



Teesside Pension Fund

Investment Strategy Workshop

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Prepared by Aon Hewitt
Retirement & Investment

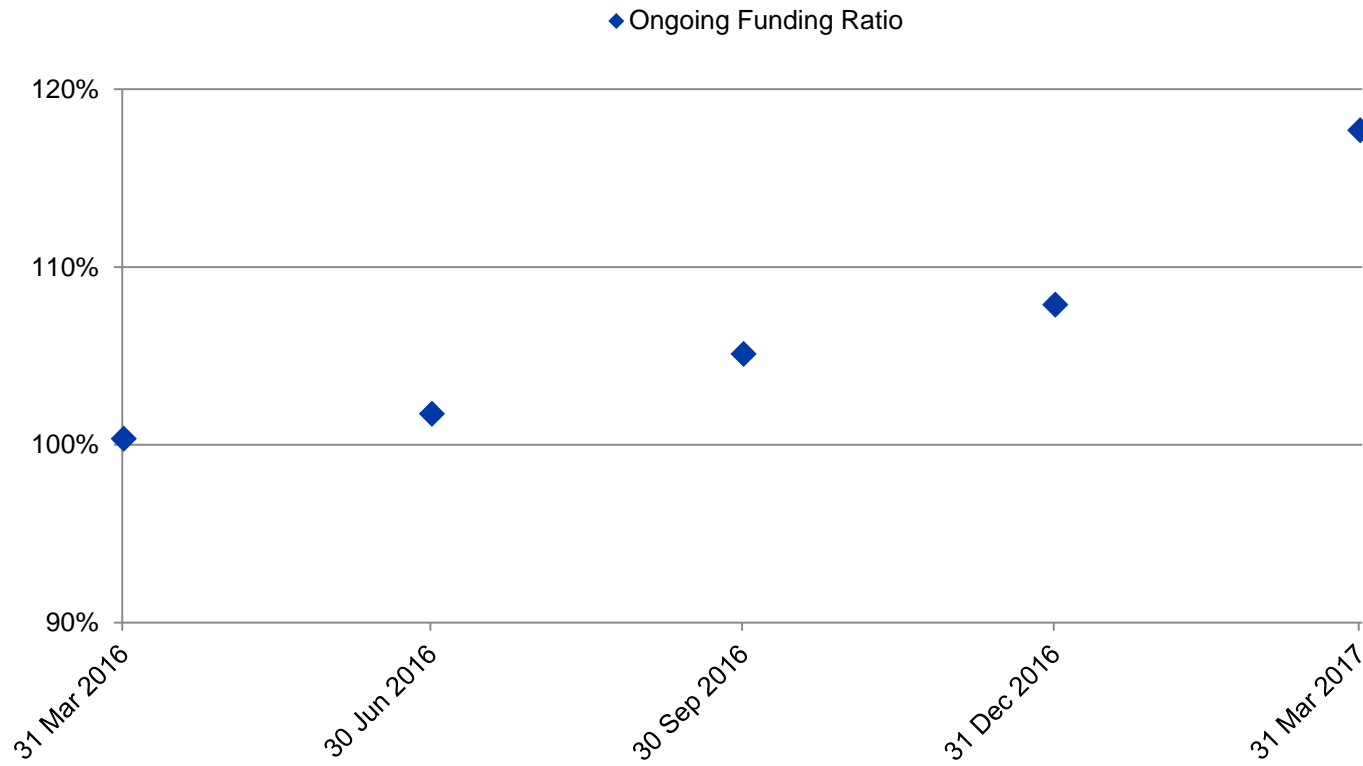
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Agenda

- 1. Past performance and current strategy**
2. Risk outlook
3. Introduction to asset liability modelling and funding methodology
4. Current investment strategy projections
5. Alternative investment strategies
6. Next steps

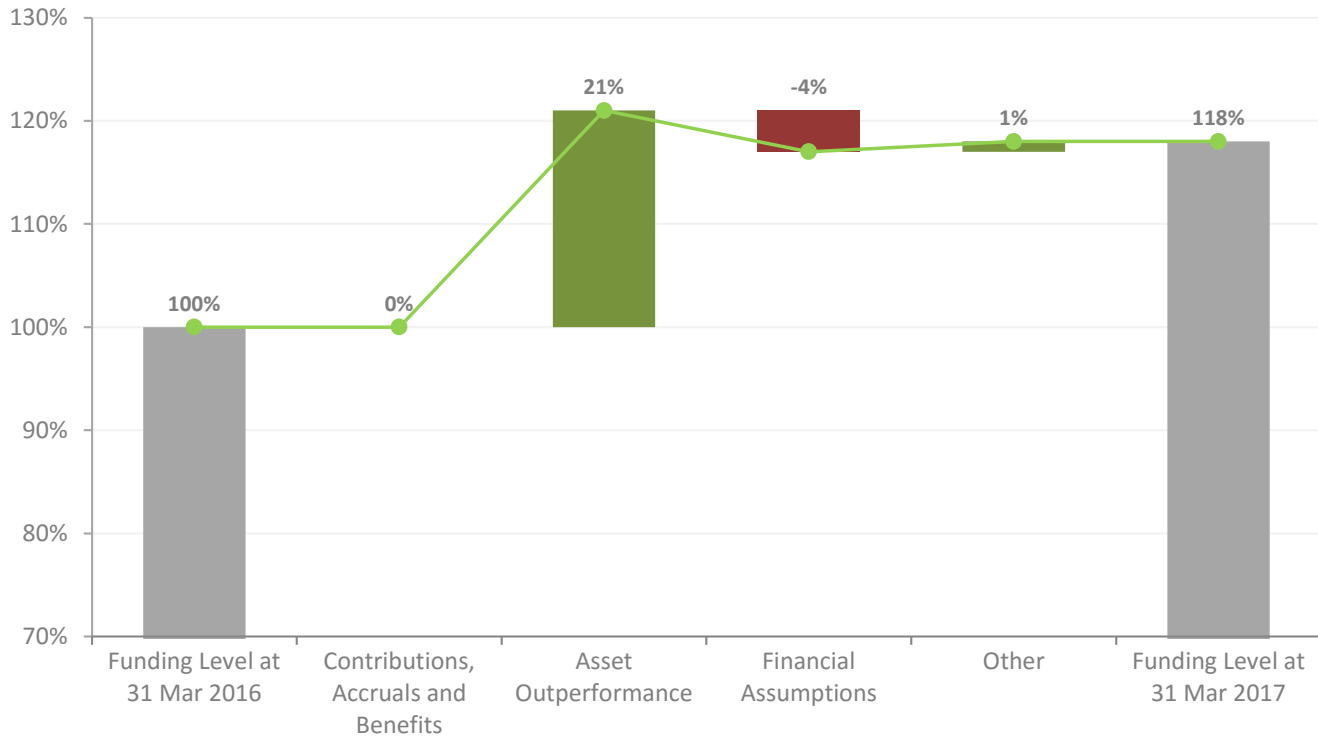
Funding level volatility / progression



Funding level estimated to be 118% at 31 March 2017

18% improvement since the valuation

Reasons for change



Improvement mainly due to asset returns

Equity performance – 31 March 2016 to 31 March 2017

**MSCI World Total Return in GBP
(rebased to 100 as at 31 March 2016)**



33% cumulative return
since March 2016

Current investment strategy

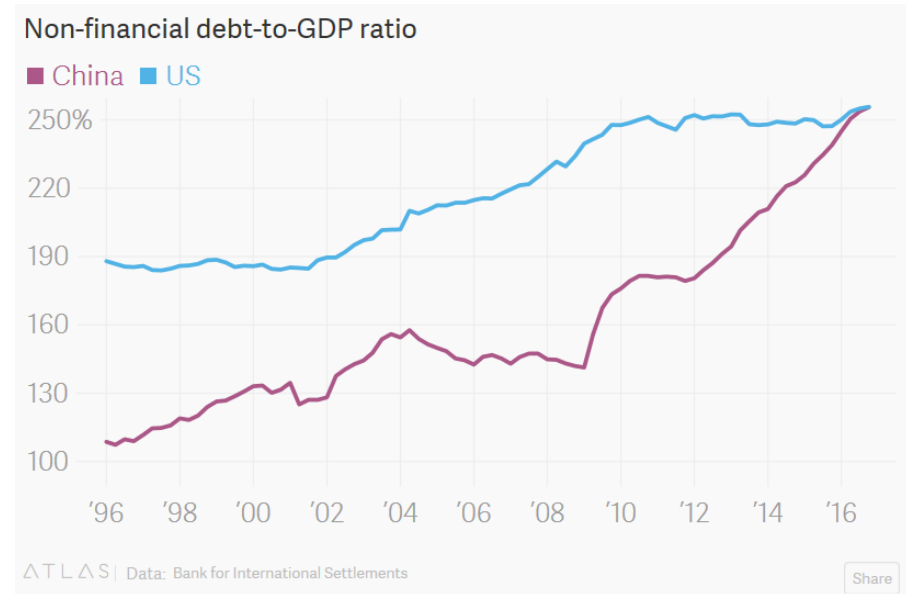
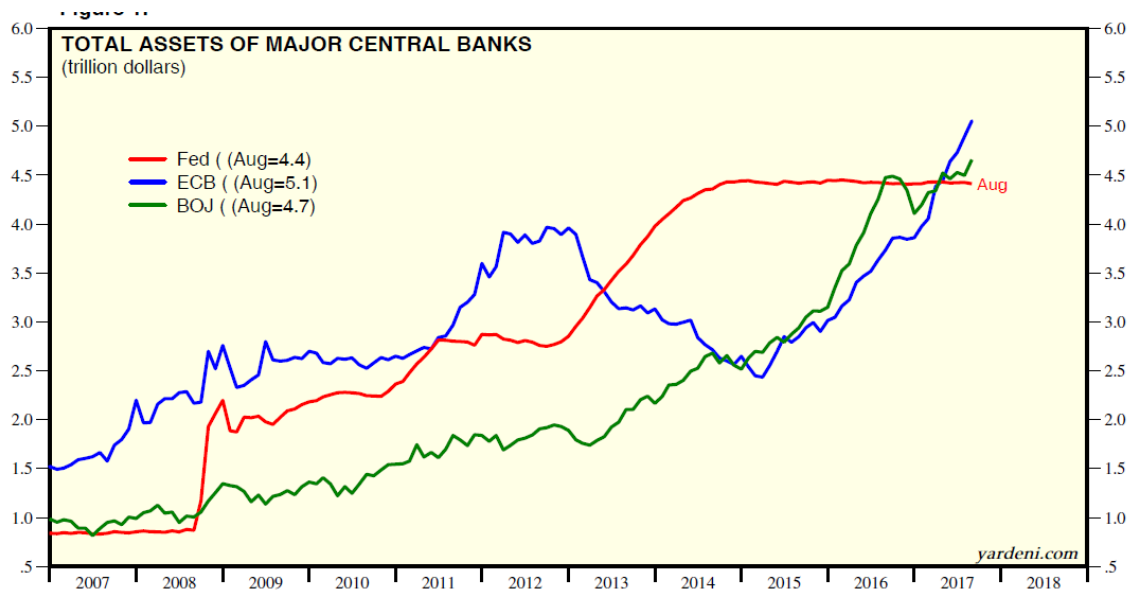
Asset class	Actual allocation as at 31 March 2017	Customised Benchmark (used in modelling)	Discount rate allocation
Total Equity	80.0%	70.0%	83.0%
UK Equities	32.0%	30.0%	36.0%
Overseas Equities	48.0%	40.0%	47.0%
Total illiquid alternatives	8.0%	15.0%	9.0%
Private Equity	2.0%	5.0%	2.0%
Property	6.0%	10.0%	7.0%
Infrastructure			
Property Debt			
Insurance linked securities			
Total bonds	12.0%	15.0%	8.0%
UK Fixed Interest Gilts		7.0%	0.5%
UK Index Linked Gilts		4.0%	0.5%
Overseas Government Bonds		2.0%	1.0%
UK Corporate Bonds			1.0%
Cash	12.0%	2.0%	5.0%
Absolute Return Bonds			

