

# Pensions Committee

**2.00pm, Wednesday, 11 December 2019**

## **Contribution Stability Mechanism Review 2019**

<b>Item number</b>	<b>5.4</b>
<b>Wards</b>	<b>All</b>

### **1. Recommendations**

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The Pensions Committee is requested to:

- 1.1 Approve the Contribution Stability Mechanism (CSM), to the effect that, from 1 April 2021, for all employers currently offered stabilised rates, contributions will be frozen for four years, then increase or decrease (towards the underlying “market base” rate) by no more than 0.5% of payroll each year thereafter. In the application of this funding strategy, the Fund will aim to keep the total contribution rate for all stabilised employers between 18.0% and 25.0% of payroll. There may be specific employer circumstances, however, which will merit the actuary certifying a contribution rate that is outside this range, which will be applied at the discretion of the Fund. This strategy will apply to all employers currently offered stabilised rates with the following exceptions:
  - 1.1.1 For two employers, West Lothian Leisure and Enjoy Leisure, whose current contributions rates are below the floor of 18%, from 1 April 2021 contributions will be increased (towards the underlying “market base” rate) by 0.5% of payroll each year, then increase or decrease by no more than 0.5% of payroll each year;
  - 1.1.2 Children’s Hearing Scotland, given its low funding level, should be excluded from CSM, unless its guarantor, the Scottish Government, is content that it should remain;
  - 1.1.3 Newbattle College, as an “admitted body” without any guarantor, should be excluded from CSM;

- 1.2 Retain the right to review or withdraw the CSM, from any or all employer(s), as protection against extreme adverse financial circumstances;
- 1.3 Note that the CSM, stipulating minimum contribution rates payable, will require to be certified by the Fund's actuary at each statutory actuarial valuation.

**Stephen S. Moir**

Executive Director of Resources

## Contribution Stability Mechanism Review 2019

### 2. Executive Summary

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- 2.1 Detailed financial modelling of asset and liability cashflows has been undertaken and advice from the Fund's actuary sought in order to inform recommendations as to the proposed extension of the Contribution Stability Mechanism (CSM).

### 3. Background

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- 3.1 The Funding Strategy Statement (at paragraph 7.5) states "The policy of the Fund is to operate a Contribution Stability Mechanism (CSM) on an ongoing basis, subject to regular reviews, in order to provide certainty of pension contributions to Fund employers for future years, together with ensuring appropriate assurance of funding level to the Fund. Contribution stability will not be offered to all employers – each employer's particular circumstances will be considered, in particular the strength of the covenant offered and the extent of membership commitment to the Fund. Employers are not obliged to participate in the CSM, but if they wish to opt out, they must make an election at the outset. .... However, contribution stability will be subject to ongoing review by the Fund, which reserves the right to remove an employer from the CSM should particular circumstances deem it prudent to do so, for example assessment of employer covenant, financial or demographic experience"
- 3.2 Employers which are open to new entrants and have contribution rates calculated based on their individual circumstances will be offered contribution stability subject to:
- satisfactory assessment of the employer covenant, and;
  - agreement by their guarantor to inclusion of the employer in the contribution stability mechanism (where appropriate).
- 3.3 At its meeting on 28 September 2016, the Committee approved "the continued use of the CSM for long-term secure employers ... for the 2017 actuarial valuation" and noted the advice from the Actuary to review the CSM prior to the next triennial valuation in 2020.

- 3.4 The Local Government Pension Scheme (LGPS) funding valuation cycle may increase to a four-yearly interval (from the current triennial) because of broader alignment of public sector schemes. This will be determined by the Scottish Government for the LGPS in Scotland.

## 4. Main report

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### **Asset (and) Liability Modelling**

- 4.1 Conscious of the desirability of providing certainty of budgetary parameters for its long-term secure employers, the Lothian Pension Fund (LPF) commissioned its actuary to undertake asset liability modelling to assist in setting the contribution strategy ahead of the statutory 2020 actuarial valuation. The intention, therefore, being that this modelling could be used to set minimum contributions payable under the CSM for a period from 1 April 2021, with the duration and thresholds of the CSM reflecting actuarial advice.
- 4.2 Prior to undertaking the modelling, from cashflows from the employer asset tracking system, the actuary confirmed that all of the CSM employers are cashflow positive, albeit some marginally so. This was noted as being fairly unusual compared to other LGPS funds where they tended to see some stabilised employers with negative positions. The actuary noted that, from a funding perspective, being cashflow positive was generally a good thing as assets are maintained to generate returns.
- 4.3 In order to minimise costs of the exercise, a pragmatic approach was adopted. Consequently, member data from City of Edinburgh Council was deemed to be representative of the CSM group and, owing to its low contribution rate relative to the majority of other employers in the group, modelling was also undertaken using data from West Lothian Leisure.
- 4.4 The asset liability model (comPASS) allows projections to be made of employers' assets and liabilities under 5,000 different economic scenarios. The output from the model includes metrics for prudence, affordability, stability and stewardship, which can be compared to assess how an employer may perform under different contribution and investment strategies.
- 4.5 The asset liability modelling report "Review of the Lothian Pension Fund's Stabilised Contribution Mechanism" by Hymans Robertson LLP, dated 08 November 2019, is provided in full at Appendix 1.
- 4.6 There are acknowledged limitations to the modelling, including anticipated adverse implications for liabilities arising from age discrimination legal cases and the equalisation of Guaranteed Minimum Pensions (GMP). Nor does the modelling address the potential impact of the employer cost cap (ceiling and floor), as pertaining to the LGPS in Scotland. The net impact on cost is unknown at present, but will be addressed in due course once these matters have been clarified on a national basis.

## **Conclusion**

- 4.7 The actuary has undertaken detailed scenario analyses, including significant stress testing to assess potential downside risks. Notwithstanding the limitations of the asset liability modelling, the actuary is supportive of the recommendations for the CSM, as detailed above.
- 4.8 Appendix 2 details the list of employers, to which LPF currently offers CSM, together with the respective recommended position for each.
- 4.9 Prior to the Committee, the actuary will provide verbal commentary on the asset liability modelling and the proposed CSM to members of both Committee and Board at the training seminar, scheduled for 25 November 2019.

## **5. Next Steps**

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- 5.1 Following consideration by Committee, appropriate communication will be undertaken with LPF employers. The suitability of the CSM for any individual employer, or indeed all employers, will be subject to ongoing review.

## **6. Financial impact**

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- 6.1 The principal objective of LPF is to ensure its long-term solvency. LPF therefore targets full funding on an ongoing basis over the long-term.
- 6.2 The CSM provides long-term secure LPF employers with future budgetary certainty, within defined parameters, together with appropriate assurance of funding level.

## **7. Stakeholder/Community Impact**

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- 7.1 The Pension Board, comprising employer and member representatives, is integral to the governance of the pension funds and they are invited to comment on the relevant matters at Committee meetings.
- 7.2 There are no adverse health and safety, governance, compliance or regulatory implications as a result of this report. The forward planning of the Committees' agendas should facilitate improved risk management and governance for the pension funds.
- 7.3 There are no adverse sustainability impacts arising from this report.

## **8. Background reading/external references**

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- 8.1 None.

## 9. Appendices

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Appendix 1 - "Review of the Lothian Pension Fund's Stabilised Contribution Mechanism" by Hymans Robertson LLP, dated 08 November 2019

Appendix 2 – Employers Currently participating in the Contribution Stability Mechanism



# Lothian Pension Fund

Review of the Lothian Pension Fund's Stabilised Contribution Mechanism

Richard Warden FFA  
Laura McInroy FFA

8 November 2019

# Addressee

- This paper has been requested by, and is addressed to, City of Edinburgh Council **in its capacity as Administering Authority** to the Lothian Pension Fund (“the Fund”).
- The results contained within are in respect of City of Edinburgh Council and West Lothian Leisure (“the Employers”) **in their capacity as participating employers** in the Fund. This is intended to be part of an investigation to allow the officers to consider a long term funding strategy for the employers that participate in the Fund’s contribution stability mechanism (“CSM employers”). It should not be used for any other purpose, for instance in determining investment strategy.
- This paper may be shared with the CSM employers for information purposes only. It does not constitute advice to any Fund employers.
- This paper should not be disclosed to any other third parties (e.g. separate advisers to the Fund or any other employers) without our prior written permission and then only in full. We accept no liability to any party for any other purpose than above, unless expressly accepted in writing.
- Any changes to the agreed funding strategy should be documented in the Funding Strategy Statement (FSS).



# Decision making record



Decision	Reason for decision	By whom	Date
CEC Scenario 4 : Freeze for 4 years followed by +/- 0.5% p.a.	LPF comfortable with freezing the contribution rates based on the narrower range of cap & floor	LPF	28 October 2019
West Lothian Leisure Scenario 1 : Increase by 0.5% p.a. for 4 years followed by +/- 0.5% p.a.	LPF commented that a step-up in contribution rates appeared to be appropriate for WLL	LPF	28 October 2019



# General comments

- Since the last Asset Liability Modelling was carried out in 2013, asset returns have been positive and as such this has helped to improve the results.
- However the funding time horizon is long term and the temptation to cut rates too deeply should be avoided as that may increase the likelihood of requiring substantial increases in the future. The principle behind the CSM is to restrict both increases and reductions to relatively small amounts between valuations.
- The LGPS funding valuation cycle may change as a result of wider developments. Consequently, at the 2020 valuation the Fund may need to set contribution rates for the following 4 years i.e. 1 April 2021 to 31 March 2025.
- When agreeing the funding strategy, the decision making process should also take into account factors which the modelling cannot:
  - E.g. unmodelled risks (such as climate change, political, McCloud – see next bullet), affordability, fairness, precedents, past agreements etc.
- At present, there is significant uncertainty around the cost of LGPS benefits due to the ongoing “McCloud case”. The resolution of this case is likely to see the cost of LGPS benefits (both past and future) increase. The modelling results take no account of this, but the risk should be factored into decision making around funding strategies.

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# Background




# Purpose

In advance of the 2017 formal valuation of the Fund, the long term funding strategy for the CSM employers was reviewed. The results of this review were that the contribution strategy set at the previous formal valuation remained appropriate. This was formalised in the FSS at that time, together with a note that the contribution strategy would be formally reviewed as part of the 2020 valuation of the Fund.

The purpose of this report is to carry out a full review of the funding strategy for the CSM employers to ensure it remains appropriate given the Fund's long term funding objectives and view of funding and investment risk.

As contributions and investment returns are the sole sources of funding members' benefits, a long term funding strategy should be considered in tandem with a long term investment strategy.

Note that this paper has not been prepared for the purpose of reviewing or advising on the Fund's long term investment strategy.



# What's happened since the last full review?

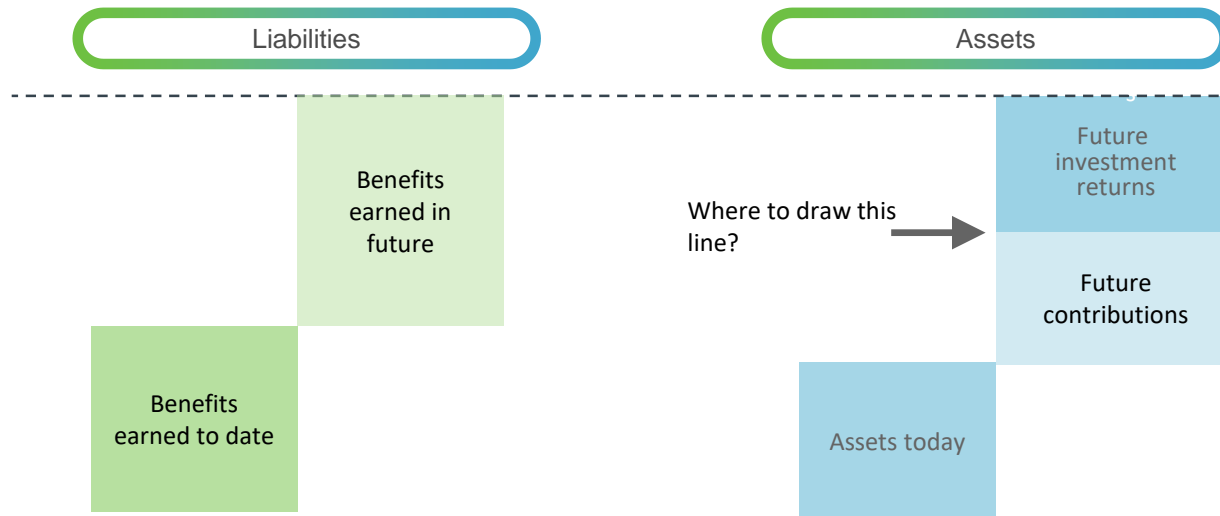


- The 2013 Asset Liability Modelling exercise considered how the assets and liabilities may evolve under 5,000 different projections for future market conditions.
- When a review takes place, we consider what has actually happened in the intervening period.
- Factors that can influence the results of a review include:
  - actual market performance in the period (which has been higher than expected);
  - changes in membership profile;
  - changes in future economic outlook;
  - risks that sit outside the modelling



# Methodology & inputs

# Setting funding strategy



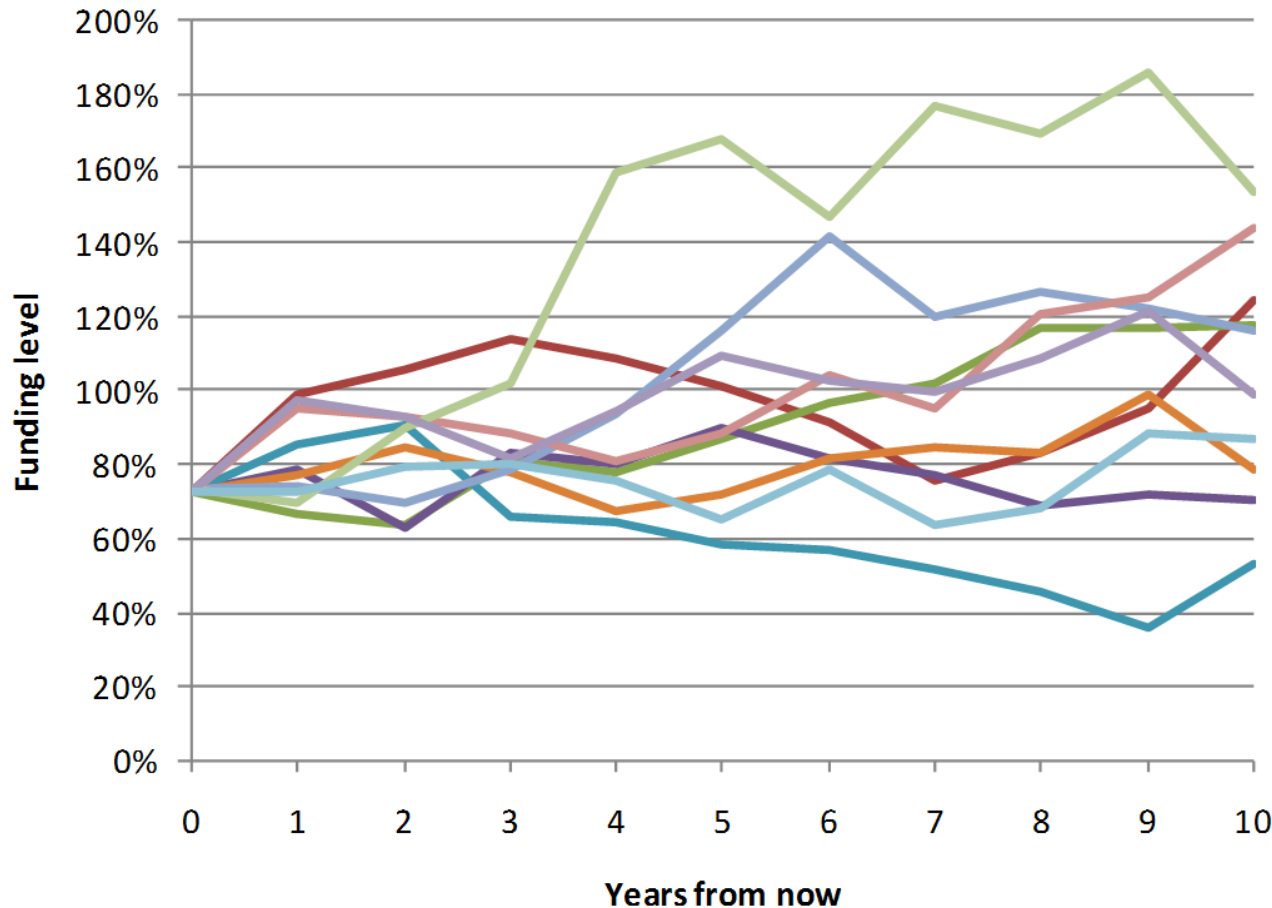
- The funding of members' benefits is achieved by a combination of contributions and investment returns.
- As such it is critical to consider how much a particular funding strategy (i.e. contribution rates) relies on future investment returns.
- This modelling considers 5,000 outcomes for future investment returns as these are unknown and volatile. It is important to understand how much reliance is being placed on investment returns, and therefore how much risk is involved in the funding strategy, as this may impact on future contribution requirements.
- This modelling looks at total contributions required (i.e. primary plus secondary) to meet the funding objective.



