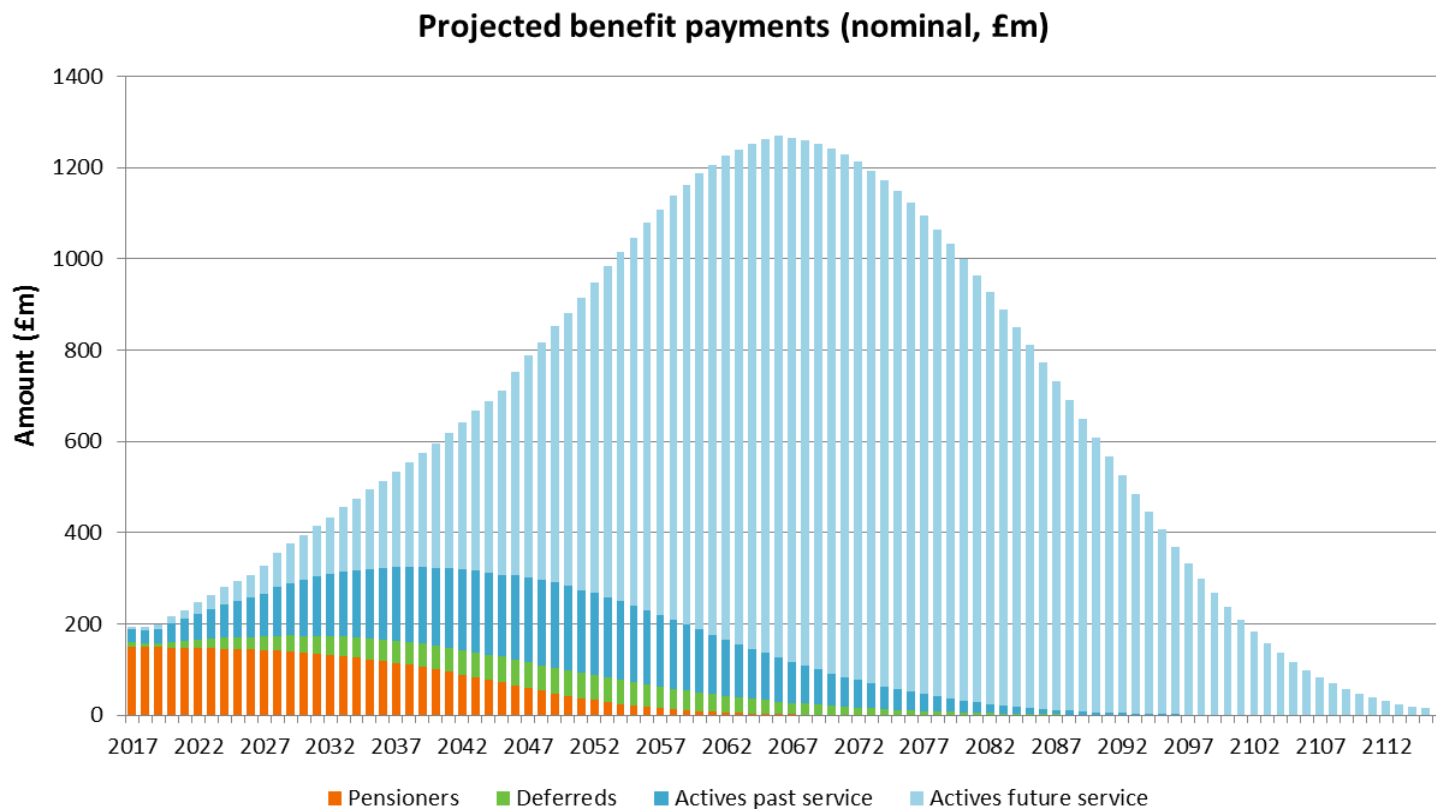
Breakdown of funding position at 31 March 2018



Curve based discount rate.