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Risk Outlook – Monetary Policy & Debt

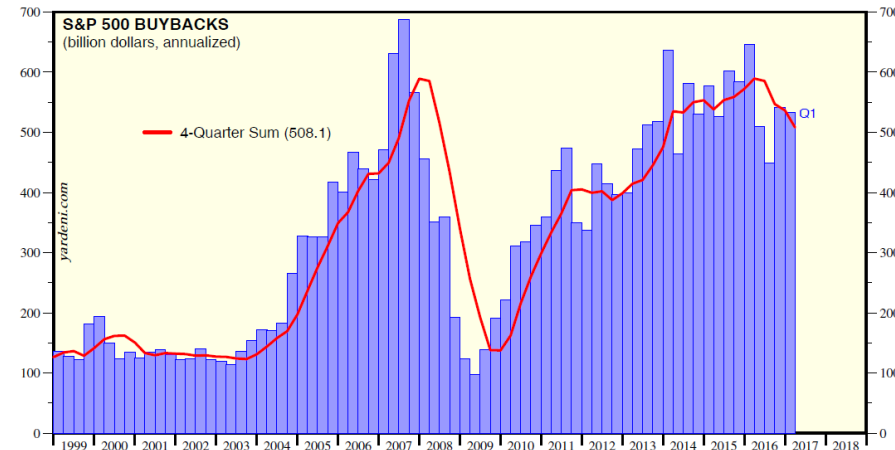
- Asset prices have been supported by extraordinary monetary policy.
- Central banks' anxiety over the slow pace of monetary normalisation is palpable.
- There is particular uneasiness about how financial markets now see ultra-low rates as an almost permanent state



Risk Outlook – Equity Valuations

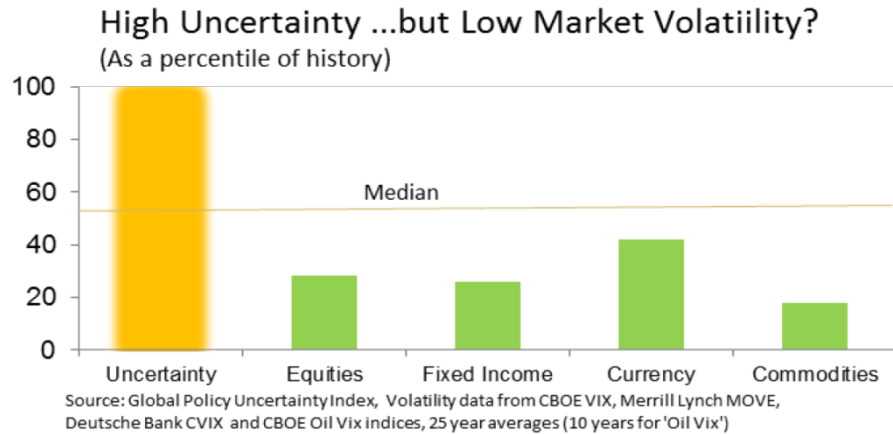
- Equity valuations are currently high, albeit supported by the broad economic backdrop and low bond yields.
- However, the risks of a meaningful market correction have been rising.

MSCI World Total Return in GBP (rebased to 100 at 31 March 2001)

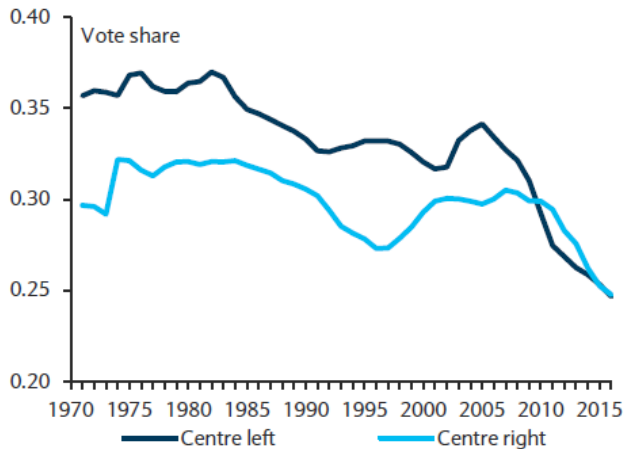


Source: Standard & Poor's Corporation.

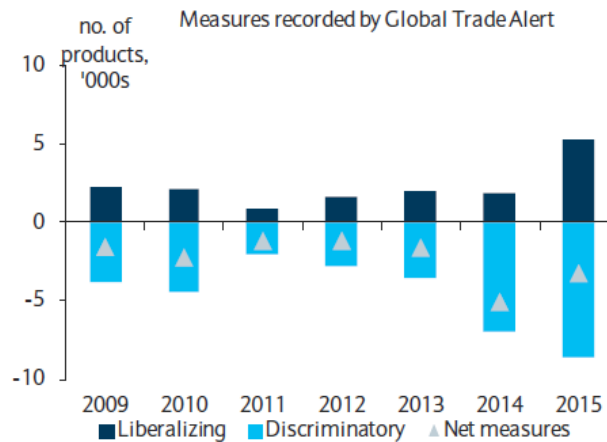
Risk Outlook - Political and Economic Uncertainty



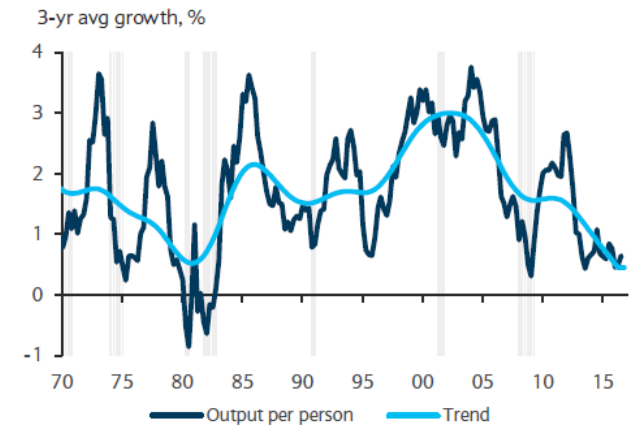
Centre-right and centre-left vote share, average advanced countries



Discriminatory trade measures have risen...



US trend productivity growth has slowed since 2000



Source: Barclays Research

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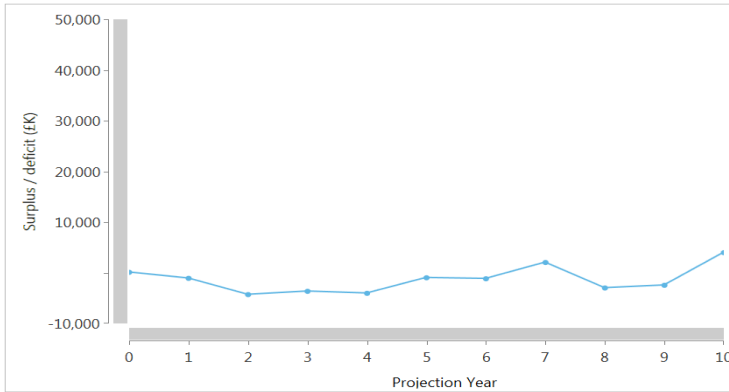
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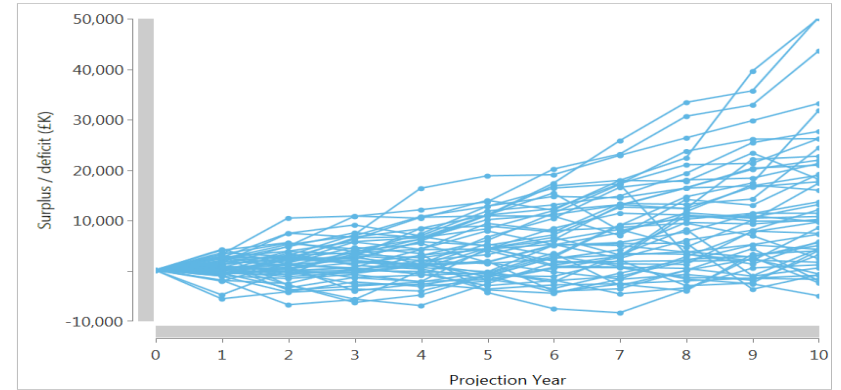
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Introduction to stochastic modelling (1)

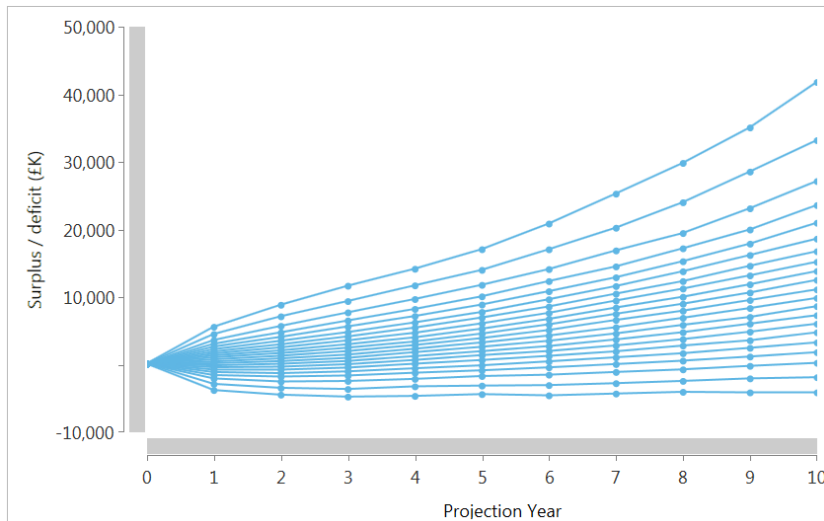
A single projection



400 projections



Funnel of doubt



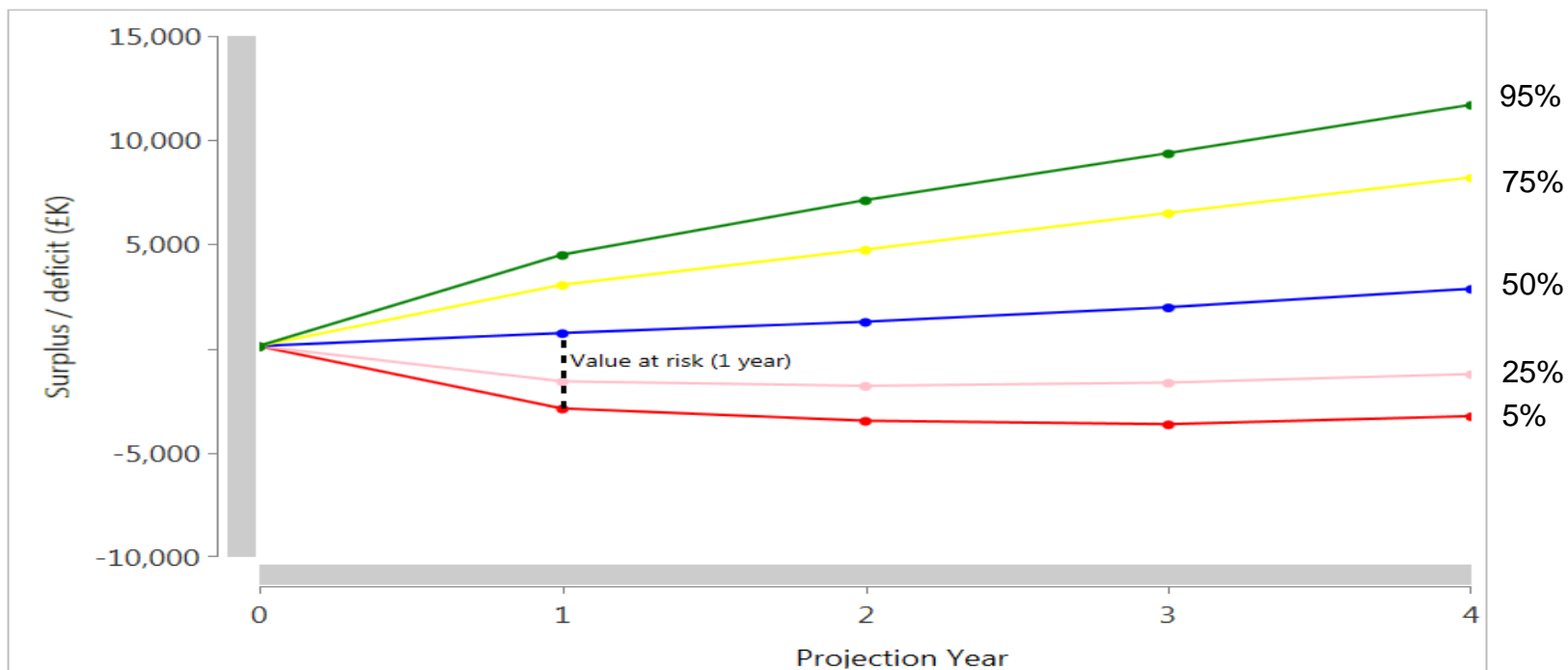
We project (typically) 5,000 potential investment strategy experiences