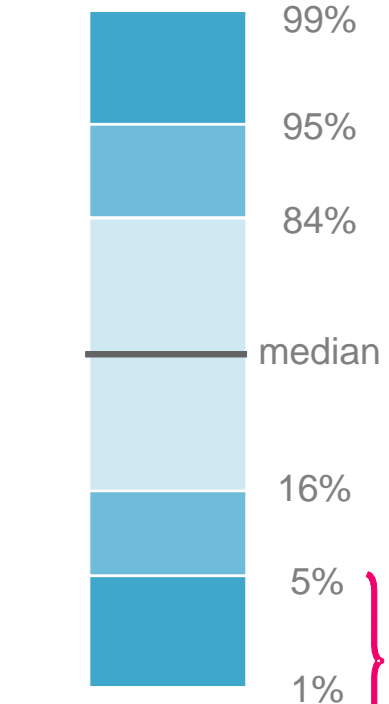
# Methodology

- This modelling is a form of asset-liability modelling (“ALM”).
- Assets and liabilities are projected forward from 2019 using membership data as at 31 March 2019 under 5,000 different outcomes for future market and economic conditions. See the “Reliances, limitations and additional details” appendix for details of the expected return on assets, economic conditions and the associated volatilities.
- For each outcome (5,000 per contribution scenario), we calculate the funding position annually throughout the projection period.
- The funding position uses the assumptions used for the 2017 valuation of the Fund. Further details are included in our 2017 valuation report dated March 2018.
- We then rank the 5,000 outcomes from best to worst and we plot the outcomes graphically (as shown in the following two pages).
- We can then compare the range of outcomes with other contribution scenarios.
- Please note the following likelihoods are adopted for each graph (please see the key on the following page for further details)
  - Lightest coloured ranges represent middle 2/3rds of the outcomes
  - The range above and below this shows 1 in 6 outcomes each
  - This range is further split into 1 in 10 for the next lightest range and 1 in 20 for the darkest range of outcomes
  - The best and worst 1% of outcomes are not shown on the graphs

# Methodology



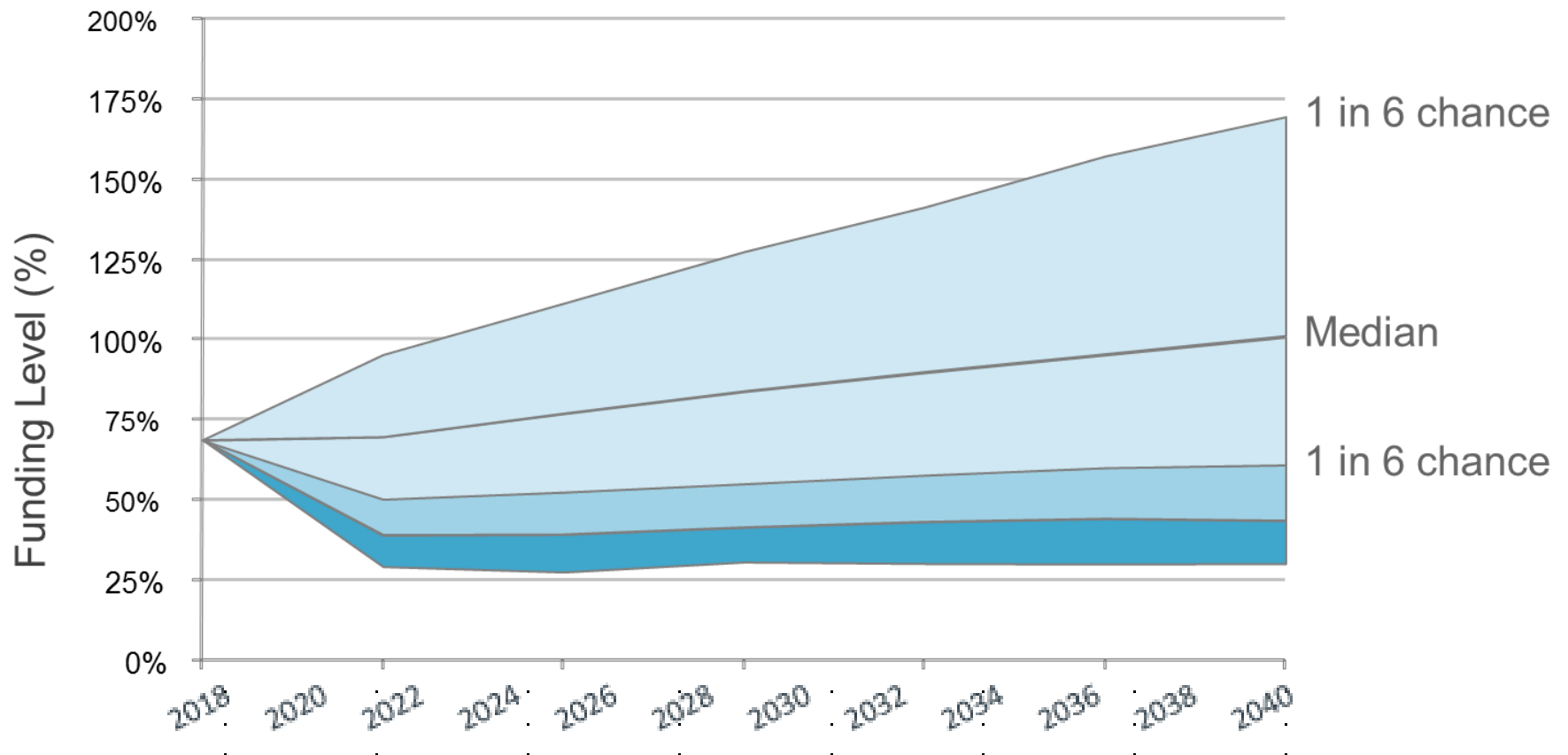
Best outcomes



Worst outcomes

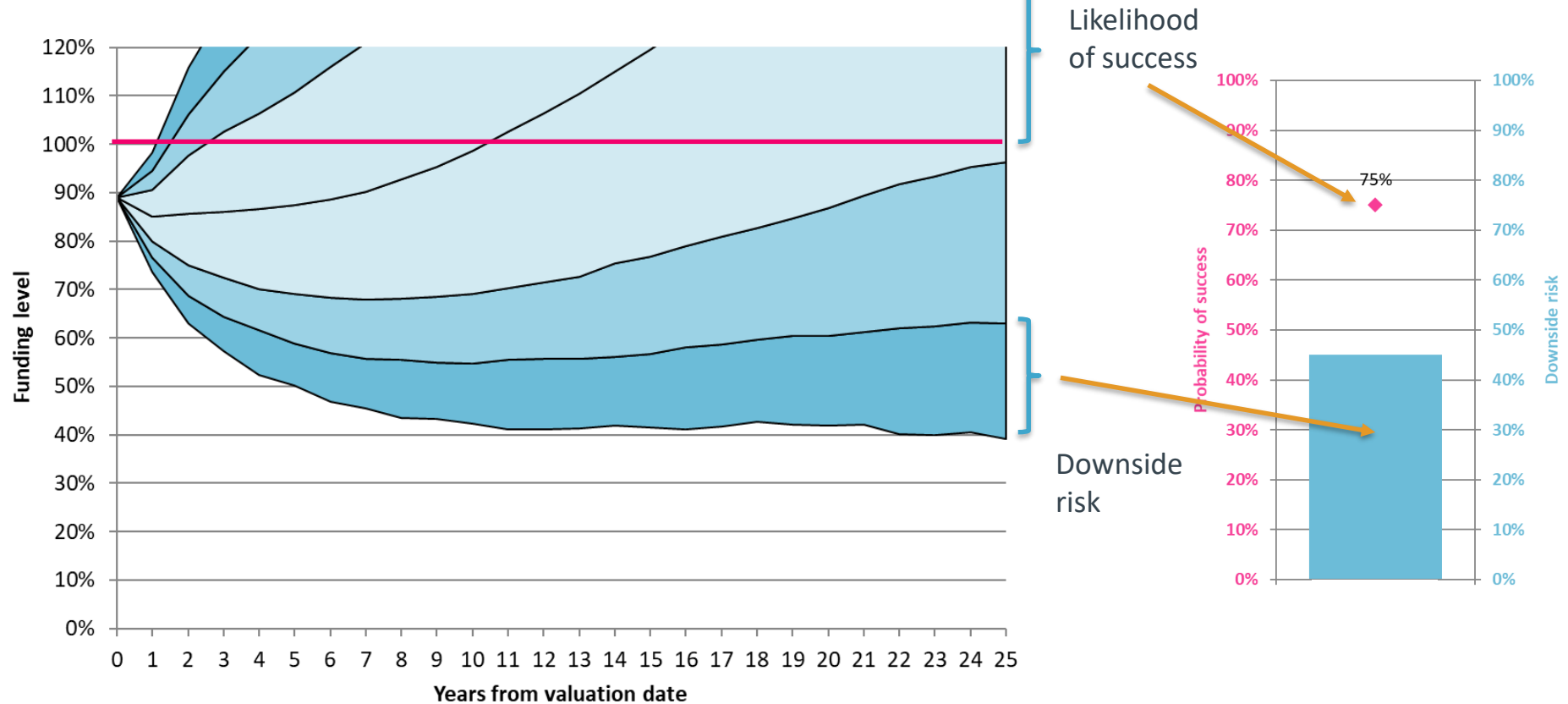
Each scenario has different inflation, investment returns, interest rates etc

# 5,000 scenarios gives a distribution of outcomes



Measure likelihood of meeting funding objective

# From this distribution we can prepare summary statistics



Assess the likelihood of 'success' and the risk when things go wrong

# Model inputs - contributions

- For each scenario, we have modelled the contribution rate expressed solely as a percentage of pay.
- The CSM employer's certified contributions may be expressed as both a percentage of pay and a monetary amount. However, for the purpose of this modelling, we have converted the monetary element into % of pay terms.
- The contributions payable in 2019/20 and 2020/21 are based on the rates certified at the 2020 valuation.
- The contribution patterns modelled make no allowance for any changes to members benefits resulting from the Cost Cap mechanism or recent 'McCloud' court case ruling

# Model inputs - stabilised contributions



- The funding strategies considered in this modelling are stabilised
- The stabilisation mechanism limits contribution rate increases and decreases to a maximum amount each year, helping employers avoid sudden or large changes
- Stabilisation will aid budgeting, avoid surprises and help keep contribution rates affordable during periods of short term market volatility
- Stabilisation is primarily used for long-term, secure employers though it can be extended

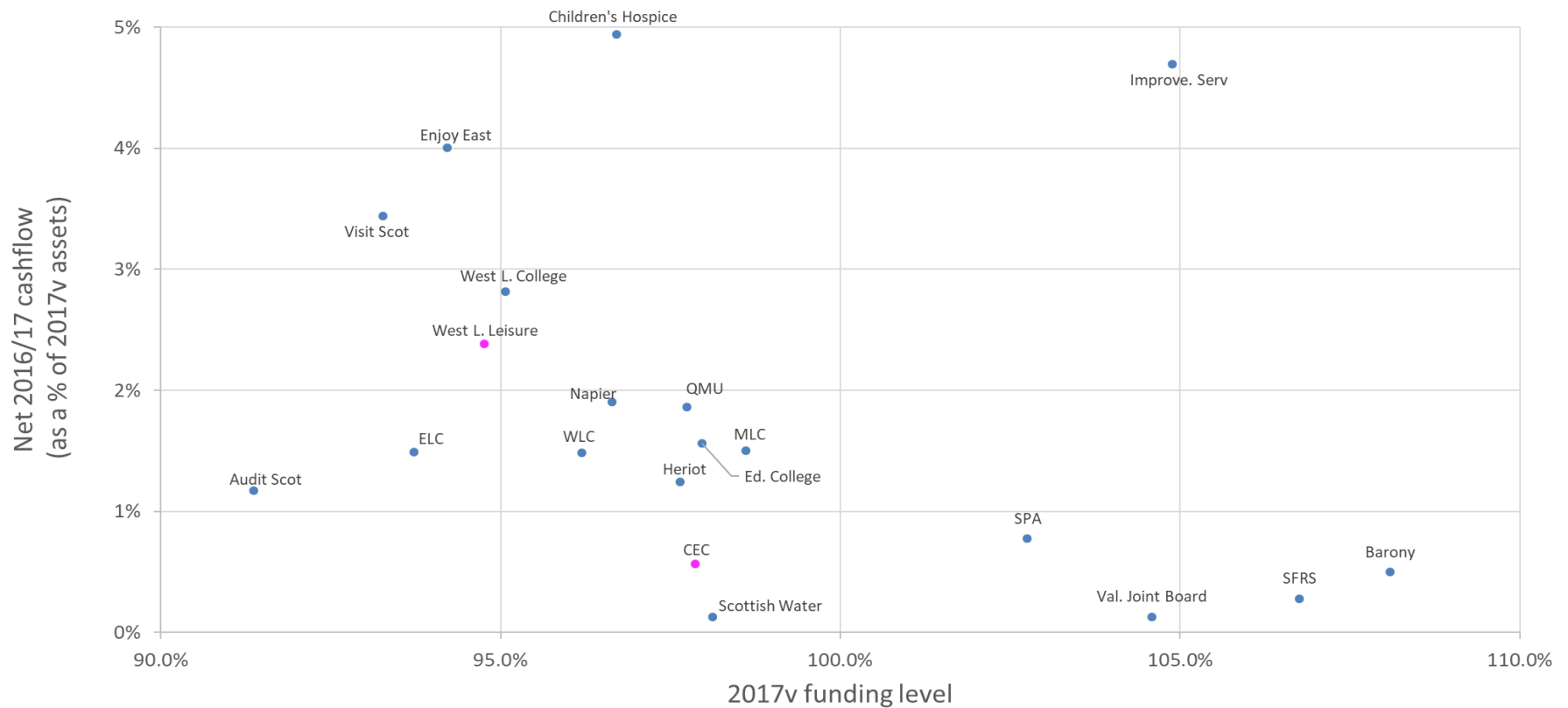
# CSM employers to be modelled

- We have analysed the CSM employers in order to determine which employers are similar in characteristics and may therefore produce similar modelling results. As part of this analysis, we considered:
  - **Net cashflow position in 2016/17** – employer and employee contributions less pensions paid. The greater the extent to which an employer's contribution income exceeds its benefit outflow, the greater the extent to which its asset share is expected to grow over time. An employer that has a positive cashflow position will be a net investor (rather than a net disinvestor) and will benefit from investment returns to a greater extent than a cashflow negative employer.
  - **2017 valuation funding level**
  - **Actual contribution rate in payment in 2020/21**
- Based on the results of this analysis, the Administering Authority selected two employers to be modelled as representative examples from the CSM group.
- Please note that our analysis of the CSM employers is crude in its nature and has limitations which should be noted. For example, an employer's *future* cashflow profile will impact the future progression of its funding position. An employer's net cashflow position will change over time due to retirements, withdrawals and deaths – our analysis of the CSM employers does not capture this. However, the Asset Liability Modelling does allow for changes in the modelled employer's cashflow position over time.