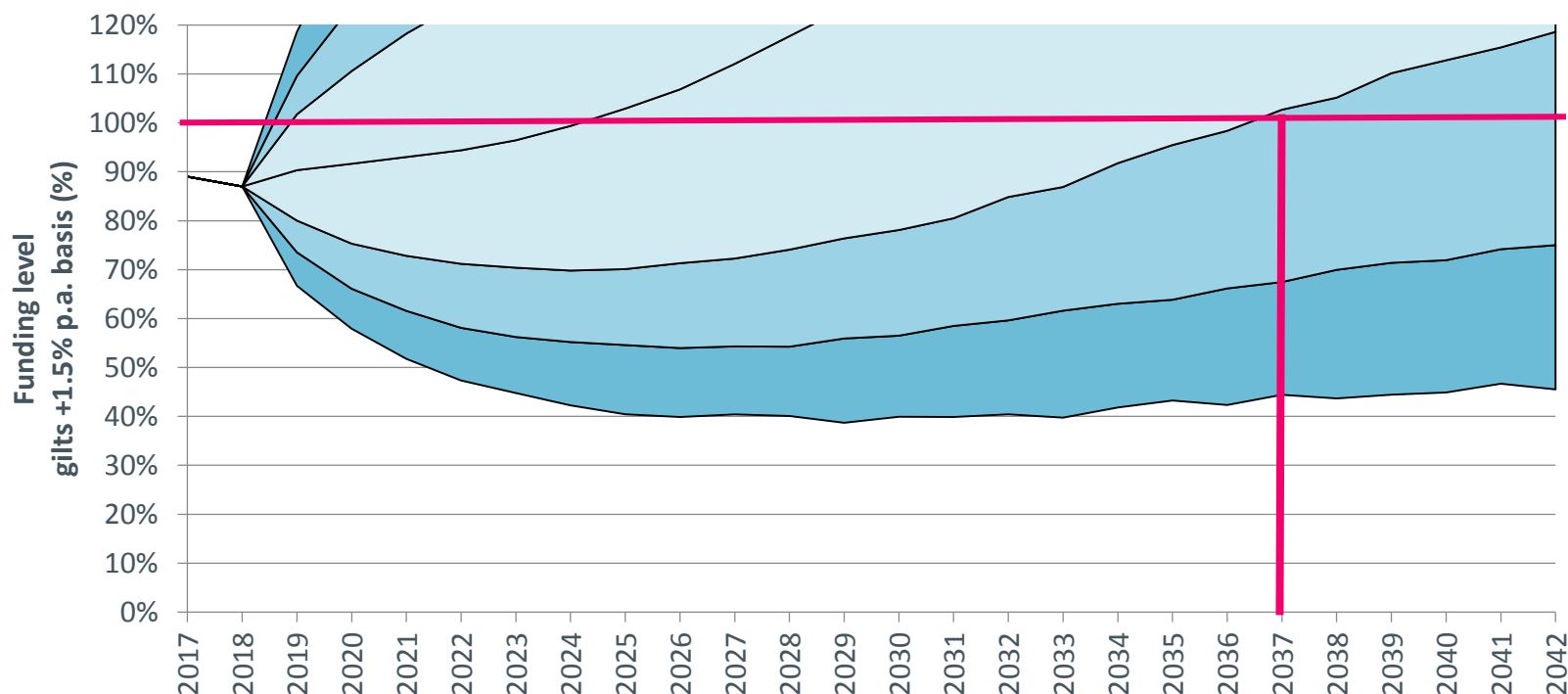


# Cashflow profile



*Note: Active future service includes benefit payments in respect of assumed future new entrants*

# Projecting the current position



- Observations
  - Assumes a discount rate of gilts + 1.5% p.a.
  - Based on current contribution schedule.
  - There is comfortably a greater than 50% chance of achieving full funding by 2037 i.e. 20 years from the valuation date. The median expectation is that the Fund will reach full funding by 2025.