Too few projections may mean results are not credible

Plotting 5,000 projections in one graph would be impossible to interpret

Ranking the simulations to produce a 'Funnel of doubt' illustrates the degree of uncertainty around the Fund's financial position

Introduction to stochastic modelling – Value at Risk



- From the funnel of doubt we are able to identify the key percentiles
- Using the difference between the outcomes under different percentiles at a point in time can provide us with a measure of the 'Value at Risk' or 'VaR'
- This provides a figure of how much the Fund's deficit might increase under certain scenarios, such as the 1 in 20 worst outcome
- This can be calculated by working out the difference between the 50th percentile and the 5th percentile

Key funding statistics and assumptions

- Based on:
 - Probability of funding success of **70%** (the probability of being 100% funded on the solvency funding target at the end of the trajectory period)
 - Solvency funding target (long term funding target)
 - Trajectory period of 25 years (the time taken to reach 100% funding on the solvency funding target)
- Discount rate (investment return assumption) of **4.7%** as at 31 March 2016
- The discount rate is updated each quarter based on the Capital Market Assumptions at the relevant date
 - Discount rate as at 31 March 2017 was **4.5%**
- A higher discount rate results in a lower value placed on the liabilities
 - Higher funding level and lower future service contribution rate

Aon Hewitt Capital Market Assumptions – Risk and Return

Asset Class	Median 10 Year Return p.a.	Median 10 Year Volatility p.a.
Inflation - RPI	3.2%	1.0%
Inflation - CPI	2.1%	1.0%
UK Equities	6.4%	17.9%
Overseas Equities	7.1%	19.5%
Private Equity	8.5%	26.2%
UK Fixed Interest Gilts	1.6%	10.4%
Overseas Government Bonds	1.6%	10.4%
UK Index Linked Gilts	0.8%	8.5%
Property	5.5%	11.8%
Cash	1.2%	0.9%
Infrastructure	6.4%	17.6%
Property Debt	4.8%	8.0%
Absolute Return Bonds	3.2%	4.0%
Insurance Linked Securities	4.5%	3.4%

- The return assumptions are "best estimates" of annualised returns, by which we mean annualised median returns. That is, there is a 50/50 chance that actual returns will be above or below the assumptions. The assumptions are long-term assumptions, based on least 10 year projection periods and are updated on a quarterly basis
- Our assumptions are based on consensus or market based inputs unless we believe that the consensus view is clearly unrealistic. For example, analyst expectations for company earnings are often over-optimistic so caution is needed when interpreting them
- We use data from a wide range of sources when formulating the Capital Market Assumptions (CMAs) including, among others, Consensus Economics, the Institutional Brokers' Estimate System (I/B/E/S), the Bank of England, the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters, the European Central Bank and research produced by range of prominent investment banks and research institutes
- The base asset class assumptions are for market returns. For some classes we have also made an additional allowance for managers outperforming the market

Source: Aon Hewitt. Capital Market Assumptions as at 30 June 2017, expressed in GBP terms.

Aon Hewitt Capital Market Assumptions – Correlation

10 Year Median Correlations	Inflation - RPI	Inflation - CPI	UK Equities	Overseas Equities	Private Equity	UK Fixed Interest Gilts	OS Gov't Bonds	UK Index Linked Gilts	Property	Cash	Infrastructure	Property Debt	Absolute return bonds	Insurance linked securities
Inflation - RPI	1.00	0.82	0.01	0.04	0.02	-0.14	-0.14	-0.01	0.03	0.02	0.07	0.04	0.08	0.05
Inflation - CPI		1.00	0.02	0.04	0.03	-0.10	-0.10	-0.02	0.02	-0.03	0.07	0.04	0.04	0.03
UK Equities			1.00	0.82	0.58	-0.15	-0.15	-0.09	0.45	-0.03	0.27	0.20	0.02	0.14
Overseas Equities				1.00	0.78	-0.11	-0.11	-0.05	0.39	-0.03	0.50	0.18	0.21	0.10
Private Equity					1.00	-0.10	-0.10	-0.06	0.32	-0.03	0.37	0.17	0.19	0.08
UK Fixed Interest Gilts						1.00	1.00	0.47	-0.07	0.38	-0.06	0.31	0.19	0.16
OS Gov't Bonds							1.00	0.47	-0.07	0.38	-0.06	0.31	0.19	0.16
UK Index Linked Gilts								1.00	-0.07	0.30	-0.01	0.23	0.11	0.15
Property									1.00	0.01	0.19	0.27	-0.01	0.11
Cash										1.00	-0.01	0.23	0.32	0.42
Infrastructure											1.00	0.07	0.19	0.07
Property Debt												1.00	0.18	0.25
Absolute Return Bonds													1.00	0.16
Insurance linked securities														1.00

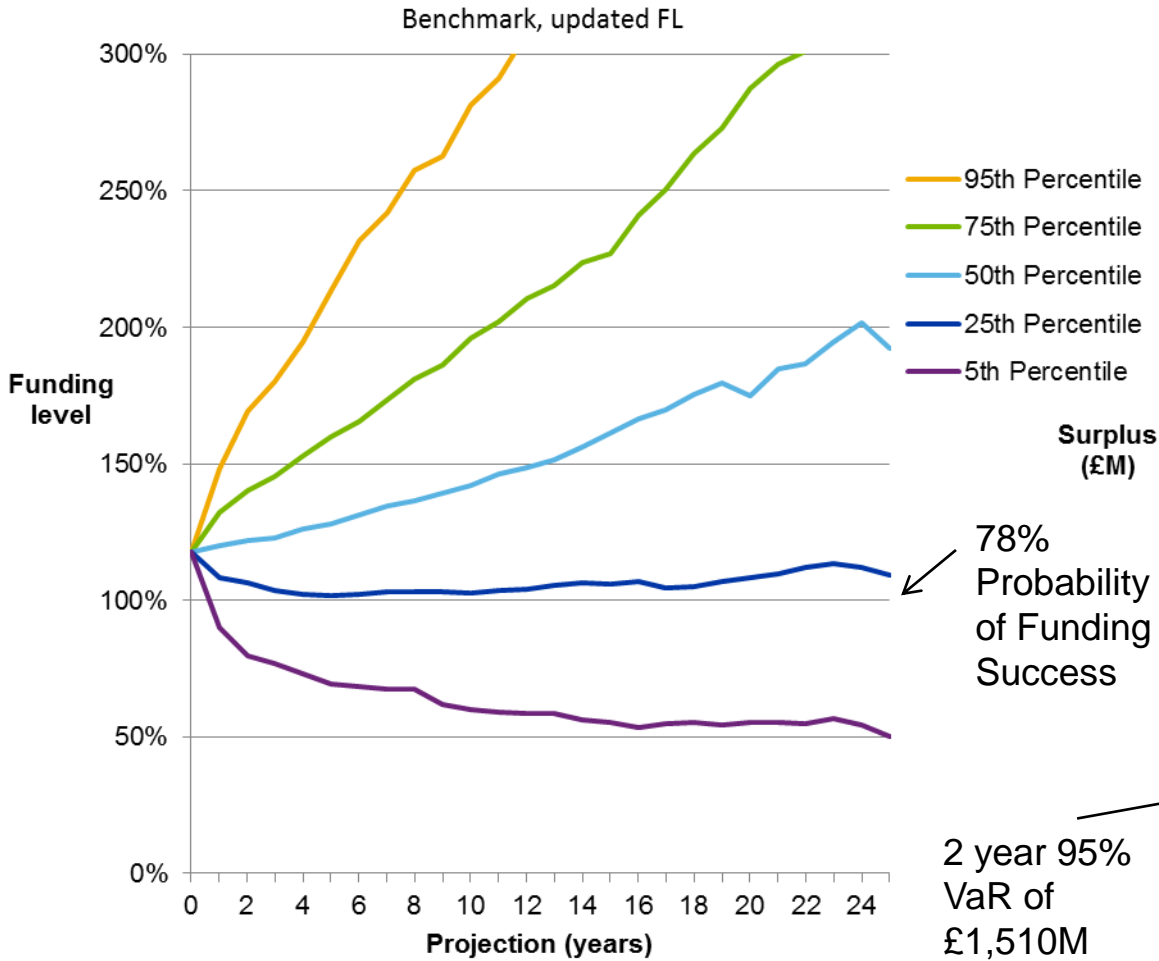
Source: Aon Hewitt. Capital Market Assumptions as at 30 June 2017, expressed in GBP terms.

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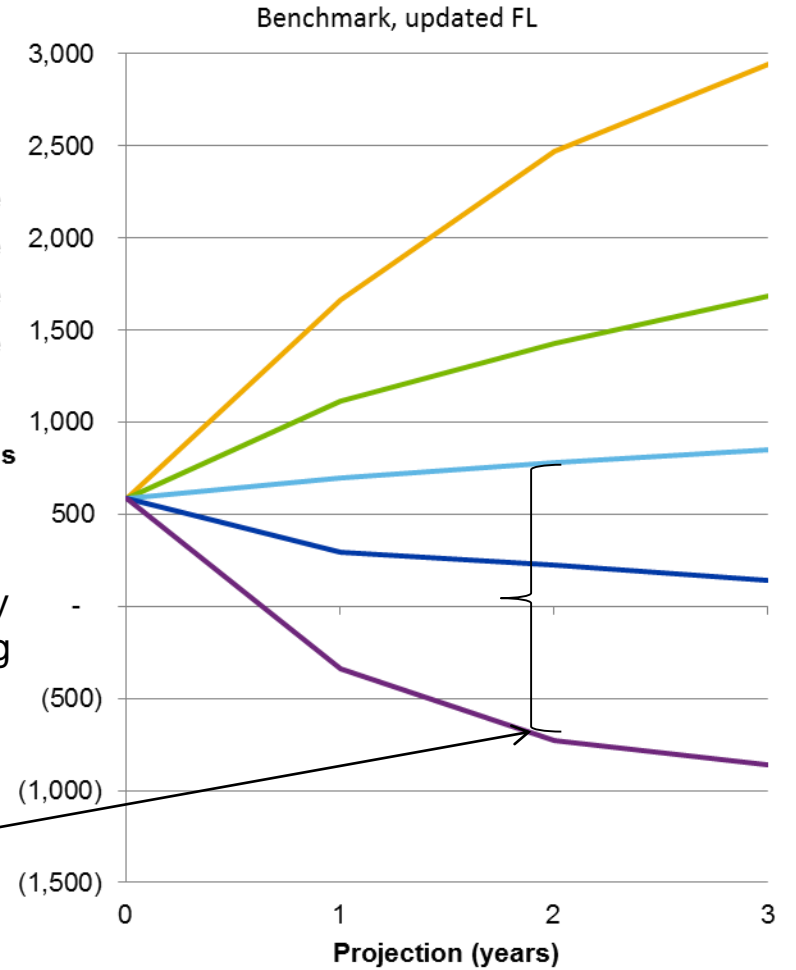
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Current Strategy