# CSM analysis

The employers shown in pink highlight are the representative examples of the CSM employers we have modelled.

Relationship between cashflow position and funding position (2017v)





# CSM analysis (cont.)

The employers shown in pink highlight are the representative examples of the CSM employers we have modelled.

Contribution rate vs 2017 funding level



There is a wide range of contribution rates in payment

# CSM employers to be modelled

- The Administering Authority elected to model:
  - **West Lothian Leisure (WLL)**, due to its low contribution rate relative to other employers in the CSM group (Enjoy East Lothian has a similarly low contribution rate and should be considered alongside the modelling results for WLL)
  - The **City of Edinburgh Council (CEC)** to represent the other employers in the CSM group

# Model inputs - contribution patterns (CEC)

Funding strategy	Currently certified in R&A		New R&A from 2020 valuation				
	YTE 2020	YTE 2021	YTE 2022	YTE 2023	YTE 2024	YTE 2025	Thereafter (stabilisation mechanism)
1) +0.5% for 4 years then +/-0.5% (floor: 15%, cap 30%)	22.2%	22.7%	23.2%	23.7%	24.2%	24.7%	From 1 April 2025, contributions will increase or decrease (towards the underlying “market based” rate) by no more than 0.5% of payroll each year (with a contribution rate floor of 15% and cap of 30%)
2) -0.5% for 4 years then +/-0.5% (floor: 15%, cap 30%)	22.2%	22.7%	22.2%	21.7%	21.2%	20.7%	Stabilisation in line with scenario 1 from 1 April 2025
3) Freeze for 4 years then +/-0.5% (floor: 15%, cap 30%)	22.2%	22.7%	22.7%	22.7%	22.7%	22.7%	Stabilisation in line with scenario 1 from 1 April 2025
4) Freeze for 4 years then +/-0.5% (floor: 18%, cap 25%)	22.2%	22.7%	22.7%	22.7%	22.7%	22.7%	Stabilisation in line with scenario 1 from 1 April 2025 but with a higher contribution rate floor of 18% and lower contribution rate cap of 25%
5) -1.5% for 4 years then +/-1.5% (floor: 15%, cap 30%)	22.2%	22.7%	21.2%	19.7%	18.2%	16.7%	From 1 April 2025, contributions will increase or decrease (towards the underlying “market based” rate) by no more than 1.5% of payroll each year (with a contribution rate floor of 15% and cap of 30%)

NB contribution rates include expenses of 0.3%

# Model inputs - contribution patterns (WLL)



Funding strategy	Currently certified in R&A		New R&A from 2020 valuation				
	YTE 2020	YTE 2021	YTE 2022	YTE 2023	YTE 2024	YTE 2025	Thereafter
<b>1)</b> +0.5% for 4 years then +/-0.5% (floor 5%, cap 30%)	14.7%	14.7%	15.2%	15.7%	16.2%	16.7%	From 1 April 2025, contributions will increase or decrease (towards the underlying “market based” rate) by no more than 0.5% of payroll each year (with a contribution rate floor of 5% and cap of 30%)
<b>2)</b> -0.5% for 4 years then +/-0.5% (floor 5%, cap 30%)	14.7%	14.7%	14.2%	13.7%	13.2%	12.7%	Stabilisation in line with scenario 1 from 1 April 2025
<b>3)</b> Freeze for 4 years then +/-0.5% (floor 5%, cap 30%)	14.7%	14.7%	14.7%	14.7%	14.7%	14.7%	Stabilisation in line with scenario 1 from 1 April 2025
<b>4)</b> Freeze for 4 years then +/-0.5% (floor 10%, cap 25%)	14.7%	14.7%	14.7%	14.7%	14.7%	14.7%	Stabilisation in line with scenario 1 from 1 April 2025 but with a higher contribution rate floor of 10% and lower contribution rate cap of 25%
<b>5)</b> -1.5% for 4 years then +/-1.5% (floor 5%, cap 30%)	14.7%	14.7%	13.2%	11.7%	10.2%	8.7%	From 1 April 2025, contributions will increase or decrease (towards the underlying “market based” rate) by no more than 1.5% of payroll each year (with a contribution rate floor of 5% and cap of 30%)

**NB** contribution rates include expenses of 0.3%

# Model inputs – liabilities and assets

- This initial modelling has been carried out for CEC and WLL
- Assets and liabilities are valued consistently
- Liability values are based on membership data provided as at 31 March 2019 by the Fund
- Liability values are assessed on the same methodology for assumptions as applied at the 2017 formal funding valuation, but updated for 31 March 2019 market conditions
- Asset values as at 31 March 2019 have been taken from the employers' HEAT schedules at this date

# Model inputs – liabilities and assets

31 March 2019 (£m)	City of Edinburgh Council	West Lothian Leisure
Liabilities		
Active members	1,211	16
Deferred members	369	6
Pensioners	1,157	5
<b>Total liabilities</b>	<b>2,736</b>	<b>28</b>
 <b>Asset share</b>	 <b>2,828</b>	 <b>27</b>
 Surplus/(deficit)	 91	 (1)
Funding level	103%	97%

# Model inputs - investment strategy

Asset class	Current benchmark
UK equities	8%
Overseas equities	58%
<b>Total Growth assets</b>	<b>65%</b>
Infrastructure (equity)	11%
Senior Loans (sub inv. Grade)	2%
Commercial property	7%
<b>Total other growth</b>	<b>20%</b>
Index linked gilts	7%
Corporate bonds	8%
<b>Total bonds</b>	<b>15%</b>
<b>Grand total</b>	<b>100%</b>

The above asset split was provided by the Lothian Pension Fund for the purpose of this modelling exercise



# Decision making framework



# Decision making framework (1)

- Consider different funding strategies from 1 April 2021
  - The contribution patterns tested were agreed after correspondence with Fund officers
  - The contribution strategies described on slides 21 and 22 are a subset of the 9 contribution strategies modelled for the employers. This report focuses on the strategies that provide the most insight to help determine viable contribution strategies for the CSM employers. Results for the other strategies modelled can be provided on request.
- Time horizon
  - We have considered the position at 2040 i.e. 20 years from the 2020 valuation date. We have also considered the results at 2037 to give insight into how sensitive the results are to the time horizon.
- Likelihood of success
  - What is the “risk” tolerance? i.e. how likely is it the employer will be fully funded within the time horizon?
  - We have assumed use of a minimum 67% measure although this should not be viewed as a target

# Decision making framework (2)

- Downside risk
  - How “bad” is the worst case scenario? i.e. how low could the funding level get by the end of the time horizon?
  - The averages of the worst 5% funding levels are shown for all future years.
- Combine all the above to reach a value judgement

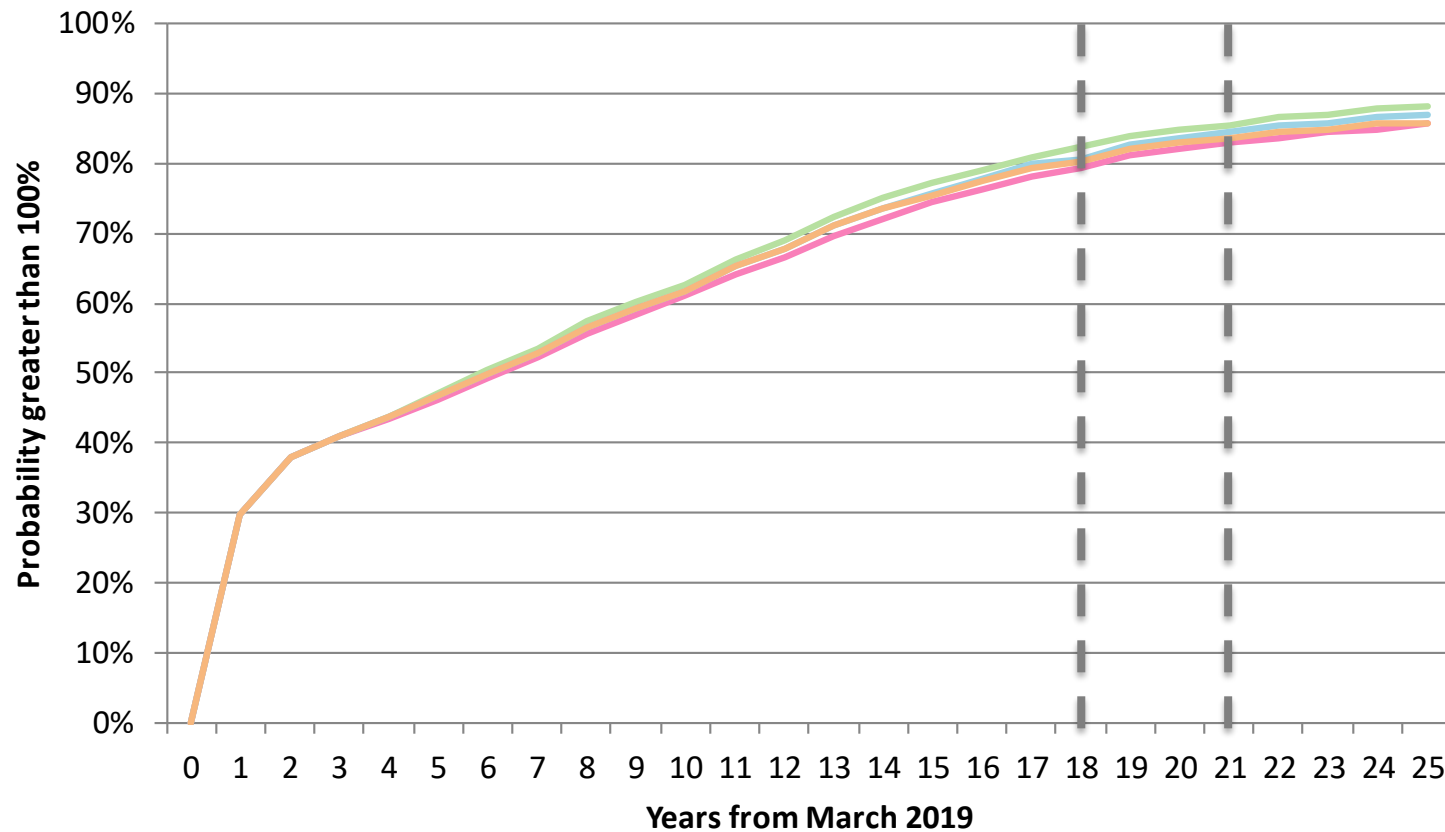
# Decision making framework (3)

- Wider factors than modelling results should also be considered
  - **Budgets**
    - What has been budgeted for the next few years?
    - If contributions are reduced now, will there be difficulty in increasing contributions in the future?
  - **Unmodelled risks**
    - Legal risks - McCloud, Cost Cap and GMP equalisation
    - Uncertainty around possible benefit changes
    - Ideally, contribution strategy should be flexible enough to absorb benefit changes
    - Other 'big ticket' risks include climate change and political.
    - **No allowance included in modelling**
  - **Time horizon – stay at 20 years?**
    - Some GAD pressure for this to reduce but not necessarily relevant in an open scheme
  - **Stand up to scrutiny?**
    - Results / proposed rates need to be justified to:
      - Pension Committee and Local Pension Board
      - External bodies e.g. Government Actuary's Department (GAD)