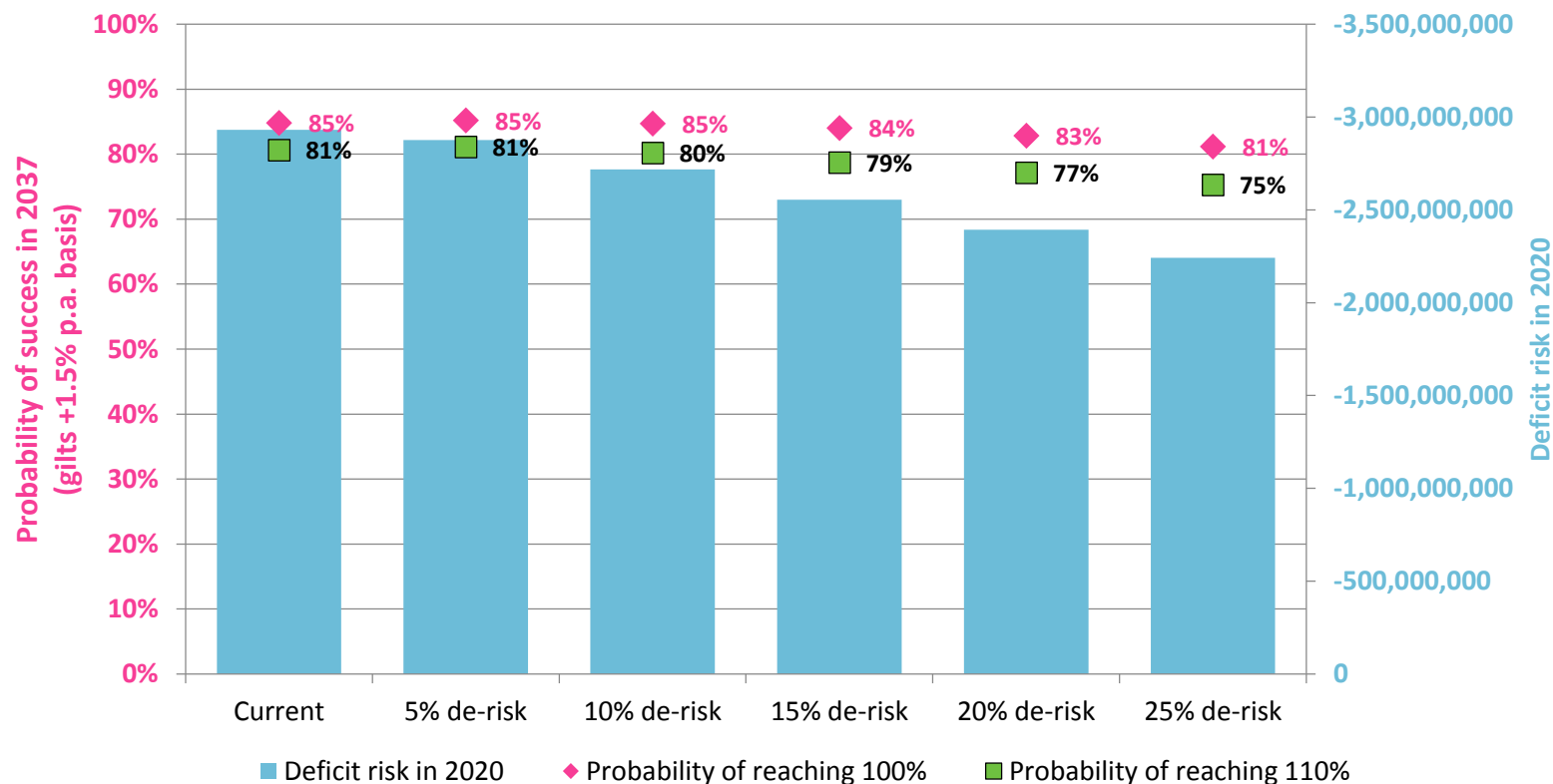
# Alternative strategies

We modelled a number of alternative investment strategies. The five investment strategies we would like to focus on are illustrated in the table below.