Funding level projection



Surplus projection



Current Investment Strategy – Key Statistics

<u>March 2016 valuation assumptions</u>		
	Funding Level as at 31 March 2016	Funding Level as at <u>31 March 2017</u>
	Capital market assumptions as at 31 March 2016	Capital market assumptions as at <u>30 June 2017</u>
Expected median 10 year return (%)	6.7	6.5
Expected median 10 year volatility (%)	13.7	13.7
Indicative Ongoing Discount Rate (%)	4.7	4.5
VaR95 – 2 year (£m)	1,207	1,511
Probability of funding success (%)	70	78

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Alternate strategies

Asset class	Current	25% from Equities to Bonds	10% from Equities to Alts	20% from Equities to Alts
Total Equity	70.0%	45.0%	60.0%	50.0%
UK Equities	30.0%	19.3%	25.7%	21.4%
Overseas Equities	40.0%	25.7%	34.3%	28.6%
Total illiquid alternatives	15.0%	15.0%	22.5%	30.0%
Private Equity	5.0%	5.0%	5.0%	5.0%
Property	10.0%	10.0%	10.0%	10.0%
Infrastructure			2.5%	5.0%
Property Debt			2.5%	5.0%
Insurance linked securities			2.5%	5.0%
Total bonds	15.0%	40.0%	17.5%	20.0%
UK Fixed Interest Gilts	7.0%	20.5%	7.0%	7.0%
Overseas Government Bonds	2.0%	5.8%	2.0%	2.0%
UK Index Linked Gilts	4.0%	11.7%	4.0%	4.0%
Cash	2.0%	2.0%	2.0%	2.0%
Absolute Return Bonds			2.5%	5.0%

Summary of modelling results

	March 2016 Valuation	Current	25% from Equities to Bonds	10% from Equities to Alts	20% from Equities to Alts
Expected 10 year return (%)	6.7	6.5	5.2	6.4	6.2
Expected 10 year volatility (%)	13.7	13.7	9.8	12.3	10.8
<i>Efficiency</i>	<i>0.49</i>	<i>0.47</i>	<i>0.53</i>	<i>0.52</i>	<i>0.57</i>
Indicative Ongoing Discount Rate	4.7	4.5	4.1	4.7	4.8
VaR95 – 2 year (£m) *	1,207	1,511	1,062	1,351	1,197
Probability of funding success (%) **	70	78	69***	81	84

* Value at Risk measured on the ongoing discount rate.

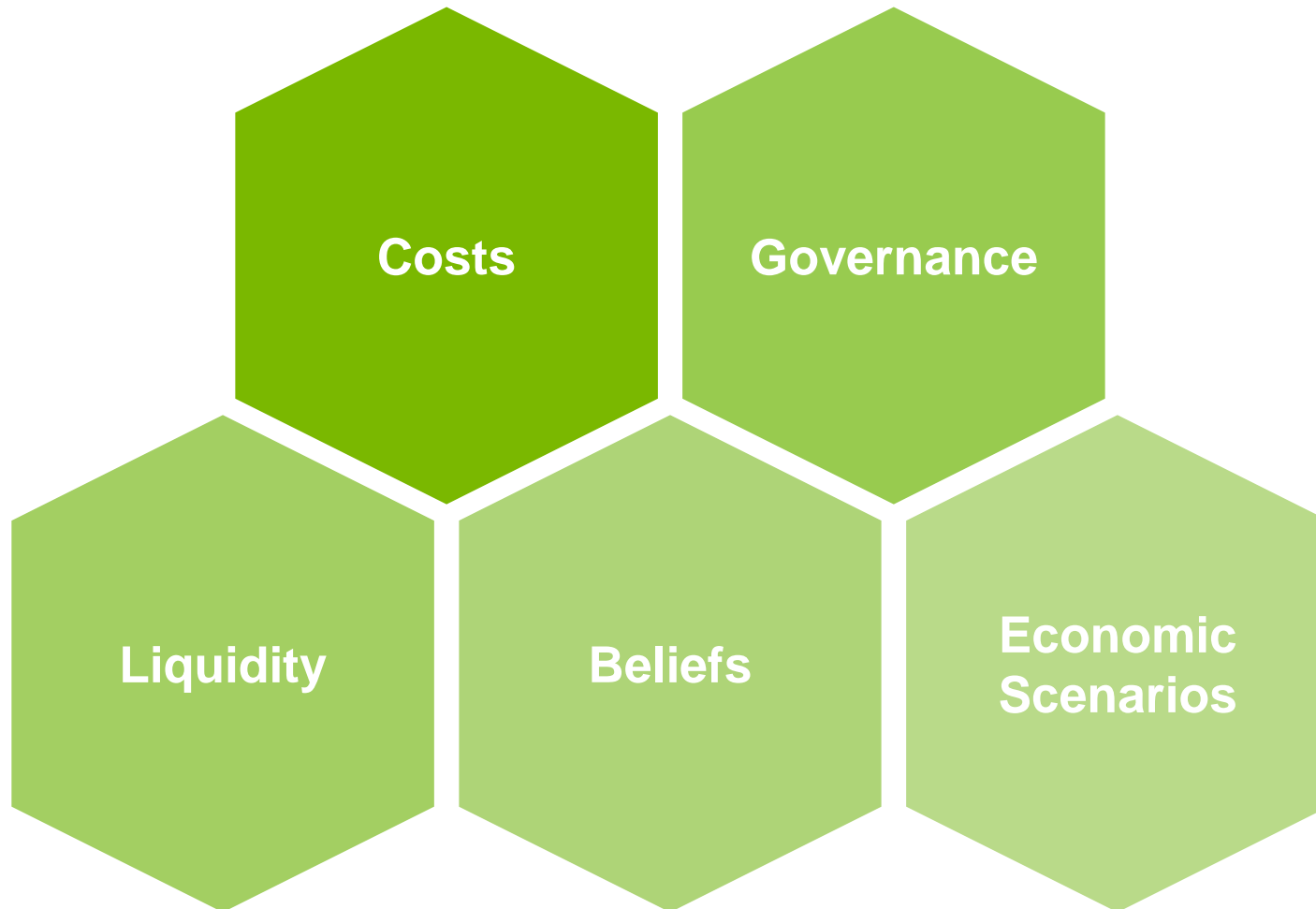
** The Probability of Funding Success is measured using the “Solvency” discount rate which is the long term discount rate based on the asset strategy.

*** In practice the Probability of funding success may be different to this as the ongoing discount rate would likely be altered.

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Other aspects to investment strategy – it's not just about modelling!



Proposals and next steps

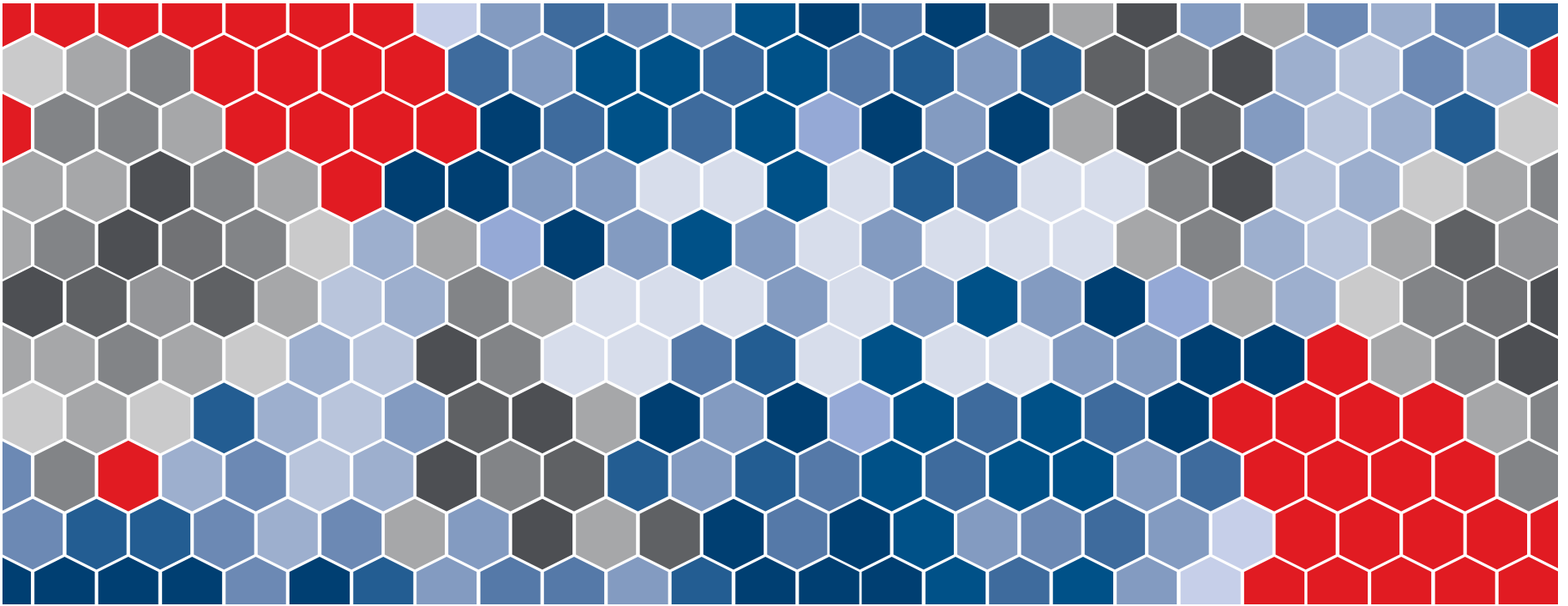
Proposals:

1. Propose long-term strategy moves 20% from equities into alternatives
2. Propose medium-term strategy moves 10% from equities into alternatives
3. Propose investigate whether, and how, to reduce equity risk in the short-term

Next steps:

1. More training and information
2. Implementation – Pool or DIY

Appendices

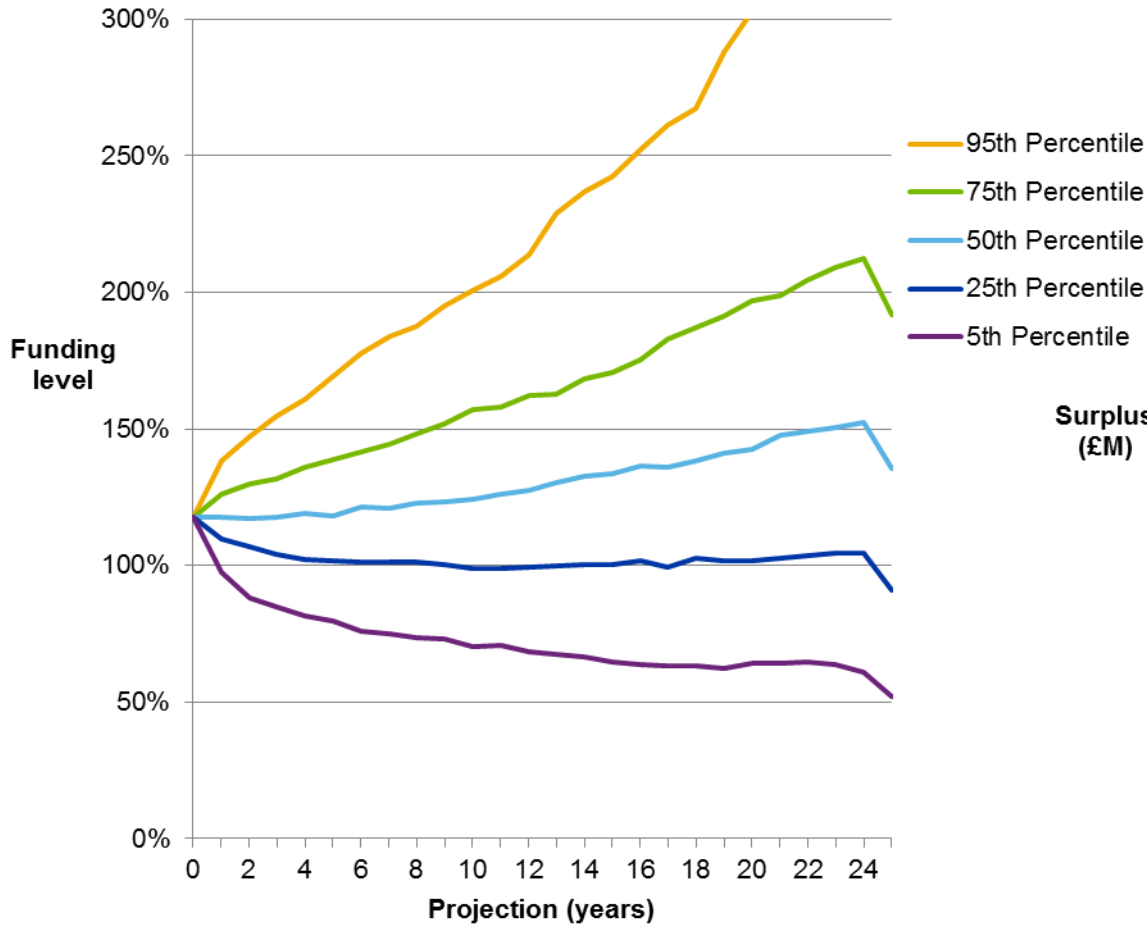


Appendix A: Alternative strategies charts

25% switch from Equities to Bonds

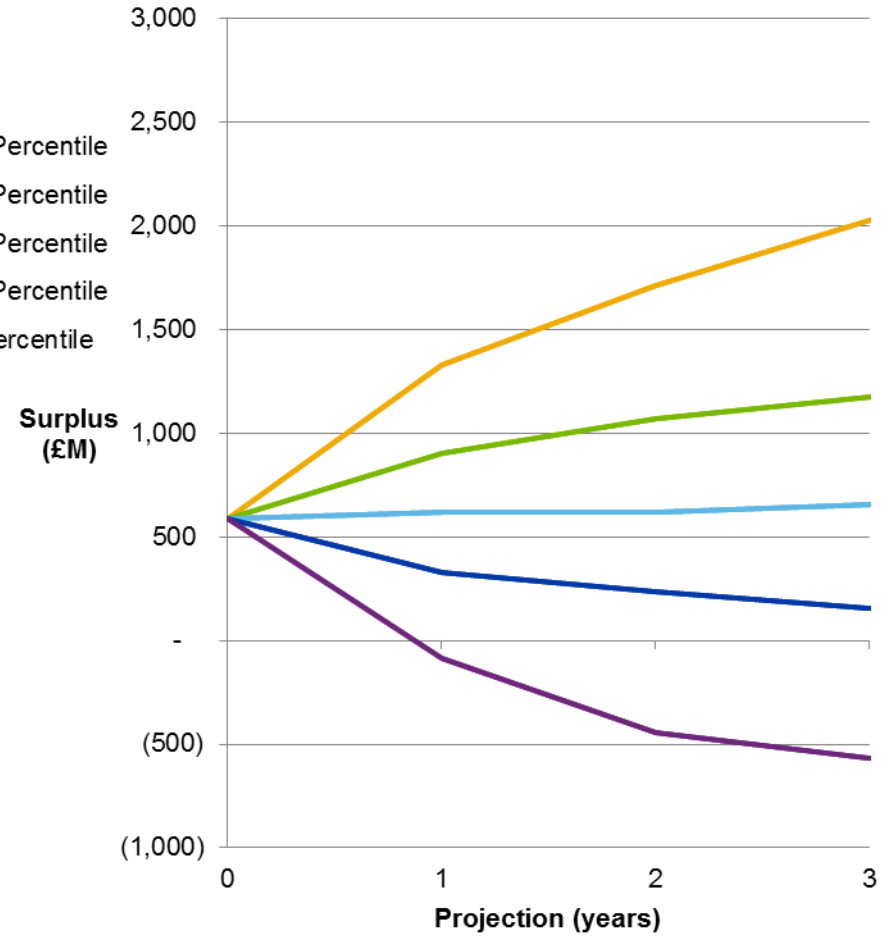
Funding level projection

Low Risk 45% equity, updated FL



Surplus projection

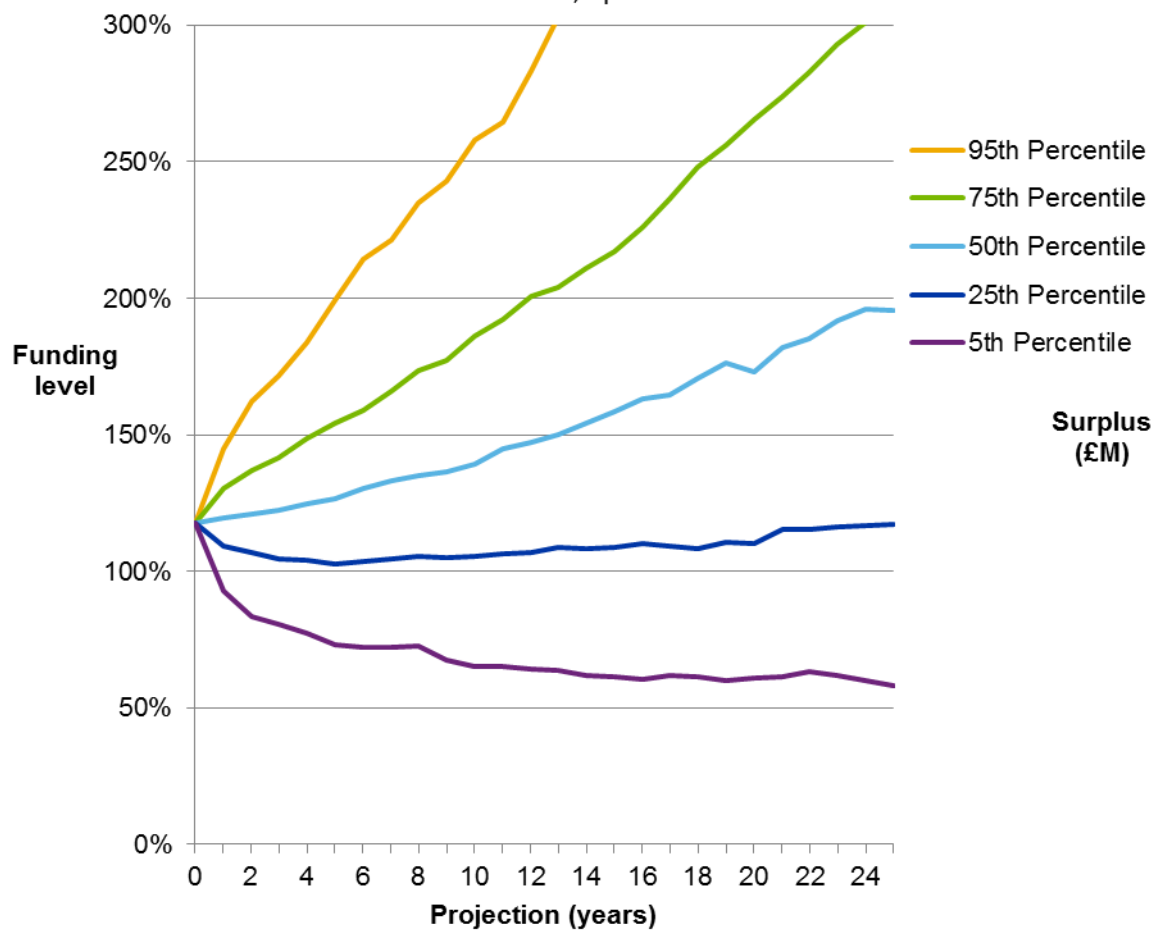
Low Risk 45% equity, updated FL



10% Alternatives

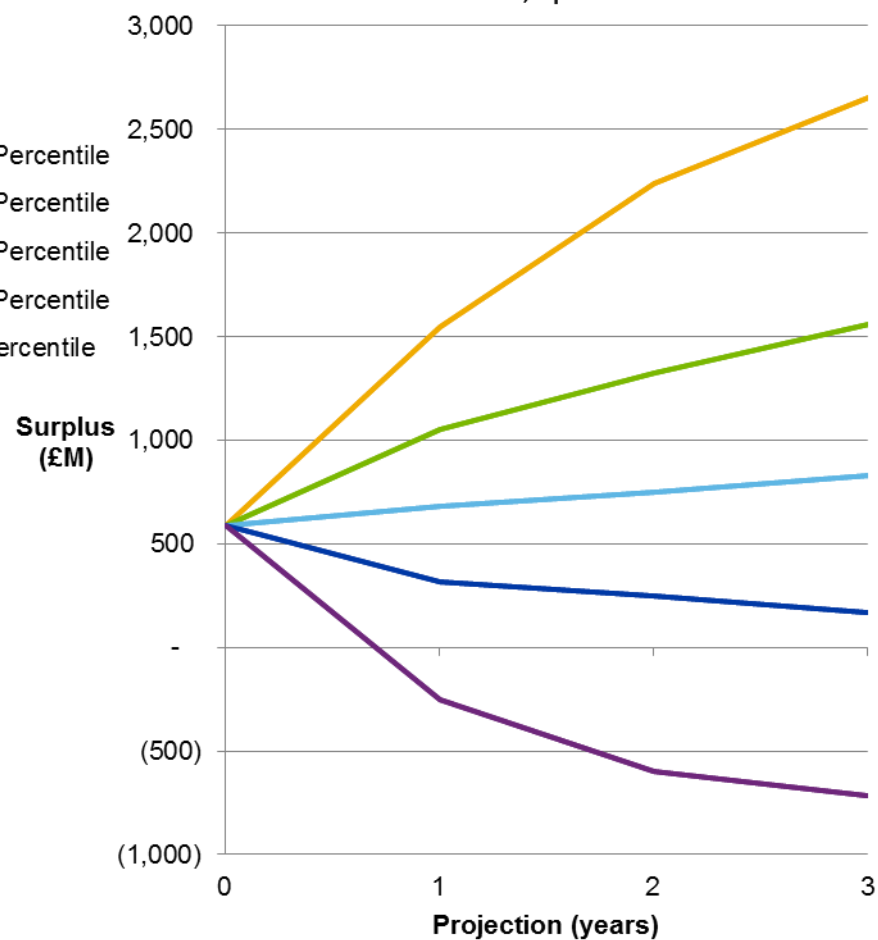
Funding level projection

Alternatives 10%, updated FL



Surplus projection

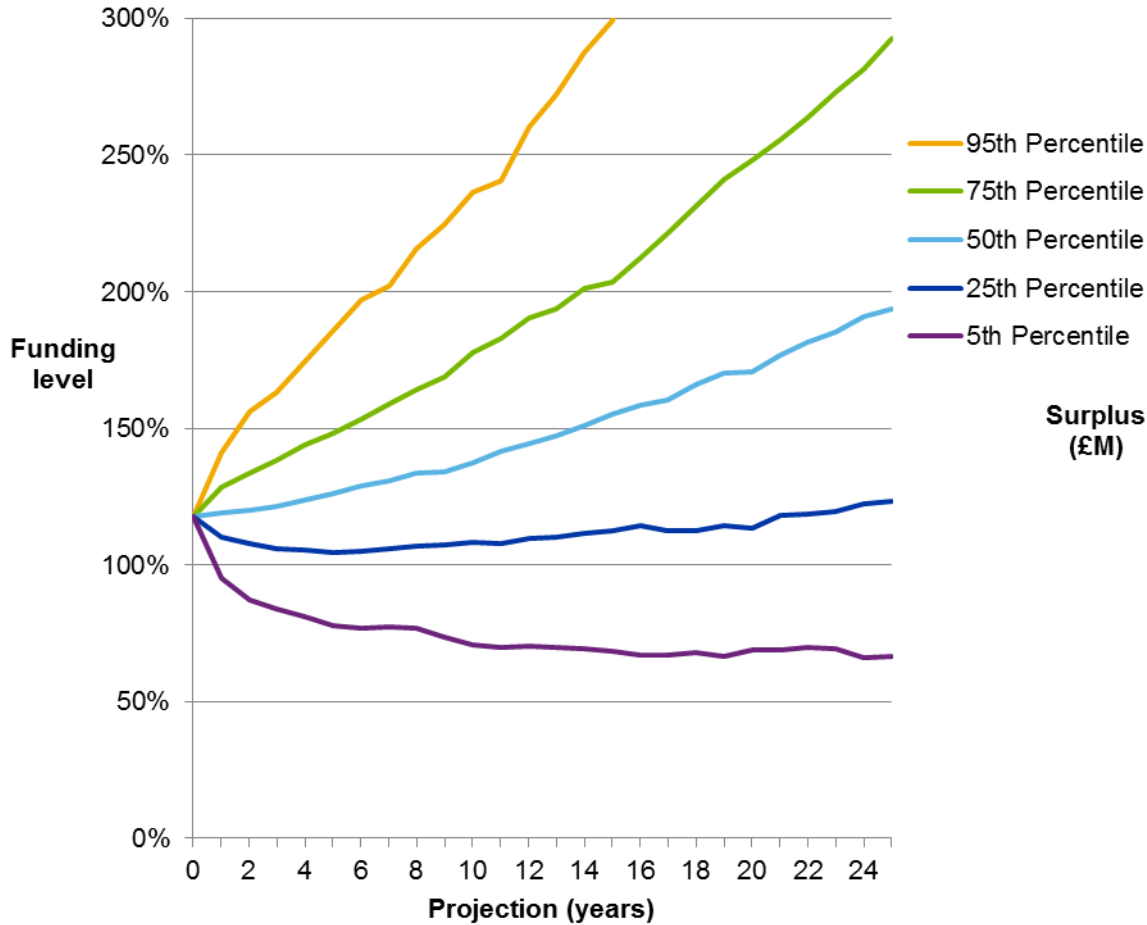
Alternatives 10%, updated FL



20% Alternatives

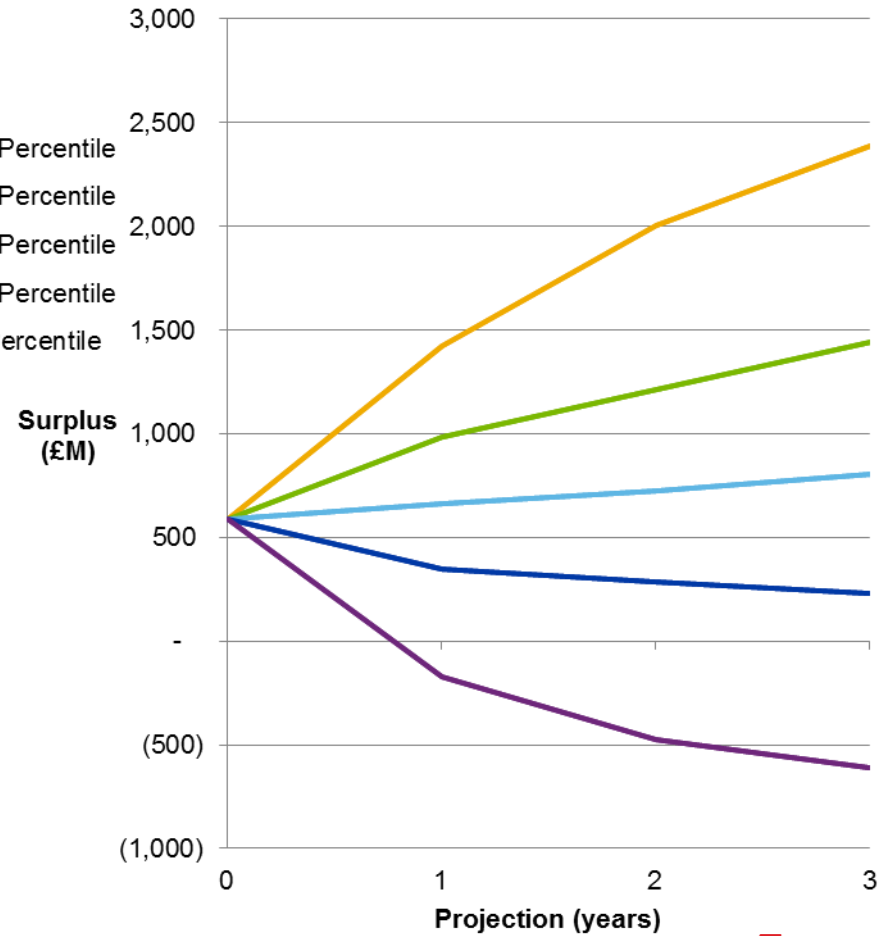
Funding level projection

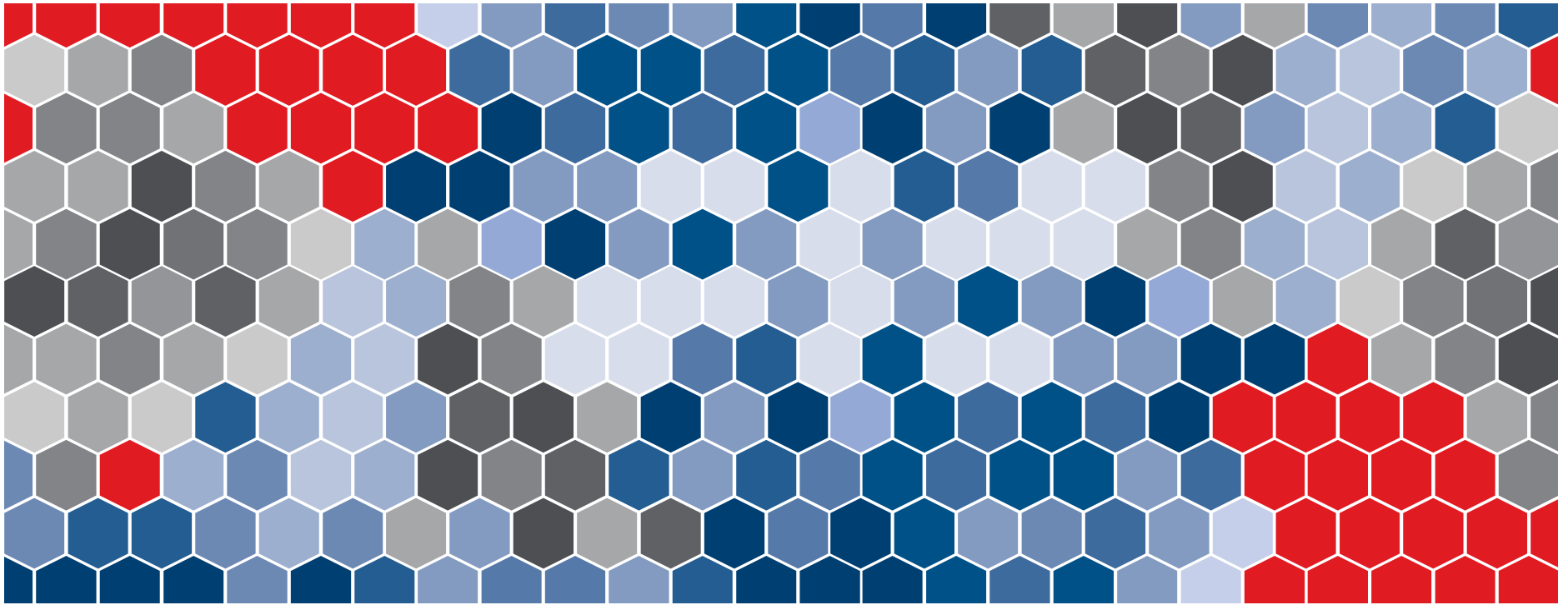
Alternatives 20%, updated FL



Surplus projection

Alternatives 20%, updated FL





Appendix B: Funding Statistics and Assumptions

Key Funding statistics and assumptions (1)

Key Statistic or Assumption	How is it derived?	What is it used for?	What was agreed at last valuation (2016)	What was assumed in modelling?	Impact of changing
Solvency discount rate	Calculated using stochastic distribution of funding level outcomes, assuming fully funded, with a 80% probability of remaining fully funded in 25 years	Calculation of Ongoing discount rate and probability of funding success	4.3% p.a.	Varies depending distribution of expected returns	If reduces then likely Ongoing discount rate will need to reduce.