# City of Edinburgh Council

# Likelihood of being above 100% funded (scenarios 1-4)



+0.5% for 4 years then +/-0.5%

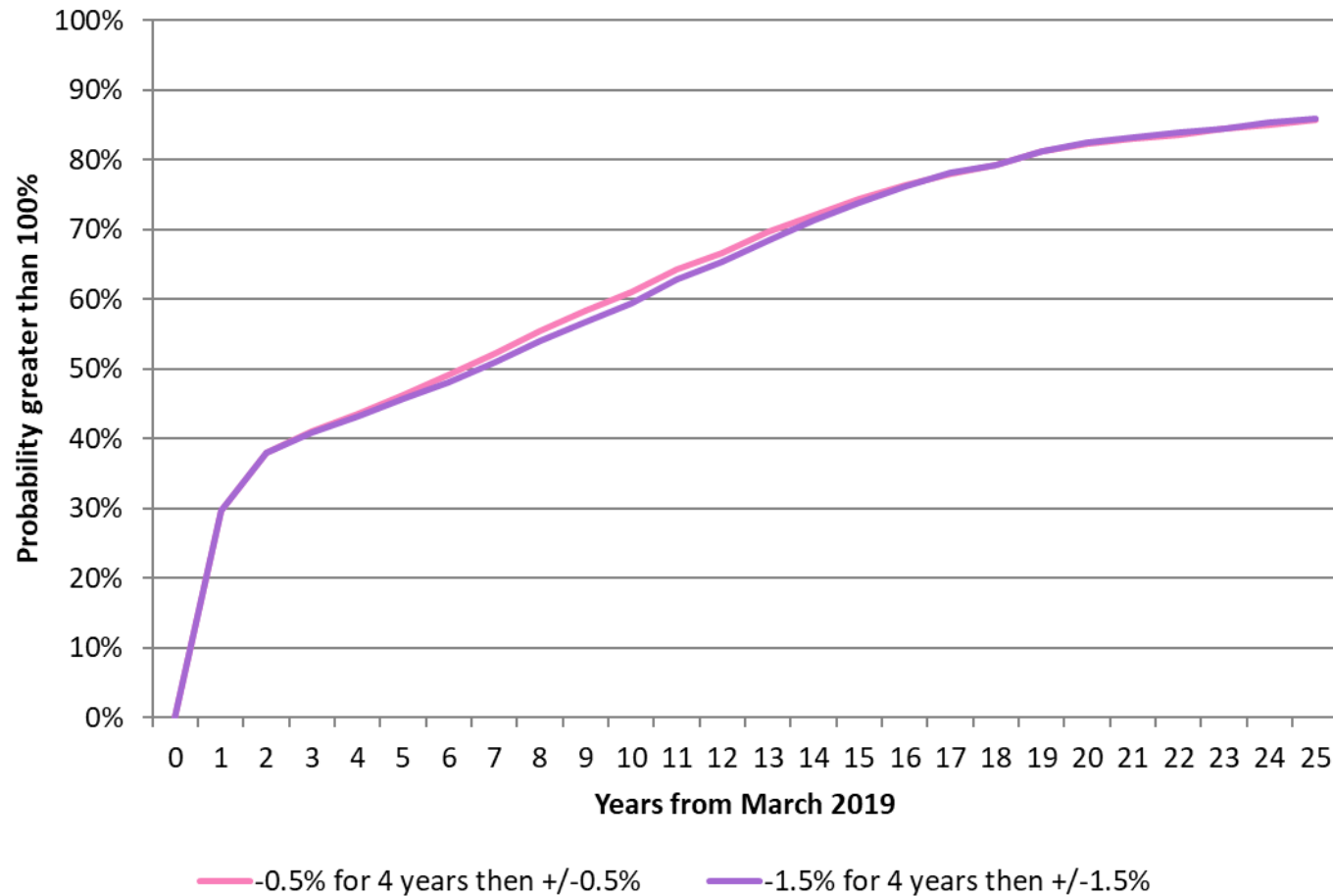
-0.5% for 4 years then +/-0.5%

freeze for 4 years then +/-0.5%

freeze for 4 years then +/-0.5% (18%, 25%)

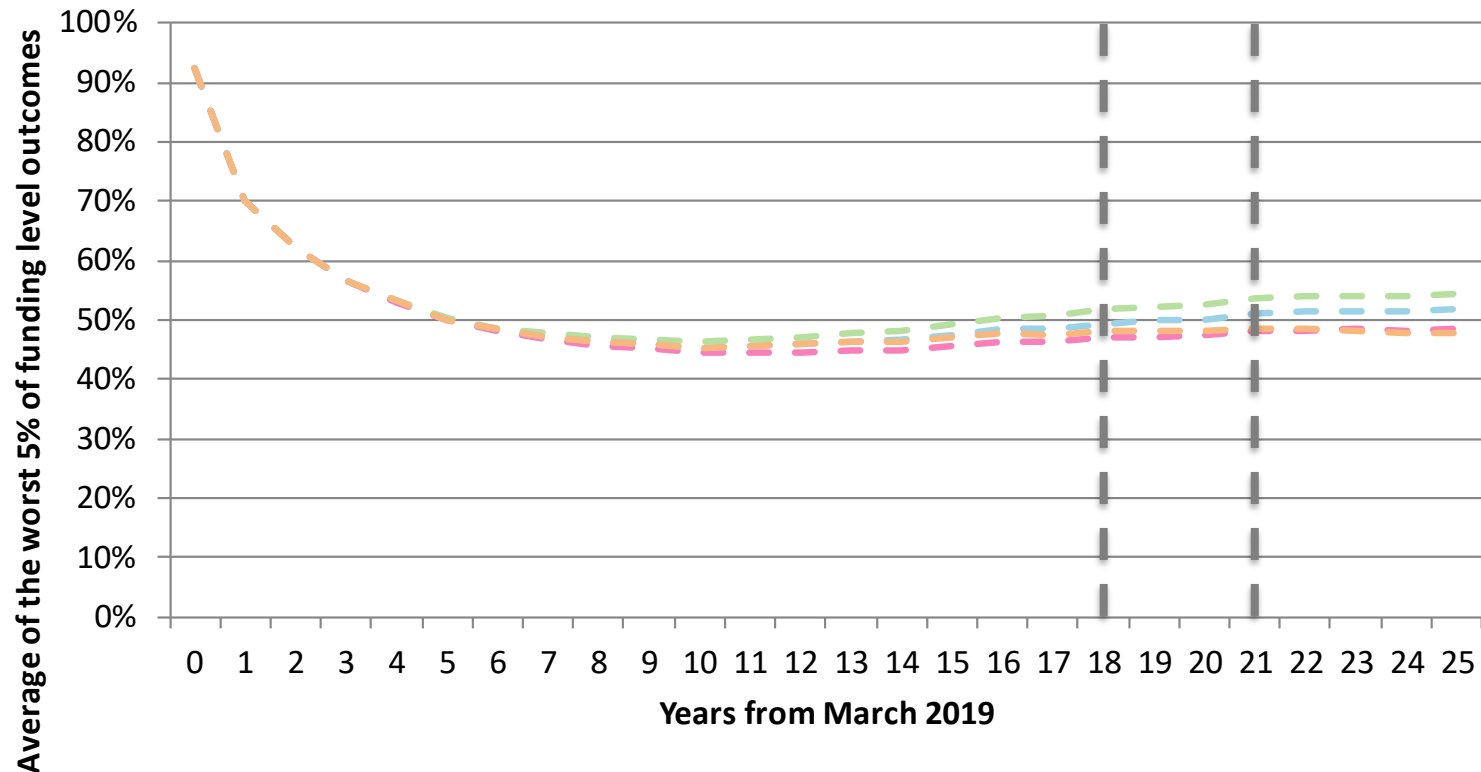
All scenarios modelled have >66% likelihood of success

# Likelihood of being above 100% funded (scenarios 2 and 5)



Long term outcomes similar as contribution rate bounces back quicker under +/-1.5% scenario

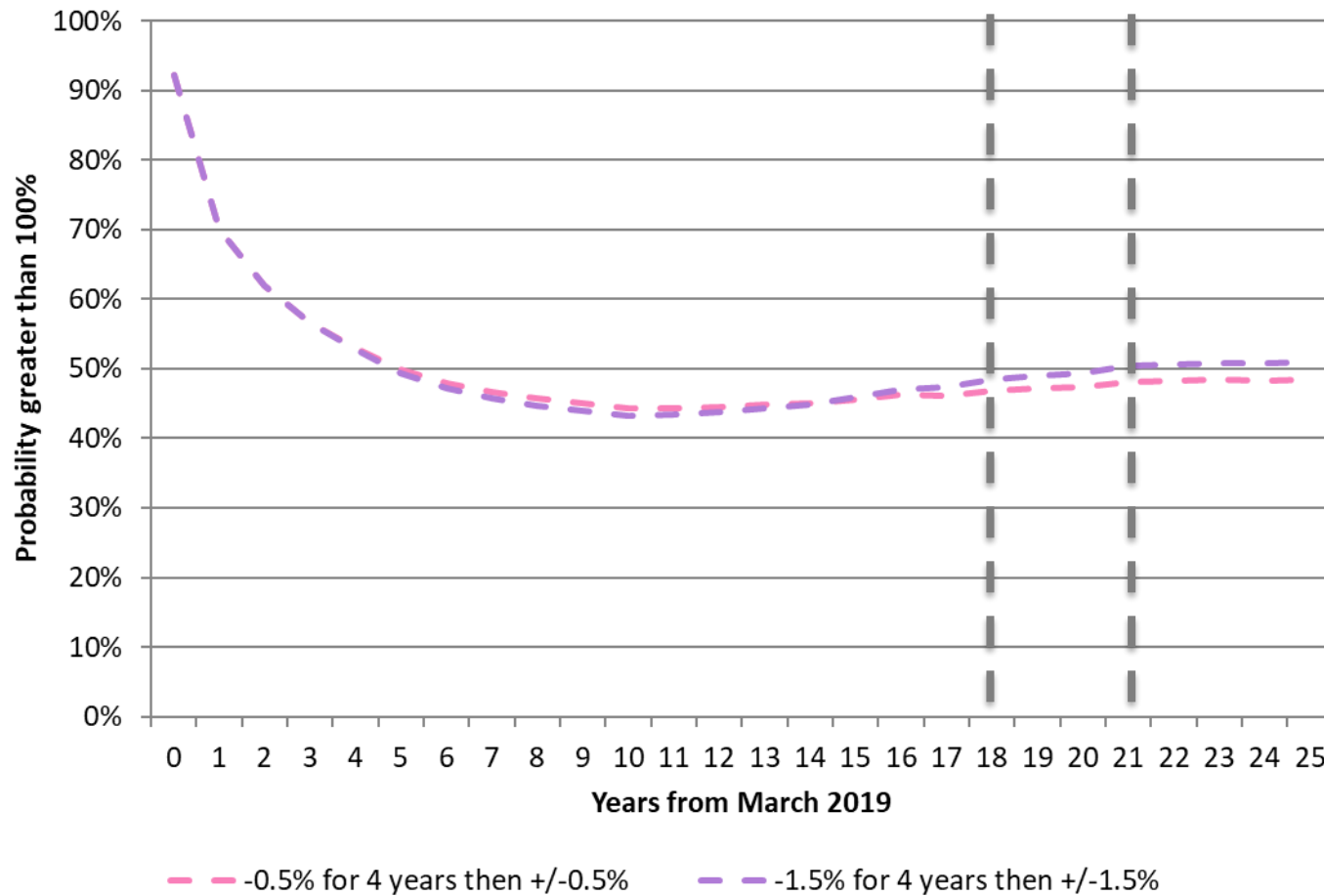
# Average of the worst 5% of funding Levels (scenarios 1-4)



- +0.5% for 4 years then +/-0.5%
- 0.5% for 4 years then +/-0.5%
- freeze for 4 years then +/-0.5%
- freeze for 4 years then +/-0.5% (18%, 25%)

Higher contributions now lead to lower downside risk,  
contribution rate cap reduces the ability to 'bounce back'

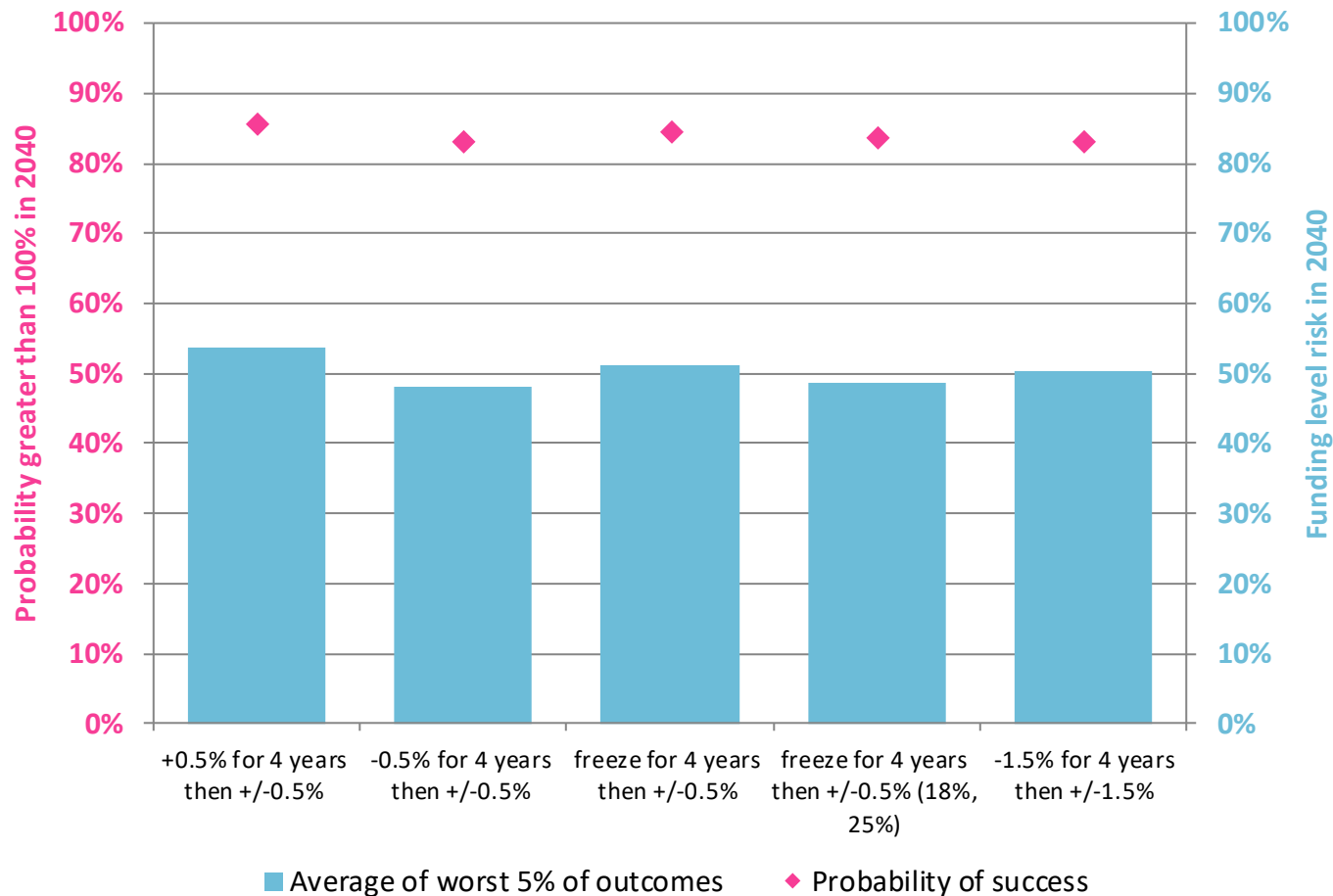
# Average of the worst 5% of funding Levels (scenarios 2 and 5)



+/-1.5% scenario has lower downside risk as contributions increase faster in bad scenarios