- **Strategy 1: 5% De-risking** - switching 5% from equities into real long term assets
- **Strategy 2: 10% De-risking** – switching 10% from equities into real long term assets (5%) and bonds (5%)
- **Strategy 3: 15% De-risking** – switching 15% from equities into real long term assets (5%) and bonds (10%)
- **Strategy 4: 20% De-risking** – switching 20% from equities into real long term assets (5%) and bonds (15%)
- **Strategy 5: 25% De-risking** – switching 25% from equities into real long term assets (5%) and bonds (20%)

	Current	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Equities	65%	60%	55%	50%	45%	40%
Real Long Term Assets	25%	30%	30%	30%	30%	30%
Bonds (of which credit)	10% (5%)	10% (5%)	15% (5%)	20% (5%)	25% (5%)	30% (5%)
Cash	0%	0%	0%	0%	0%	0%

# Impact of de-risking



- Observations

- Assumes a discount rate of gilts + 1.5% p.a. and current contributions.
- The chart shows that there is scope to reduce the downside risk without materially impacting the probability of success.
- As an example, the Fund has scope to switch 15% from equities and reduce the downside risk by over £400m (in 3 years) without a material impact on the probability of success.

# Impact of flex in contributions

	Current	30% of pay	25% of pay	20% of pay	15% of pay	10% of pay
Probability of being at least <b><u>100%</u></b> funded in 2037	85%	88%	85%	81%	76%	71%
Probability of being at least <b><u>110%</u></b> funded in 2037	81%	85%	81%	76%	72%	67%
Deficit Risk in 2020 (Median – Tail VaR)	<b>-£2,930m</b>					

- Observations
  - Assumes a discount rate of gilts +1.5% p.a. based on the current investment strategy
  - Reducing the contribution levels has a significant impact on the probability of being fully funded by 2037.



# Impact of yield reversion

	Current	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Probability of reaching <u>100%</u> in 2037	85%	85%	85%	84%	83%	81%
Probability of reaching <u>100%</u> in 2037 - Lesser impact of yield reversion	75%	75%	75%	74%	73%	70%
Probability of reaching <u>110%</u> in 2037	81%	81%	80%	79%	77%	75%
Probability of reaching <u>110%</u> in 2037 - Lesser impact of yield reversion	69%	70%	68%	67%	65%	63%

- Comments

- Assumes a discount rate of gilts + 1.5% p.a. and based on current contributions
- To assess the impact of our assumption that, on average, gilt yields will rise by more than is currently implied by markets we have considered results which only include the 4<sup>th</sup> and 5<sup>th</sup> quintiles of real yields in 20 years. This equates to a median yield of -0.9% p.a.
- Taking a lower level of advance credit for yield reversion reduces the likelihood of success by 10-15%.

# Conclusions

# Conclusions

- Overall, the results show that there is considerable scope to reduce investment risk (reducing equity exposure by up to 20% for all three Funds) whilst maintaining a strong long-term likelihood of success...
  - ...this applies for the 110% target as well, which would enable the Funds to build up a buffer against future adversity
- The probability remains high even if fixing contributions at levels around 20 to 25%, due to the level of investment return expected.
- However, if the extent of modelled “yield reversion” is limited, so as not to take too much credit for this in advance, the scope to reduce risk is more limited.
- Initial results on this basis still indicate scope to reduce the exposure to equities in favour of bonds and real assets, but by lesser amounts. For example:
  - Falkirk – by perhaps 5 to 10%
  - Fife – by up to 20%
  - Lothian – by perhaps 10 to 15%

# Appendix: Reliances & Limitations



# Reliances & Limitations

## Data – Cashflows

In projecting forward the evolution of the Funds, we have used estimated cashflows generated using our actuarial valuation system, based on information provided as part of the 2017 actuarial valuation of the Funds including the LGPS (Scotland) Regulations.

## Data – 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 subjective assumptions are the average excess equity return over the risk free asset (tending to approximately 3% p.a. as the investment horizon is increased), the volatility of equity returns (approximately 18% p.a. over the long term) and 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 market for CPI linked instruments is not well developed and our model for expected CPI in particular may be subject to additional model uncertainty as a consequence. The output of the model is also affected by other more subtle effects, such as the correlations between economic and financial variables.

Our expectation (i.e. the average outcome) is that long term real interest rates will gradually rise from their current low levels. Higher long-term yields in the future will mean a lower value placed on liabilities and therefore our median projection will show, all other things being equal, an improvement in the current funding position (because of the mismatch between assets and liabilities). The mean reversion in yields also affects expected bond returns.

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.