Ongoing discount Rate	Calculated using stochastic distribution of funding level outcomes (calculated using solvency discount rate), assuming current funding level, with an agreed target probability of funding success	<ol style="list-style-type: none"> 1) Calculating present value of liabilities, i.e. funding level. 2) Setting future service rate. 3) Setting deficit recovery contributions if required 	4.7% p.a.	Fixed for purposes of modelling	<p>If Solvency rate moves considerably lower then we would expect the Ongoing rate to also reduce.</p> <p>This would result in:</p> <ol style="list-style-type: none"> 1) Higher present value of liabilities 2) Higher future service rate

Key Funding statistics and assumptions (2)

Key Statistic or Assumption	How is it derived?	What is it used for?	What was agreed at last valuation (2016)	What was assumed in modelling?	Impact of changing?
Probability of funding success	Calculated using stochastic distribution of funding level outcomes on solvency basis. Target probability is chosen by client depending on level of risk appetite or prudence.	Quantify level of prudence	70%	Varies depending distribution of expected returns	If probability of funding success changes then may wish to change: 1) Risk/return of investments 2) Target probability 3) Contributions paid 4) Timescale for deficit recovery period if applicable
Future service rate	Based on Ongoing discount rate.	Setting employer contributions	15.7% p.a.	Based on ongoing discount rate as at 31 March 2017 (16.7% p.a.)	Higher or lower employer contributions
Deficit recovery contributions	Based on size of deficit on Ongoing discount rate, together with deficit recovery period.	Setting employer contributions	None*	Future accrual rate is reduced by surplus being recovered over 25 years	Contributions only applicable when in deficit. Surplus can be used to reduce future service rate