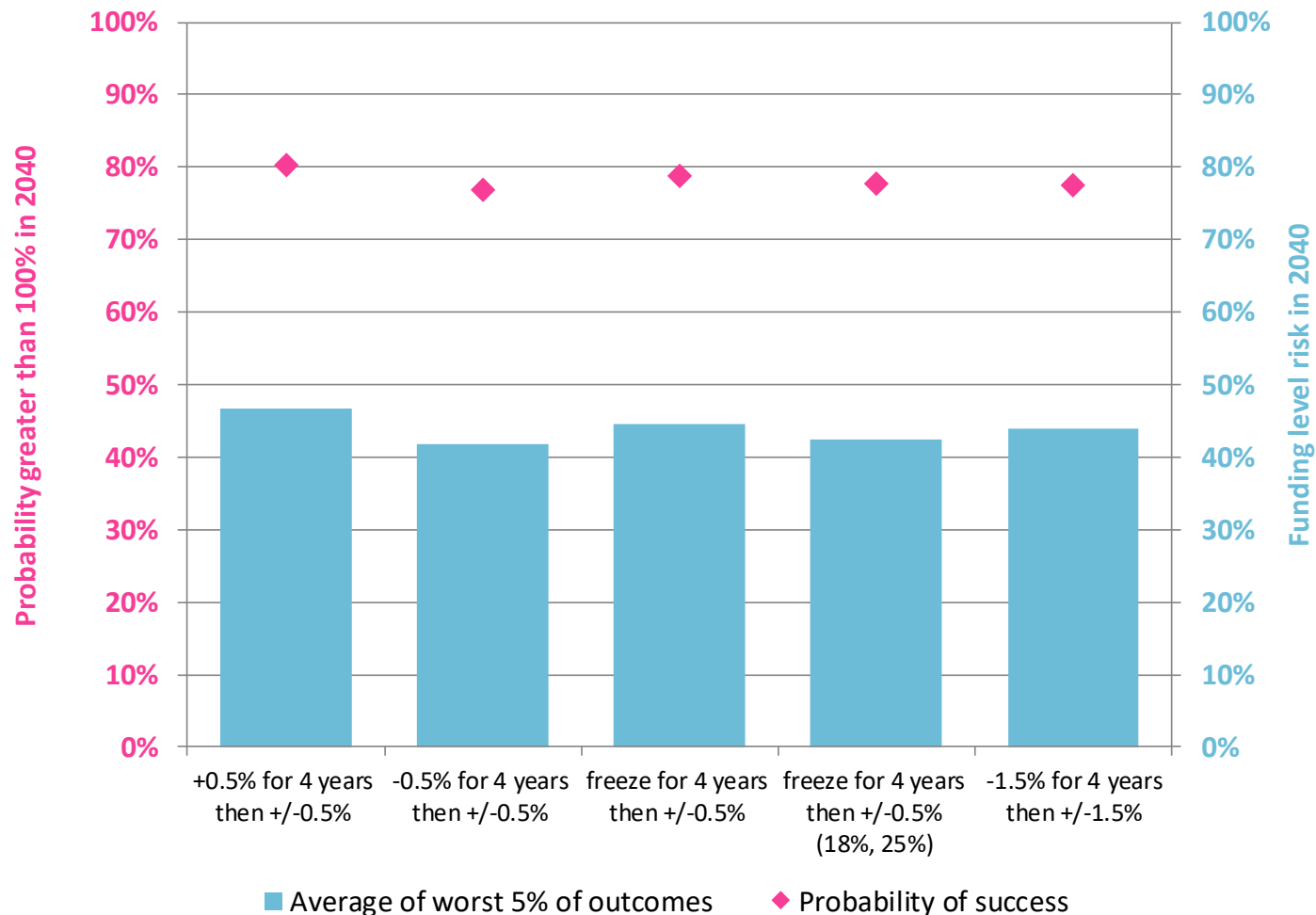


# Success vs risk in 2040



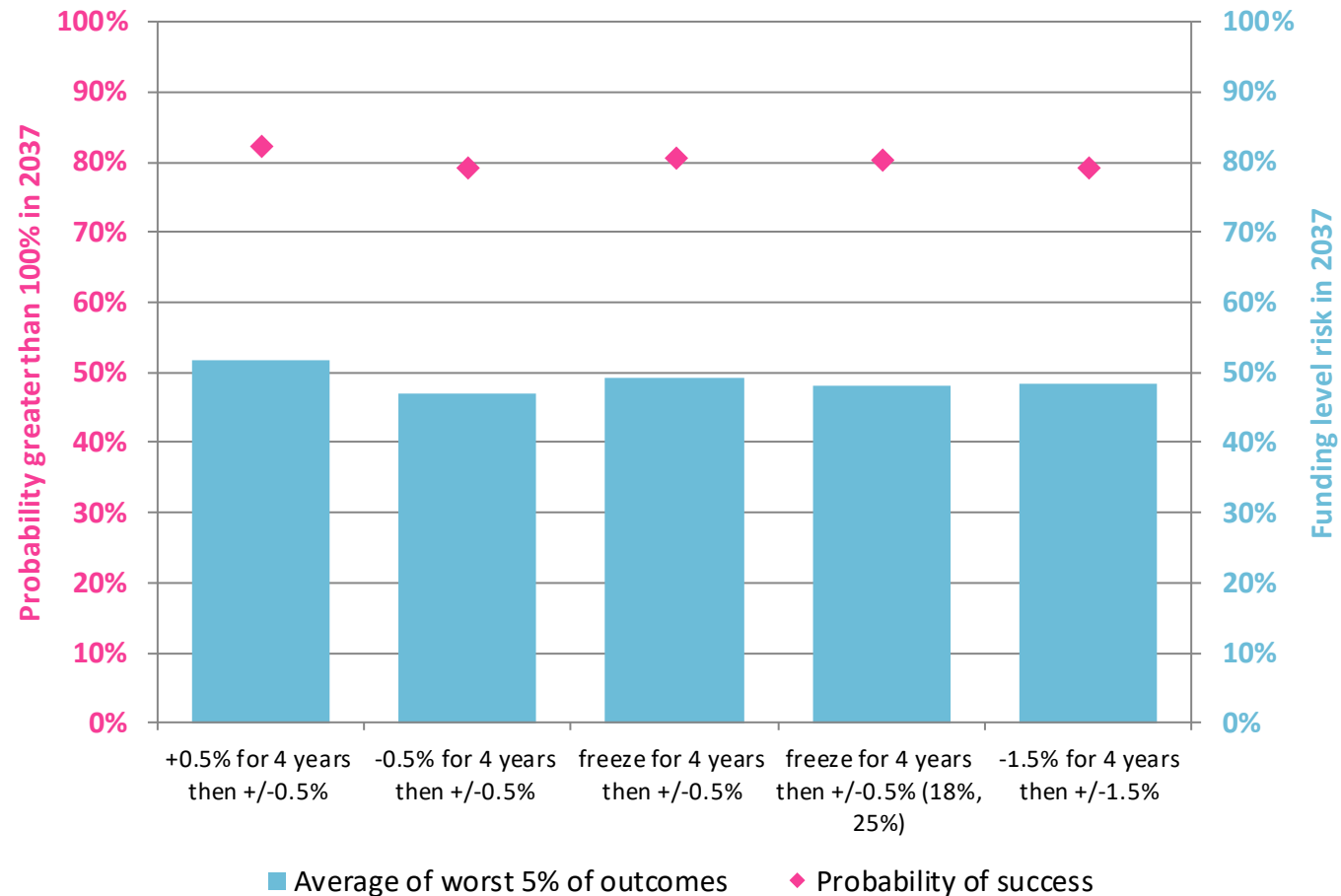
Increasing contributions now has best funding outcomes, but freezing or short term reductions has acceptable downside risk

# Success vs risk in 2040 – without mean reversion



The upside and downside risk measures reduce by around 6-7%.

# Success vs risk in 2037



Time horizon could be reduced and funding target still met in >75% of outcomes

# Summary of results

Contribution strategy	Likelihood of meeting funding target in 2037	Likelihood of meeting funding target in 2040	Average of the worst 5% of funding levels in 2040
+0.5% for 4 years then +/-0.5% (floor: 15%, cap 30%)	82%	86%	54%
-0.5% for 4 years then +/-0.5% (floor: 15%, cap 30%)	79%	83%	48%
Freeze for 4 years then +/-0.5% (floor: 15%, cap 30%)	81%	84%	51%
Freeze for 4 years then +/-0.5% (floor: 18%, cap 25%)	80%	84%	49%
-1.5% for 4 years then +/-1.5% (floor: 15%, cap 30%)	79%	83%	50%

Contribution strategy should have a greater than 2/3rds (67%) likelihood of success

Downside risk FL- Red: <40%, Amber: between 40% and 49%, Green: >49%

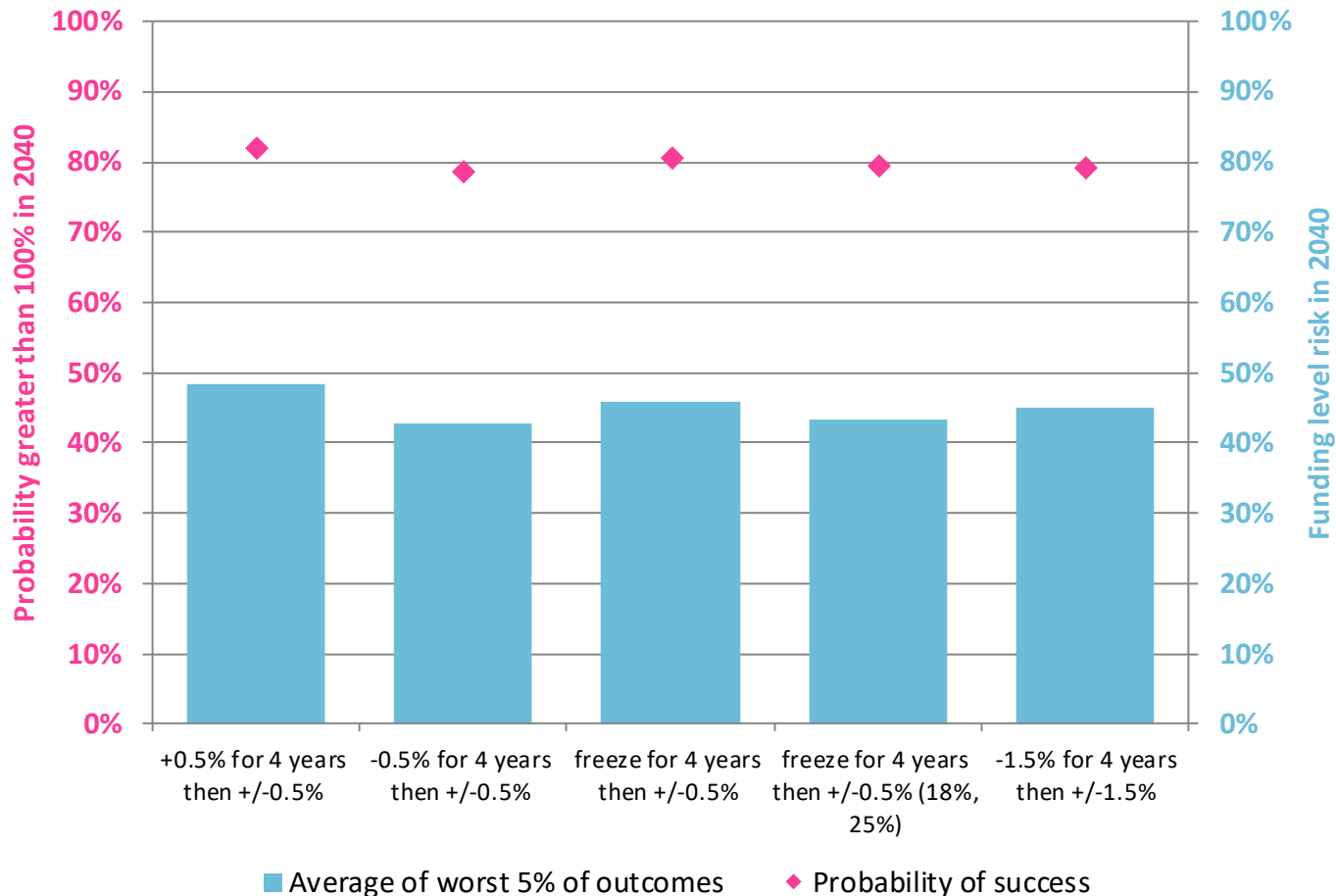
# Comment on results

- At both time horizons (2037 and 2040), all strategies modelled comfortable exceed a 67% likelihood of success
- Increasing the contribution rate from 1 April 2021 leads to the most desirable outcomes
- Freezing or reducing the contribution rate for 4 years has a small but noticeable impact on the likelihood of success and downside risk
- Applying a narrower funnel of possible contribution rates (a floor of 18% and cap of 25% as opposed to a floor of 15% and cap of 30%) has a negligible impact on the likelihood of success and downside risk
- Setting funding strategy is striking a balance between affordability and prudence. The Fund will need to consider:
  - Will freezing/reducing the rate today result in difficulties increasing the rate in future? (e.g. if future investment performance is poor)
  - How much of a 'prudence buffer' should be held as cover against unmodelled risks e.g. McCloud, climate change, political?
  - Is there an opportunity to reduce the funding time horizon at this valuation?



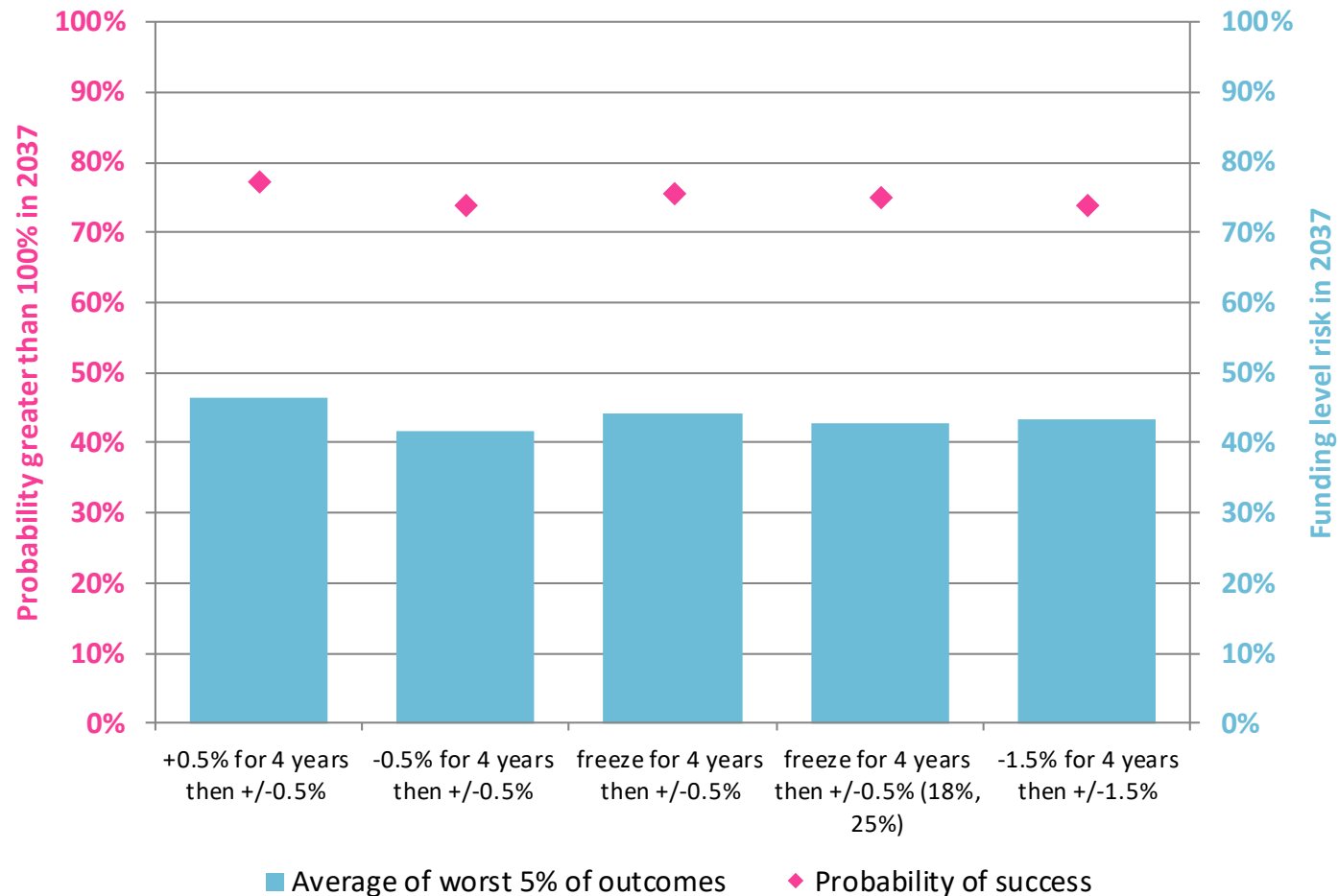
# What if asset values fall by 10% immediately?