Given the context of this modelling, we have not undertaken any sensitivity analysis to assess how different the results might be with alternative calibrations of the economic scenario generator.

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.

# Reliances & Limitations

## Model

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. Cash flows into and out of the Fund 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.

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.

Investment strategy is also 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 on the exact timing of any investment/disinvestment. In addition, there will be costs associated with buying or selling these assets. The model implicitly assumes that all returns are net of costs and that investment/disinvestment and rebalancing are achieved without market impact and without any attempt to 'time' entry or exit.

## Assumptions

We have estimated future service benefit cash flows 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 the modelling we have assumed that the Fund will undergo valuations every three years and a contribution rate will be set that will come into force one year after the simulated valuation date. For 'stabilised' contributions, the rate at which the contribution changes is capped and floored. There is no guarantee that such capping or flooring will be appropriate in future; this assumption has been made so as to illustrate the likely impact of practical steps that may be taken to limit changes in contribution rates over time. We have assumed that the Actuary to the Fund will make his or her calculations using broadly the same methodology as that currently used, but note that this is a source of uncertainty that we have not attempted to measure in the model other than where noted specifically.

# Expected Rate of Returns and Volatilities

The following figures have been calculated using 5,000 simulations of the Economic Scenario Service, calibrated using market data as at 30 June 2018. 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												Inflation	17 year real yield	17 year yield
		Cash	Index Linked Gilts (long)	UK Equity	Overseas Equity	Private Equity	Property	Emerging Market Debt	Emerging Markets Equity	Infrastructure Equity	Multi Asset Credit (sub inv grade)	Investment Grade Credit	Private Lending			
5 years	16th %ile	-0.2%	-2.9%	-3.9%	-3.8%	-7.0%	-3.3%	-2.9%	-6.8%	-4.6%	1.2%	-2.3%	1.7%	1.5%	-2.3%	0.9%
	50th %ile	1.0%	0.6%	4.2%	4.3%	5.1%	2.7%	2.4%	4.5%	4.4%	4.2%	1.0%	4.4%	3.0%	-1.4%	2.2%
	84th %ile	2.2%	4.3%	13.0%	12.8%	19.1%	9.1%	8.1%	17.3%	14.1%	6.5%	4.2%	6.4%	4.5%	-0.5%	3.8%
10 years	16th %ile	0.1%	-2.4%	-1.1%	-1.0%	-3.1%	-1.2%	-0.9%	-2.9%	-1.5%	2.2%	-0.6%	2.4%	1.7%	-1.9%	1.3%
	50th %ile	1.6%	-0.2%	4.9%	5.0%	5.8%	3.5%	3.1%	5.3%	5.1%	4.3%	1.2%	4.6%	3.1%	-0.7%	2.8%
	84th %ile	3.3%	2.1%	11.2%	11.1%	15.8%	8.1%	7.2%	14.0%	12.2%	6.2%	2.9%	6.6%	4.7%	0.5%	4.8%
20 years	16th %ile	0.9%	-1.8%	1.4%	1.5%	0.5%	0.8%	1.2%	0.3%	1.3%	3.6%	0.9%	3.5%	1.9%	-0.7%	2.2%
	50th %ile	2.6%	-0.3%	5.9%	6.0%	7.0%	4.5%	4.2%	6.4%	6.2%	5.3%	2.1%	5.6%	3.1%	0.8%	4.0%
	84th %ile	4.6%	1.3%	10.5%	10.6%	13.8%	8.3%	7.5%	12.7%	11.3%	7.1%	3.2%	7.7%	4.6%	2.3%	6.3%
Volatility (Disp) (1 yr)		1%	9%	17%	17%	28%	14%	12%	25%	20%	7%	10%	6%	1%		

The current 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 -1.6% (1.7%) to 0.8% (4.0%).

# Risk warnings

Please note the value of investments, and income from them, may fall as well as rise. This includes equities, government or corporate bonds, and property, whether held directly or in a pooled or collective investment vehicle. Further, investments in developing or emerging markets may be more volatile and less marketable than in mature markets. Exchange rates may also affect the value of an overseas investment. As a result, an investor may not get back the amount originally invested. Past performance is not necessarily a guide to future performance.

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