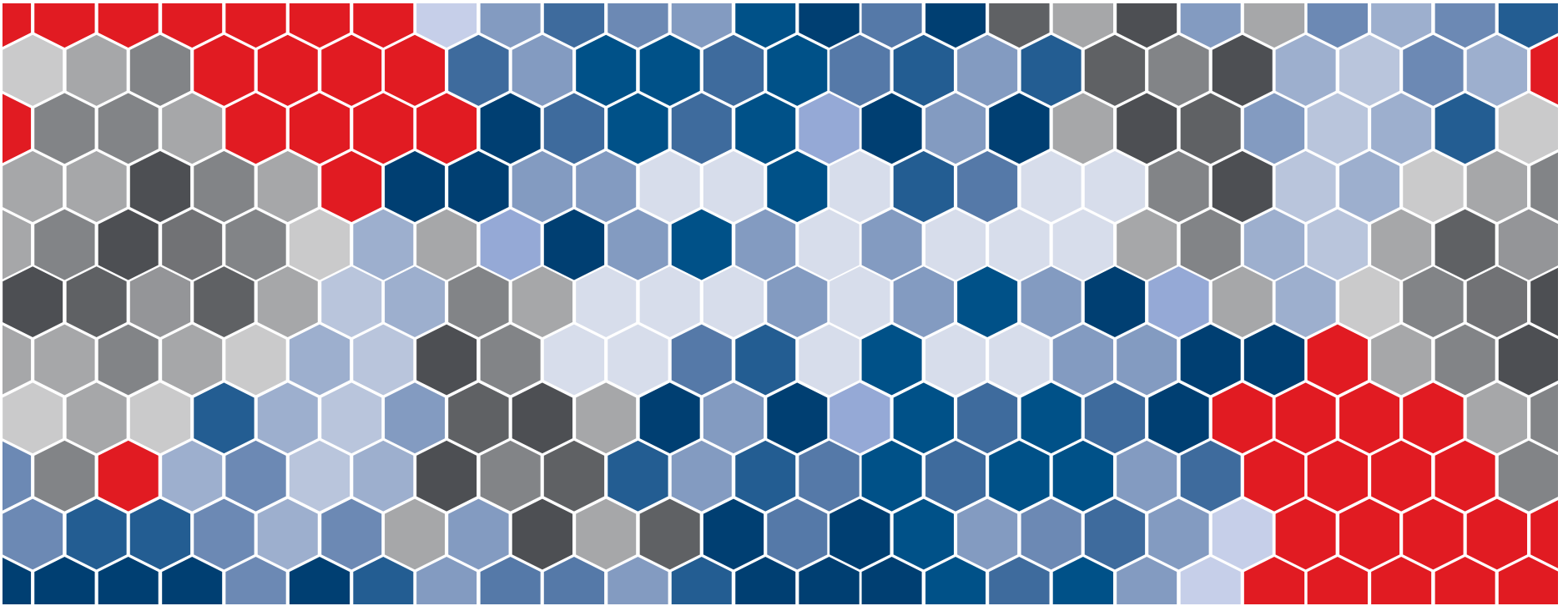
*Note - In practice some individual Employers or groups of Employers in the Fund are in deficit, so the sum of actual contributions paid by all employers differs from this.

Summary of Discount Rate modelling results and assumptions

	March 2016 Valuation	Current	25% from Equities to Bonds	10% from Equities to Alts	20% from Equities to Alts
Solvency Discount Rate (%) *	4.3	4.2	3.7	4.4	4.5
Ongoing Discount Rate used in funding level projections (%) **	4.7	4.5	4.5	4.5	4.5

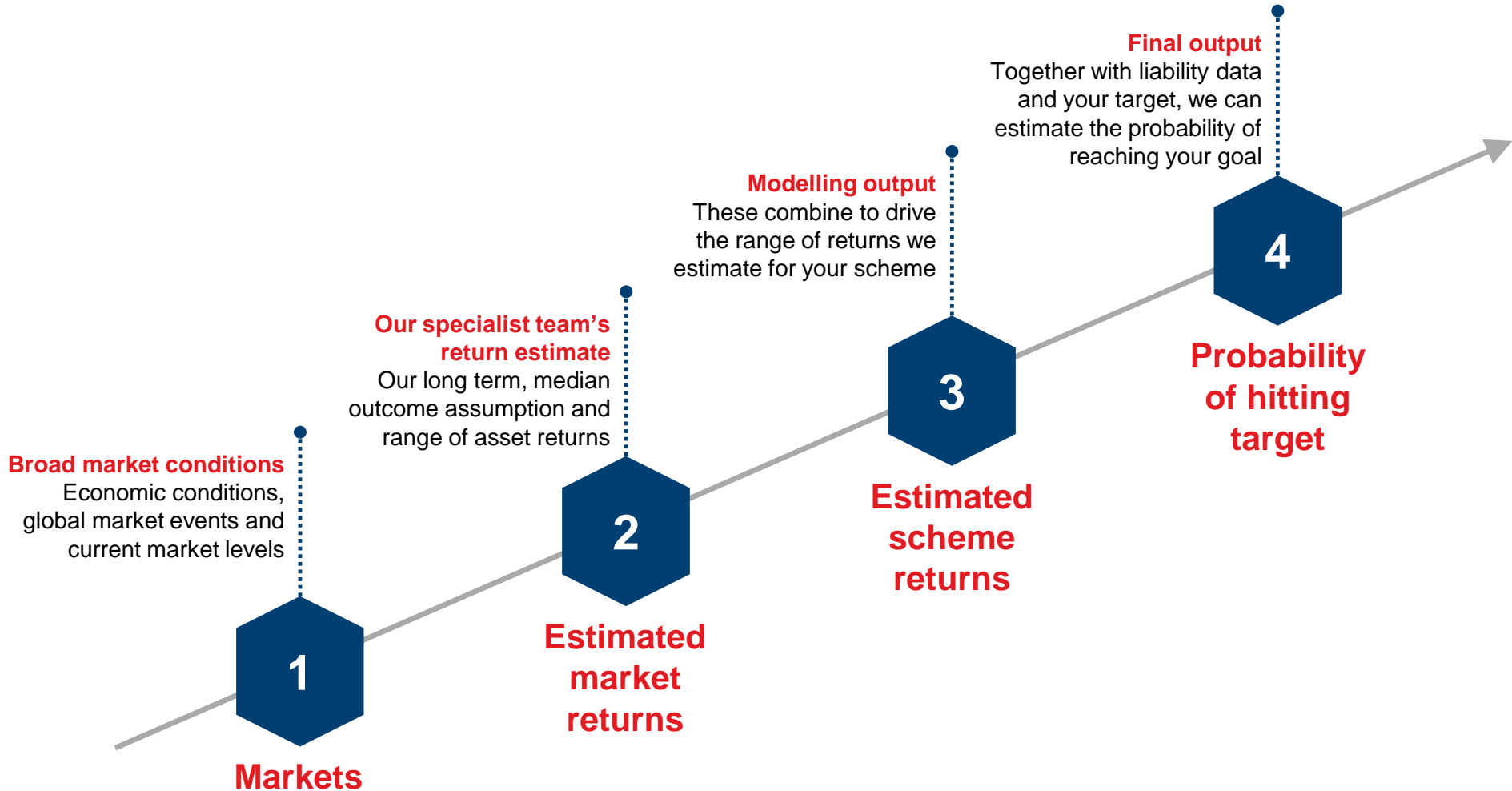
* The Probability of Funding Success is measured using the “Solvency” discount rate which is the long term discount rate based on the asset strategy.