# Success vs risk in 2040 – 10% less starting assets



If assets were 10% lower today, likelihoods of success in 2040 would be 4-5% lower

# Success vs risk in 2037 – 10% less starting assets



If assets were 10% lower today, likelihoods of success in 2037 would be 5-6% lower



# Comment on results

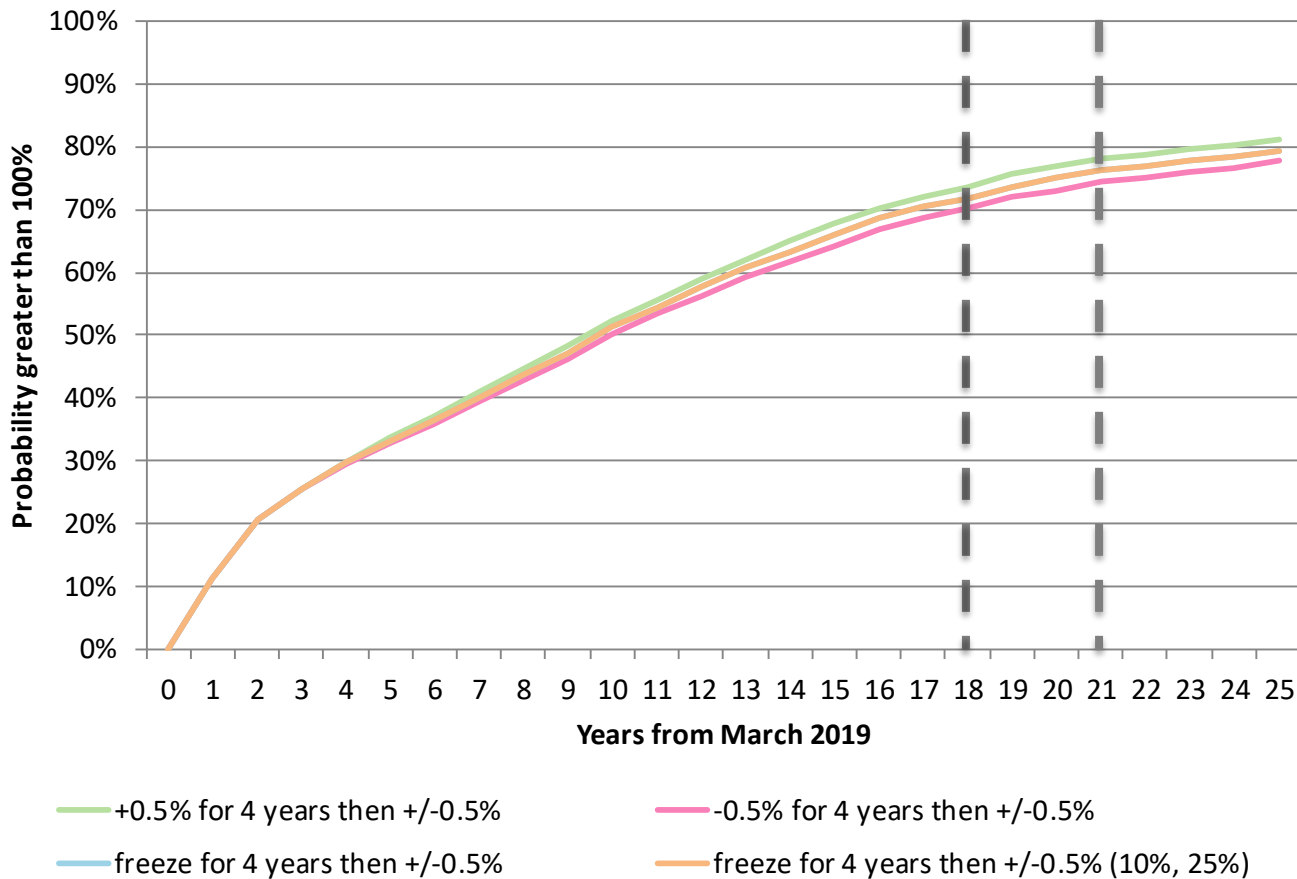
If assets were to fall by 10% today, the long term modelling shows that:

- All of the contribution strategies modelled have a likelihood of success greater than 67% and 'worst case' funding levels greater than 40%
- This supports the viewpoint that small contribution rate reductions in the short term are acceptable



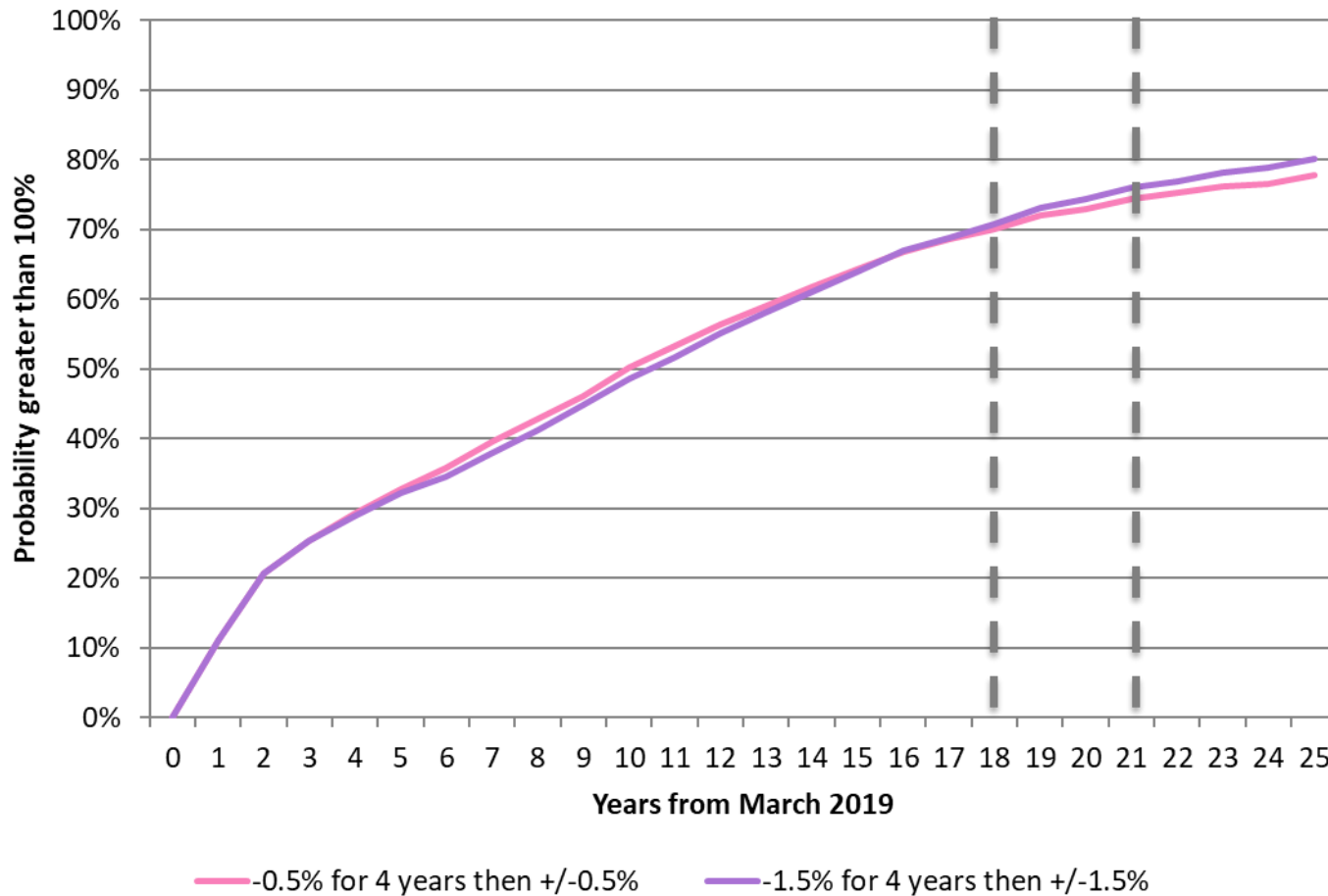
# West Lothian Leisure

# Likelihood of being above 100% funded (scenarios 1-4)



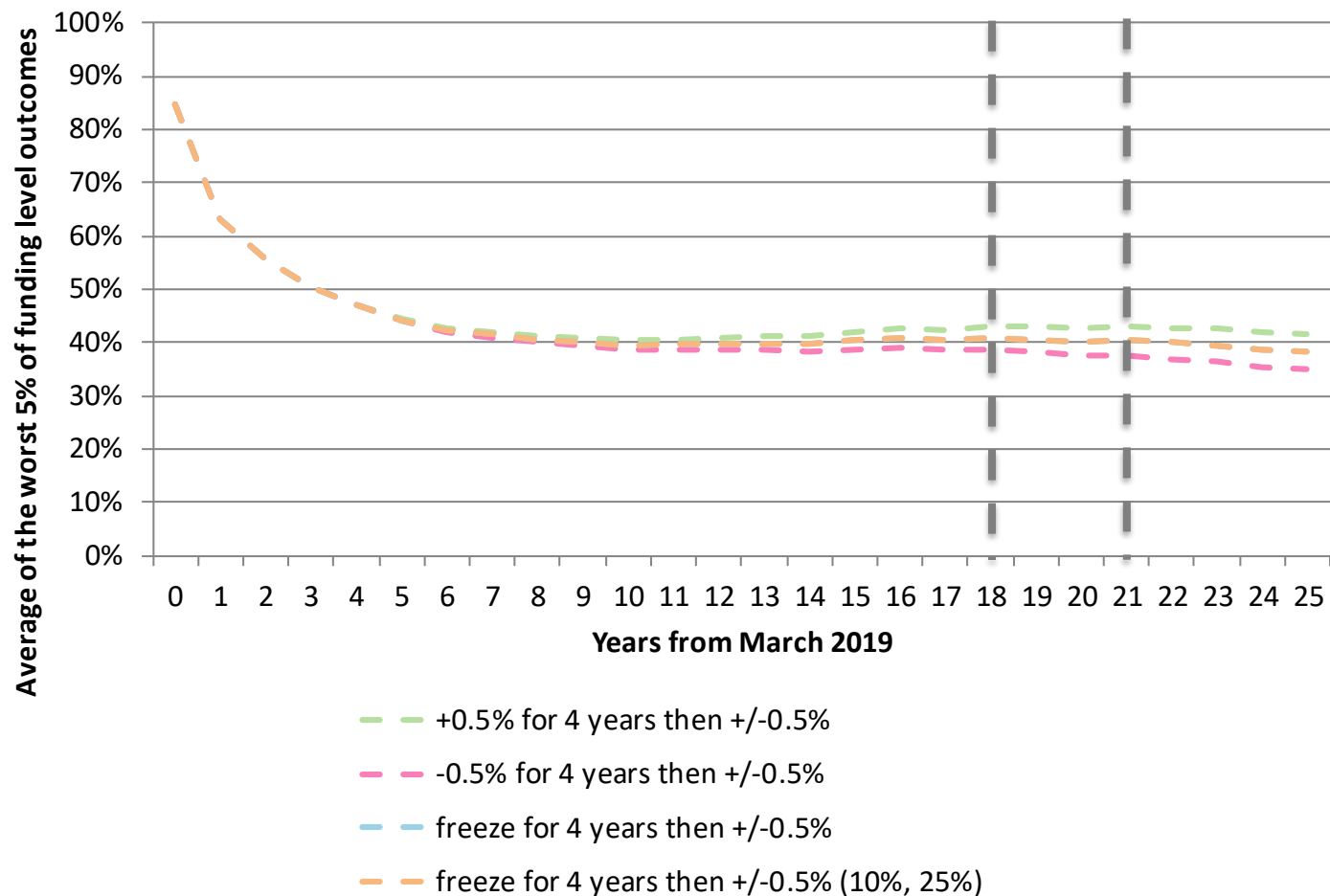
All scenarios modelled have >66% likelihood of success

# Likelihood of being above 100% funded (scenarios 2 and 5)



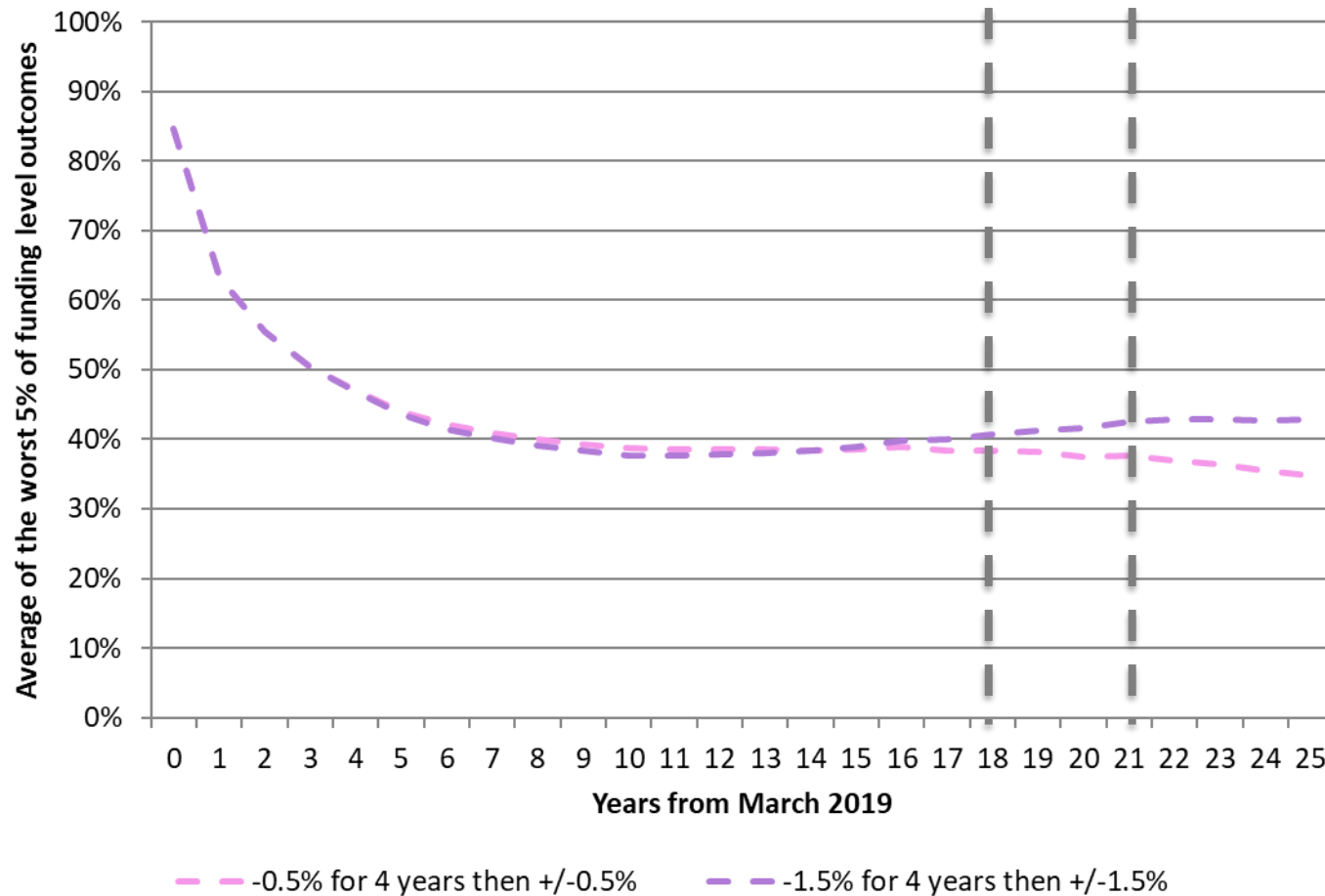
Contribution rate bounces back quicker under +/-1.5% scenario, leading to more positive long term outcomes

# Average of the worst 5% of funding Levels (scenarios 1-4)



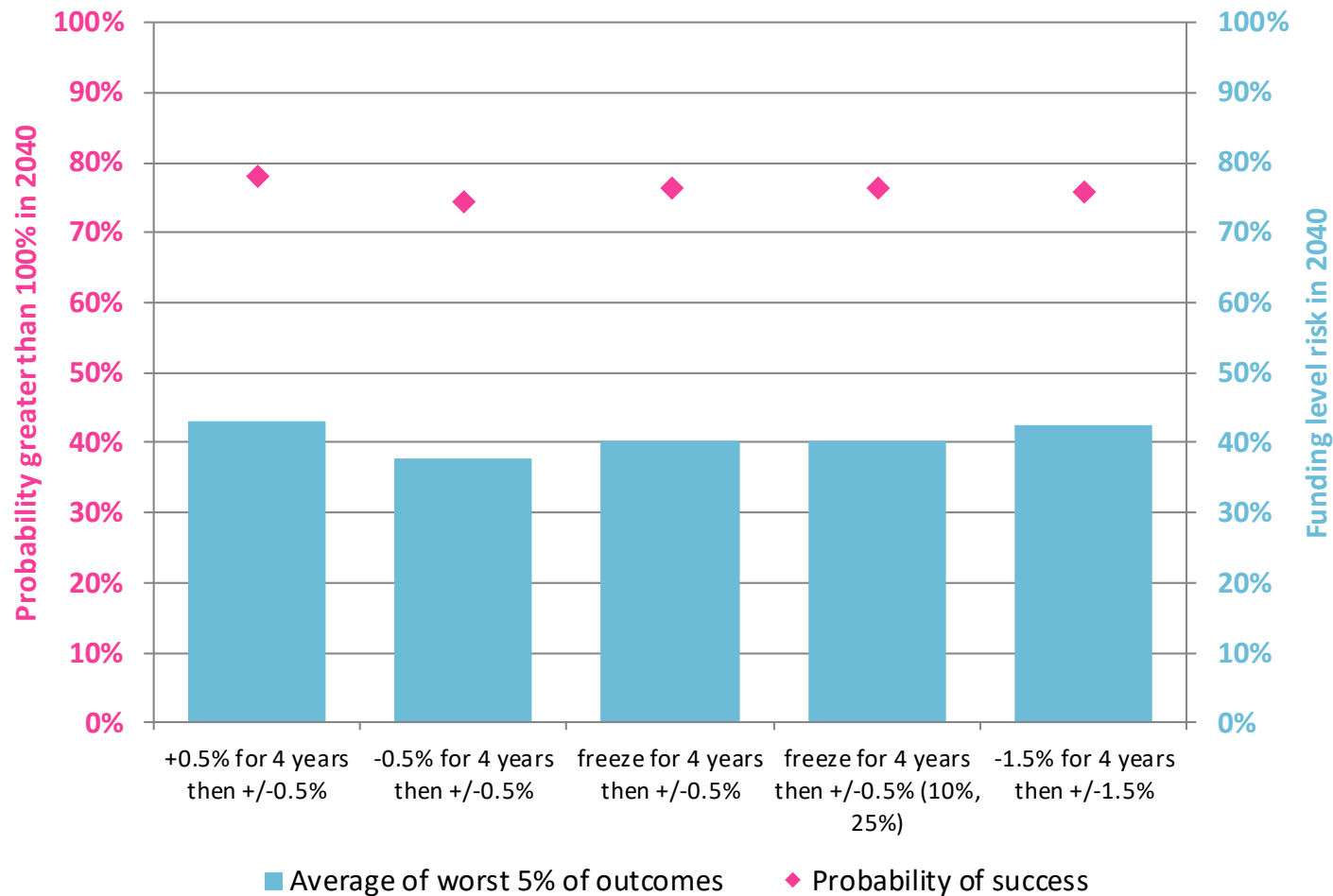
Downside risk is considerably higher than for CEC, likely due to lower current contribution rate  
Downside risk continues to worsen over time if short term reductions are taken now

# Average of the worst 5% of funding Levels (scenarios 2 and 5)



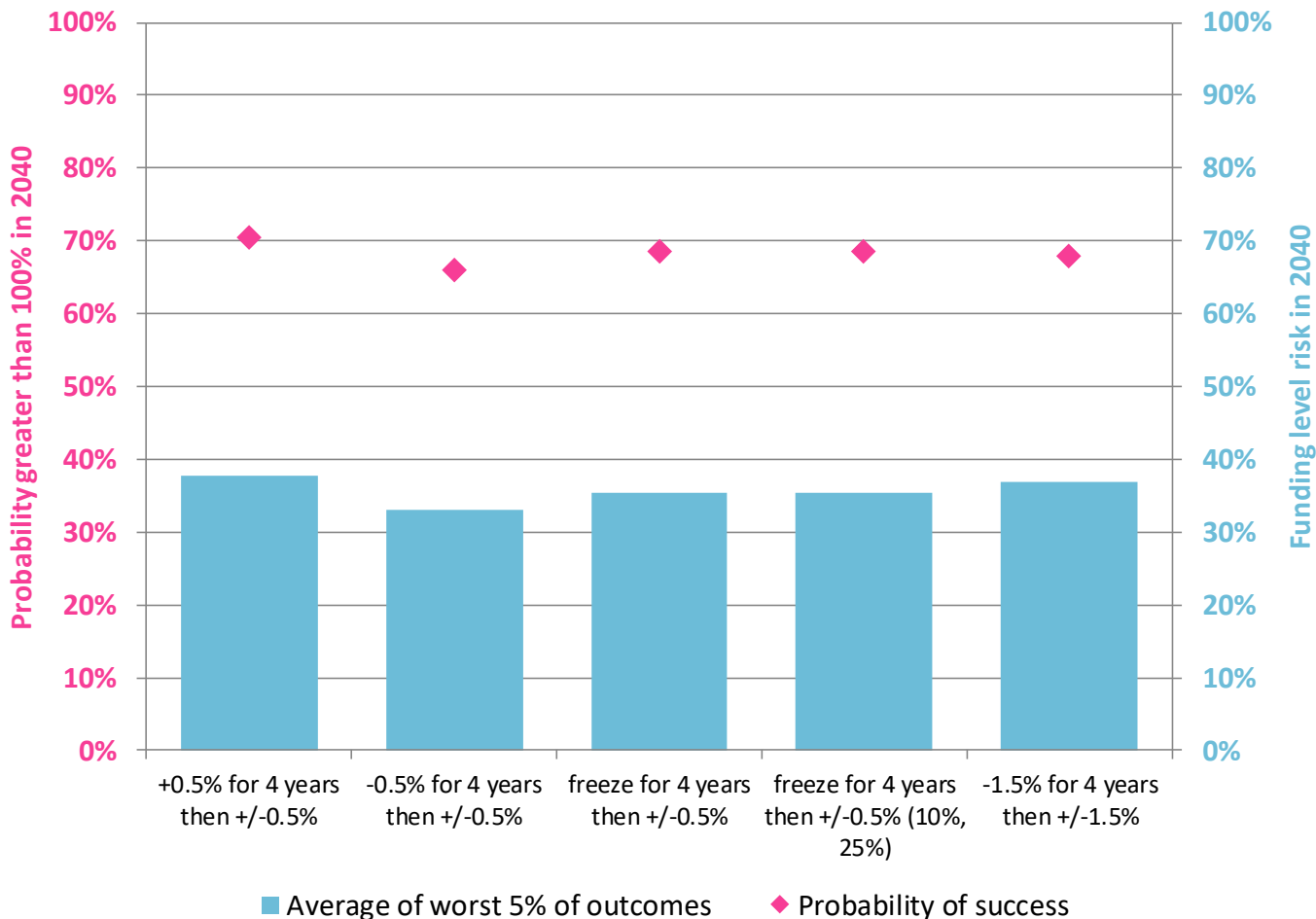
+/-1.5% scenario has lower downside risk as contributions increase faster in bad scenarios, contribution rate reductions today are only acceptable if employer is prepared to pay large contribution rate increases in future

# Success vs risk in 2040



Increasing contributions now has best funding outcomes, freezing has acceptable downside risk.  
Reducing contributions now leads to high downside risk

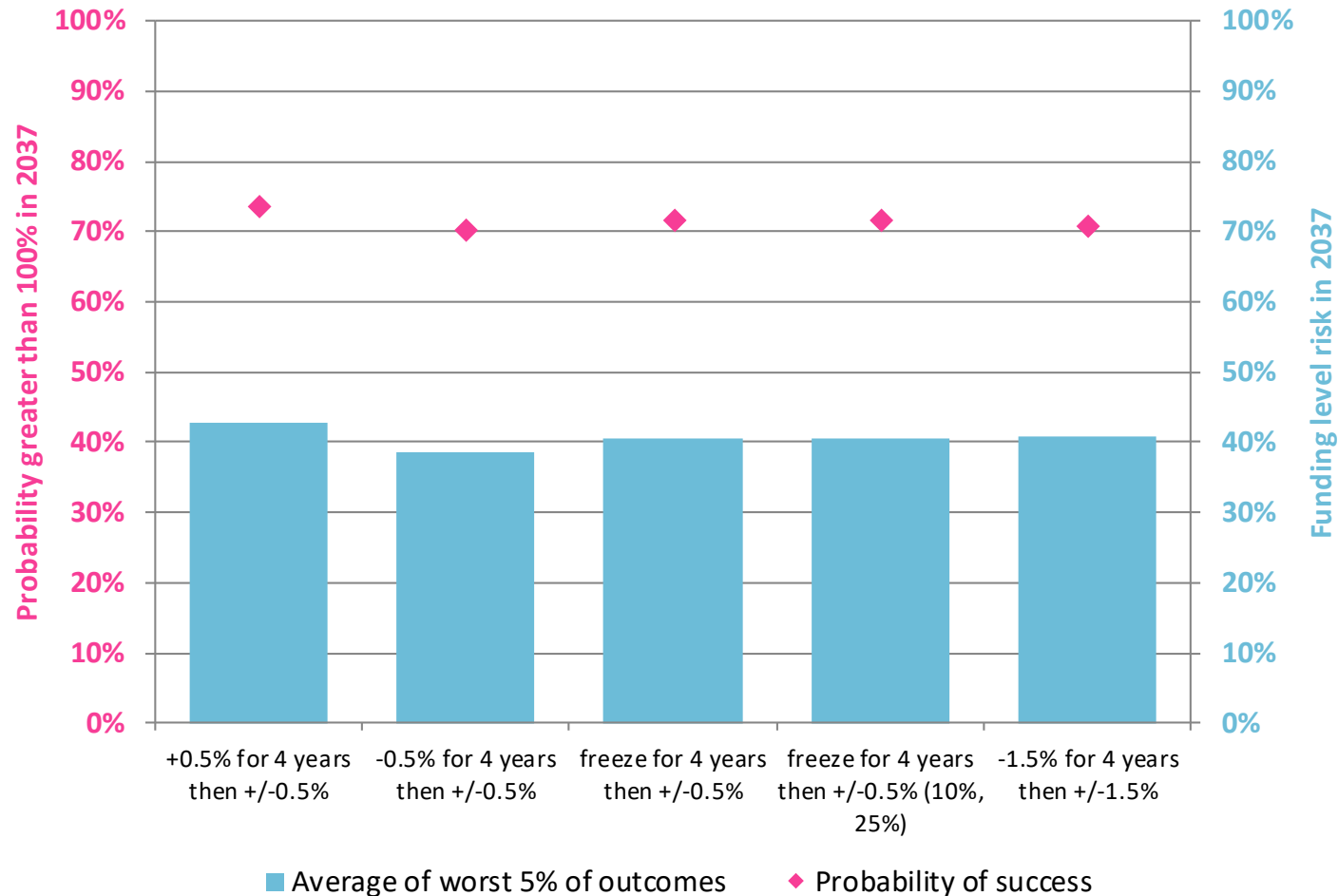
# Success vs risk in 2040 – without mean reversion



The upside and downside risk measures reduce by around 5-8%.



# Success vs risk in 2037



Time horizon could be reduced and funding target still met in >67% of outcomes

# Summary of results

Contribution strategy	Likelihood of meeting funding target in 2037	Likelihood of meeting funding target in 2040	Average of the worst 5% of funding levels in 2040
+0.5% for 4 years then +/-0.5% (floor: 5%, cap 30%)	74%	78%	43%
-0.5% for 4 years then +/-0.5% (floor: 5%, cap 30%)	70%	74%	38%
Freeze for 4 years then +/-0.5% (floor: 5%, cap 30%)	72%	76%	40%
Freeze for 4 years then +/-0.5% (floor: 10%, cap 25%)	72%	76%	40%
-1.5% for 4 years then +/-1.5% (floor: 5%, cap 30%)	71%	76%	43%

Contribution strategy should have a greater than 2/3rds (67%) likelihood of success

Downside risk FL- Red: <40%, Amber: between 40% and 49%, Green: >49%

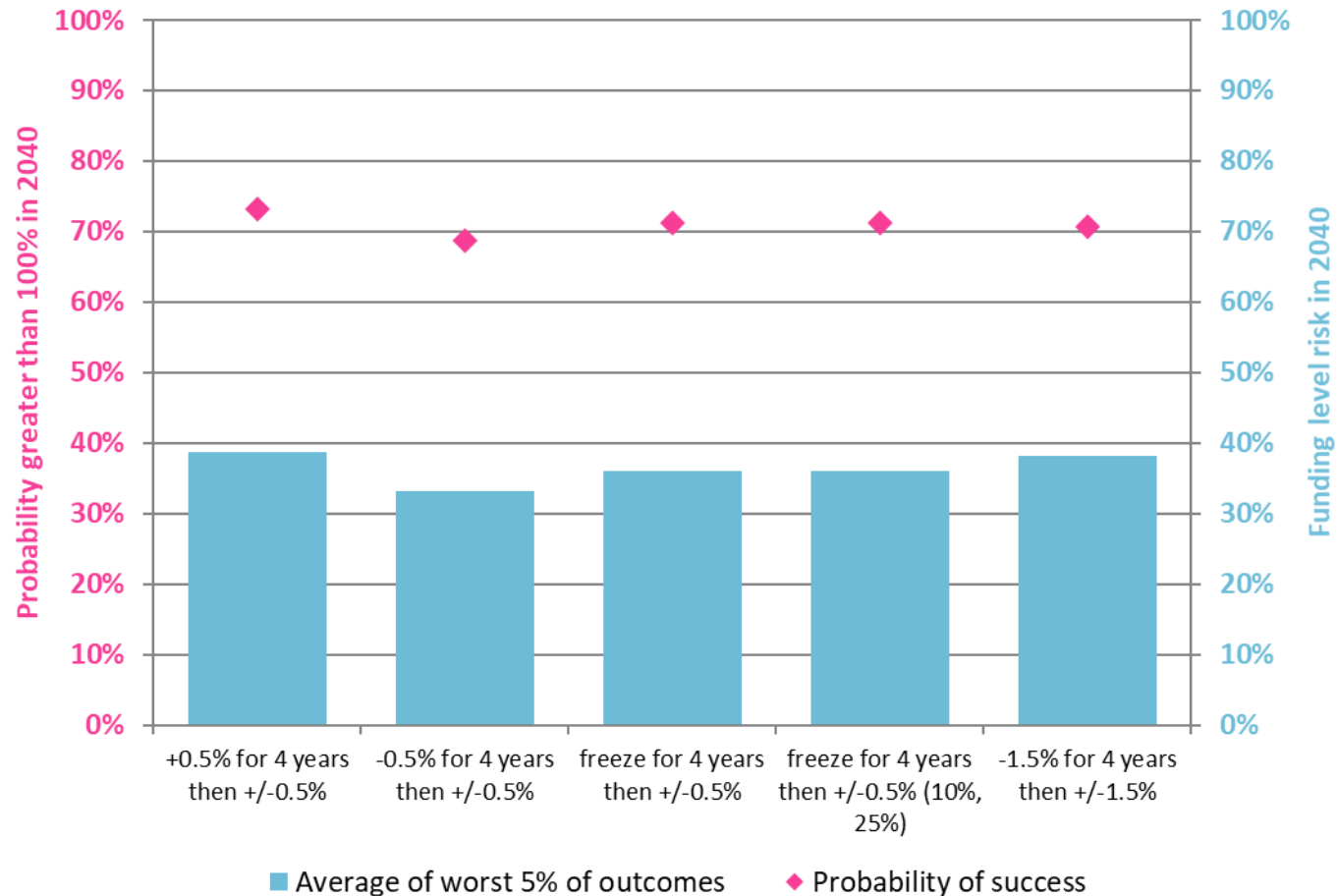
# Comment on results

- At both time horizons (2037 and 2040), all strategies modelled exceed a 67% likelihood of success
- Increasing the contribution rate from 1 April 2021 leads to the most desirable outcomes
- Reducing contribution rates in the short term leads to high downside risk in the long term. This tells us that contribution rate reductions today may mean large increases will be required in future.
- Applying a narrower funnel of possible contribution rates (a floor of 10% and cap of 25% as opposed to a floor of 5% and cap of 30%) has a negligible impact on the likelihood of success and downside risk
- Setting funding strategy is striking a balance between affordability and prudence. The Fund will need to consider:
  - Will freezing/reducing the rate today result in difficulties increasing the rate in future? (e.g. if future investment performance is poor)
  - As there is uncertainty around the benefit structure (which is likely to increase the cost of benefits) and the long term economic outlook (e.g. due to Brexit) is a reduction to contribution rates appropriate at this time?



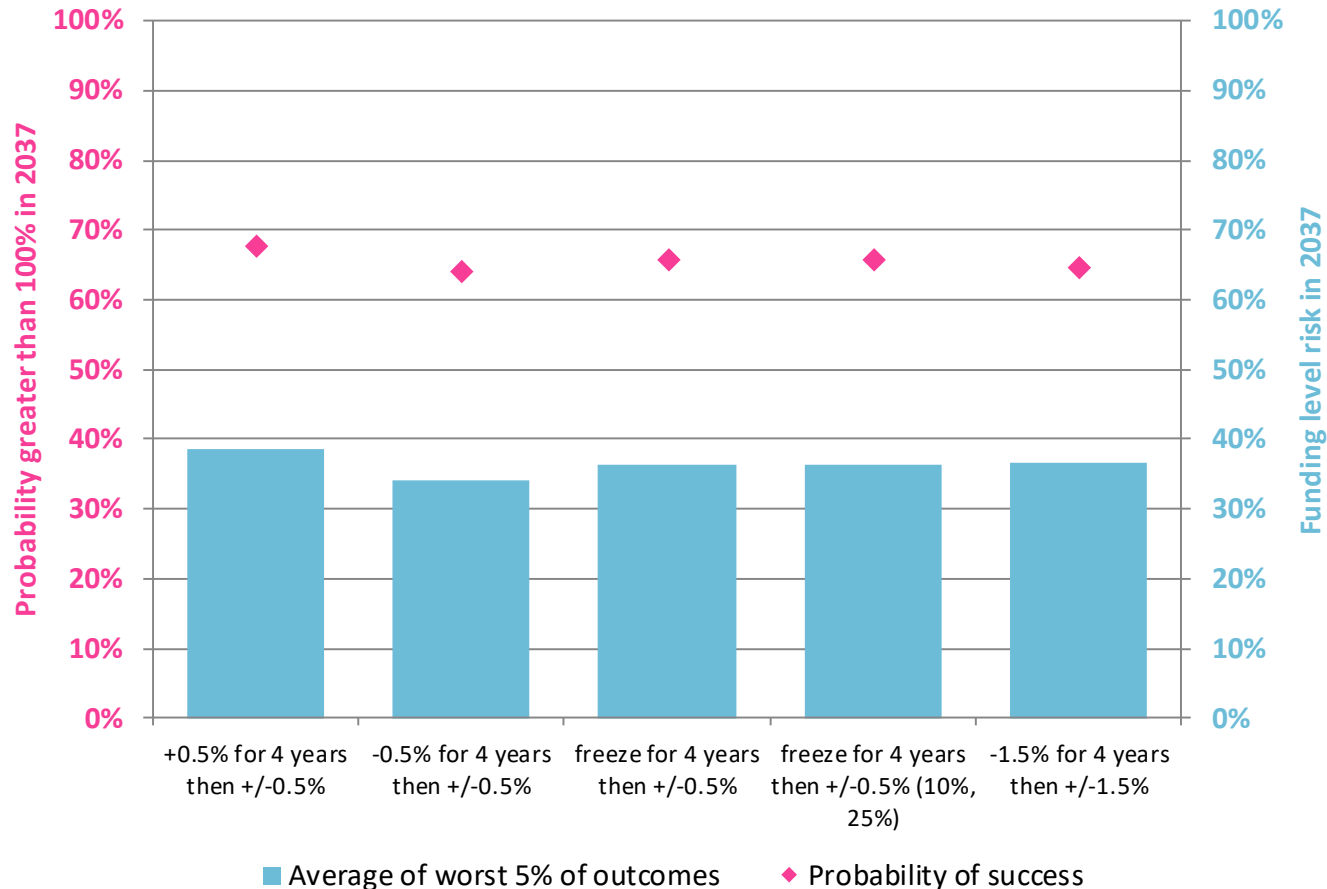
What if asset values fall by 10%  
immediately?

# Success vs risk in 2040 – 10% less starting assets



If assets were 10% lower today, likelihoods of success in 2040 would be c5% lower

# Success vs risk in 2037 – 10% less starting assets



If assets were 10% lower today, likelihoods of success in 2037 would be c6% lower,  
All strategies except strategy 1 have less than 67% likelihood of success

# Comment on results

If assets were to fall by 10% today, the long term modelling shows that:

- A contribution strategy that increases by 0.5% p.a. for the next 4 years continues to meet a 67% likelihood of success at both time horizons
- All other strategies rely on the final 3 years of the projections to meet this likelihood

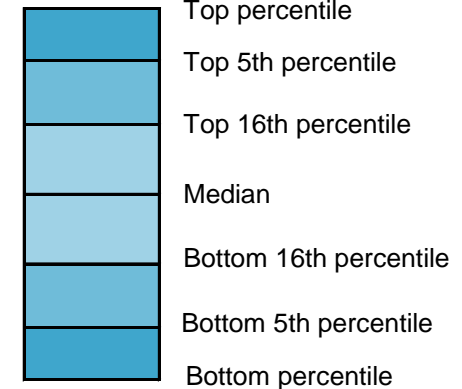


# Appendix - Technical & Professional Notes



# Reliances, limitations and additional details (1)

- We undertake 5,000 simulations of the future for each scenario. The outcomes of the simulations are ranked from “best” to “worst”. The spread of outcomes at a given point in time for a given strategy can be illustrated in charts as follows.
- The “median” funding level can be considered to be the average outcome. It should be noted that this is not the same as saying this is the most likely outcome, rather it represents the value with which we would expect all outcomes to have a 50% chance of being above and a 50% chance of being below.
- The bottom 16th percentile – approximately 1 outcome in 6 is worse than this level.
- The top 16th percentile – approximately 5 outcomes in 6 would be expected to be below this level.
- The bottom 5th percentile can be considered a “bad” outcome – 1 outcome in 20 of the simulations is expected to be worse than this.
- The top 5th percentile can be considered a “good” outcome – 19 outcomes in 20 of the simulations are expected to be below this level.
- The bottom percentile can be considered an “extremely bad” outcome, which occurs with a probability of 1 in 100.
- The top percentile can be considered an “extremely good” outcome, which occurs with a probability of 1 in 100.
- When plotting the distribution of contribution rates, rather than funding levels, the description of any outcome as ‘bad’ or ‘good’ is reversed.
- In all the charts we consider, there will be some outcomes above and below the highest and lowest levels shown.



# Reliances, limitations and additional details (2)

## Data – Cashflows

In projecting forward the evolution of the Fund, we have used estimated cash flows generated using our actuarial valuation system, based on information provided as at 31 March 2019 by the Fund.

## 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.

# Reliances, limitations and additional details (3)

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, or allowances for resource & environment constraints.

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.

## **Model**

Except where stated, we do not allow for any variation in actual experience away from the demographic assumptions underlying the cash flows. 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 Scheme are projected forward in annual increments, are assumed to occur in the middle of each Scheme 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.

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.

For the purposes of modelling very low investment risk strategies or matched bond portfolios, we have constructed an LBP (liability benchmark portfolio) that is a hypothetical portfolio that exactly matches the changes in value and cash flows of the liabilities (with a particular allowance for accrual) under all states of the world. It is generally not possible in practice to construct a portfolio with the same high quality of matching as the LBP but major financial and investment risks can be broadly quantified. However, a more detailed analysis is required to understand fully the implications and appropriate implementation of a very low risk or 'cash flow matched' strategy.

# Reliances, limitations and additional details (4)

## 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.

There are a number of different types of increases applied before and after retirement to benefits payable from the Fund.

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.

A judgement always has to be made as the most appropriate assets from the ESS to model the strategy under consideration. We have agreed this with yourselves during the scoping stage and further details are in the appendices.

## TAS Compliance

The models used to carry out this modelling, and this presentation, comply with Technical Actuarial Standards 100 (Principles for Technical Actuarial Work) and 300 (Pensions).

# Reliances, limitations and additional details (5)

		Annualised total returns										Inflation	17 year real yield	17 year yield
		Cash	Index Linked Gilts (medium)	Fixed Interest Gilts (medium)	Overseas Equity	Private Equity	Property	Emerging Markets Equity	Infrastructure Equity	Diversified Growth Fund	Multi Asset Credit (sub inv grade)			
5 years	16th %ile	-0.4%	-2.3%	-2.9%	-4.1%	-7.3%	-3.5%	-7.0%	-4.9%	-1.9%	1.1%	1.9%	-2.5%	0.8%
	50th %ile	0.7%	0.5%	0.3%	4.1%	4.8%	2.4%	4.3%	4.2%	3.5%	4.1%	3.3%	-1.7%	2.1%
	84th %ile	2.0%	3.3%	3.4%	12.5%	18.8%	8.8%	17.0%	13.8%	9.1%	6.5%	4.9%	-0.8%	3.6%
10 years	16th %ile	-0.2%	-1.8%	-1.3%	-1.4%	-3.4%	-1.5%	-3.2%	-1.8%	-0.2%	1.9%	1.9%	-2.0%	1.2%
	50th %ile	1.3%	0.0%	0.2%	4.7%	5.5%	3.1%	5.0%	4.7%	3.7%	4.1%	3.3%	-0.8%	2.8%
	84th %ile	2.9%	1.9%	1.7%	10.8%	15.5%	7.8%	13.6%	11.8%	7.7%	5.9%	4.9%	0.4%	4.8%
20 years	16th %ile	0.7%	-1.1%	0.1%	1.3%	0.3%	0.6%	0.2%	1.1%	1.9%	3.4%	2.0%	-0.7%	2.2%
	50th %ile	2.4%	0.3%	1.0%	5.8%	6.8%	4.3%	6.2%	6.0%	4.8%	5.1%	3.2%	0.8%	4.0%
	84th %ile	4.5%	2.0%	2.0%	10.4%	13.6%	8.1%	12.5%	11.1%	7.7%	7.0%	4.7%	2.2%	6.3%
	Volatility (Disp) (1 yr)	1%	7%	10%	17%	28%	14%	25%	20%	13%	8%	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 -2.1% (1.5%) to 0.8% (4.0%).

# General risk warning

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## Appendix 2

### Employers currently part of Contribution Stability Mechanism (CSM) and proposals from 1 April 2020

<b>Name of employer</b>	<b>Proposal from 1 April 2020</b>
The City of Edinburgh Council	Recommendation 1.1
West Lothian Council	Recommendation 1.1
East Lothian Council	Recommendation 1.1
Midlothian Council	Recommendation 1.1
Police Scotland	Recommendation 1.1
Scottish Fire & Rescue Service	Recommendation 1.1
Lothian Valuation Joint Board	Recommendation 1.1
Scottish Water	Recommendation 1.1
Visit Scotland	Recommendation 1.1
Heriot-Watt University	Recommendation 1.1
Queen Margaret University	Recommendation 1.1
Edinburgh Napier University	Recommendation 1.1
Edinburgh College	Recommendation 1.1
West Lothian College	Recommendation 1.1
Audit Scotland	Recommendation 1.1
The Improvement Service	Recommendation 1.1
Children's Hospice Association Scotland	Recommendation 1.1
Scottish Futures Trust	Recommendation 1.1
West Lothian Leisure	Recommendation 1.1.1
Enjoy Leisure	Recommendation 1.1.1
Children's Hearing Scotland	Recommendation 1.1.2
Newbattle College	Recommendation 1.1.3
Barony Housing Association	Due to transfer to Strathclyde Pension Fund January 2020
SESTRAN	As previously advised to Pensions Committee: removed from CSM in March 2019