** We have kept the ongoing discount rate unchanged when modelling all strategies.

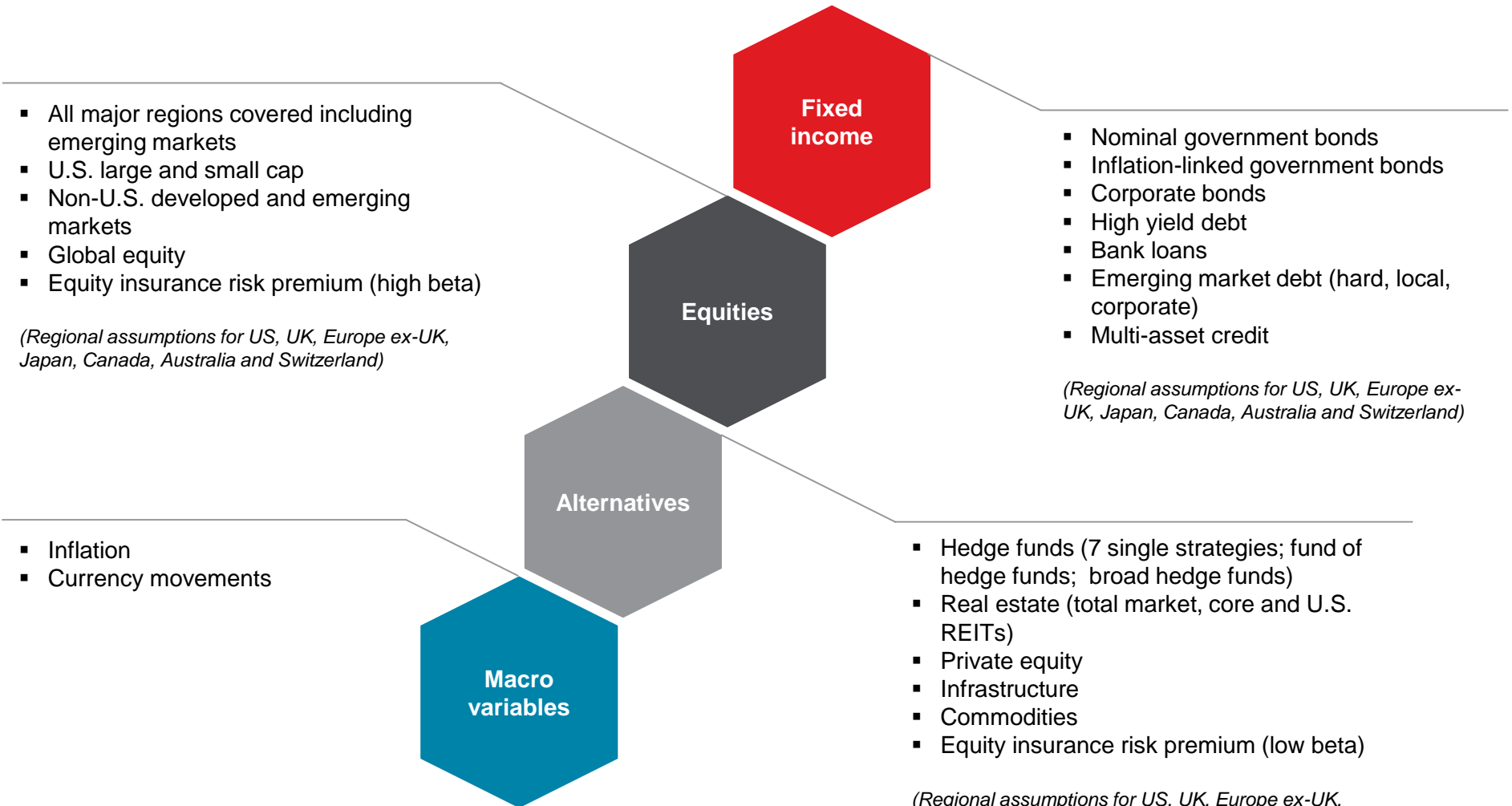


Appendix C: Capital market assumptions

The assumptions driving your results



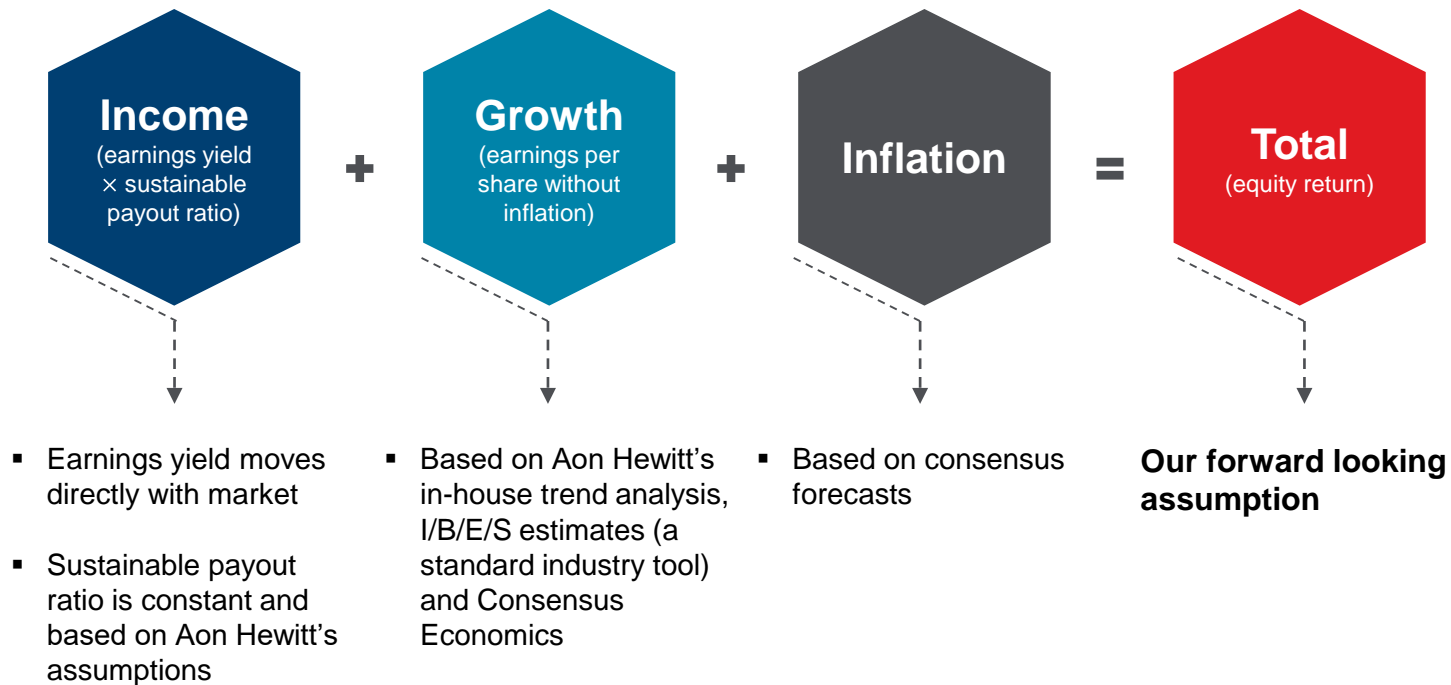
Markets we cover



Three key sets of forward looking modelling assumptions



Example: building an equity return forecast



Equity return assumptions often also include assumptions of currency movements and active manager returns (after fees).

Setting volatility and correlation assumptions

We consider:

- **Implied volatilities** priced into option contracts of various terms (i.e. implied market views from prices paid currently)
- **Historical volatility** levels
- The broad **economic/market environment**

Forward looking

We take a **forward-looking view** when setting volatility assumptions as opposed to using purely historic averages. The credit crisis demonstrated the dangers of relying solely on historical values.

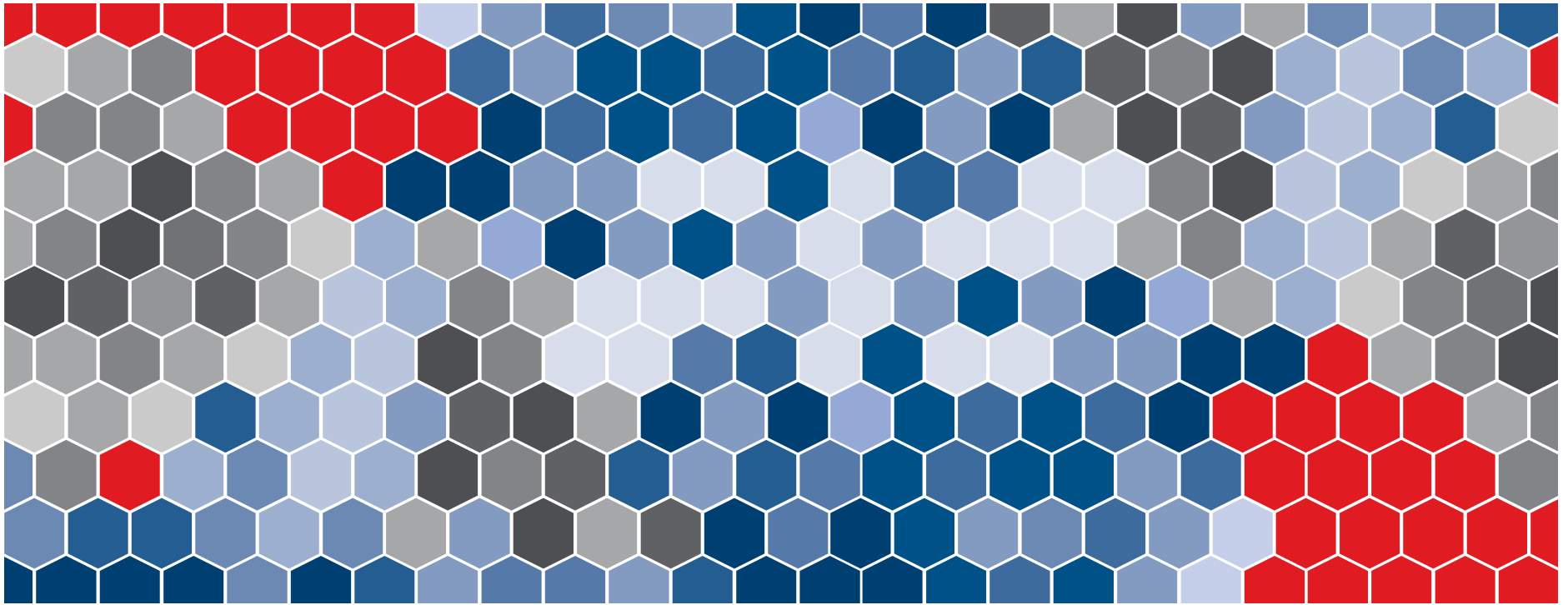
Range of inputs

Allowance for time

We take into account the fact that correlations are **highly unstable** over time and, in particular, we take into account the fact that correlations are very different in stressed environments

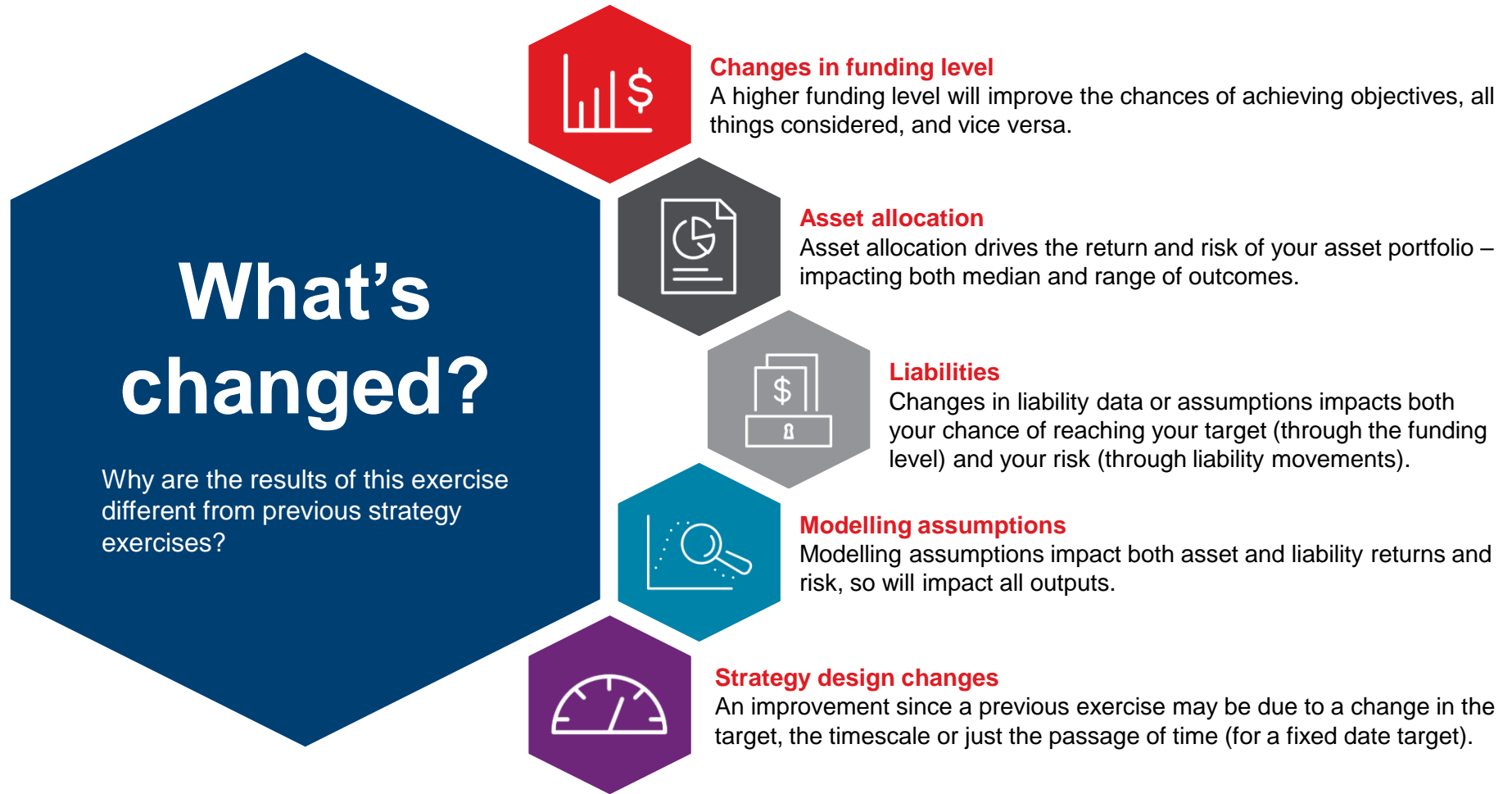
Market turmoil

We assume that **volatilities are not constant over time**; we assume that the volatility of "risky" asset classes such as equities will be at historically high levels in the next few years before declining over time.



Appendix C: Differences to previous exercise

Reconciling with previous exercises



Reconciling with previous exercises

Impacts
all
exercises



Experience since the previous exercise

Primarily, this will have affected the funding position of the scheme, to the extent that assumptions made for the previous exercise are not borne out in practice.

This may affect the funding level primarily, but may also alter future expected contributions, the current asset allocation, and demographic assumptions in the bases modelled to the extent that these are taken into account in determining the liability assumptions.

Reconciling with previous exercises

Impacts
some
exercise
s

2

Assets

Different asset allocation

Whether there has been a change in strategy or if asset allocations have drifted over time, a change in the breakdown of assets will change the balance of risks and expected return. This will impact the probability of hitting target, value at risk and expected funding level and surplus.

Example 1: a move away from a passive equity growth portfolio to a more diversified mix of active equity, hedge fund and property funds will likely decrease portfolio risk, and therefore reduce the potential loss in funding level or increase in deficit. It may also reduce the expected return. The impact on the probability of hitting your target will depend which of these impacts is stronger.

Example 2: a move from bonds to liability driven investment, or an increase in the leverage in a liability driven investment portfolio, will decrease risk to the funding level or surplus, but may also reduce upside in the event that we see yields rise (and therefore your expected outcome in the best 5% of market conditions may reduce).



Different managers

Even within asset classes, different managers have different return and risk targets. Replacing managers may change the expected return and risk of your portfolio, which will in turn affect your probability of reaching target, value at risk (VaR) and expected range of outcomes.

A downgrade of a manager from Buy to Hold may decrease the expected return as we reduce the return assumption for active return (or alpha) above the benchmark for managers who are not Buy rated. We may however allow for the alpha in the strategy when projecting the scheme's longer term performance, on the assumption that managers are replaced with Buy rated managers.

Different total asset value

A change in the total asset value will change the absolute value at risk (VaR) or absolute changes in surplus or deficit, even if your funding level and asset allocation are unchanged.

Reconciling with previous exercises

Impacts
some
exercise
s

3

Liabilities

Change in discount rate

A change in discount rate not only impacts your current funding level (see above), but also changes your future expected return relative to the liabilities.

For example: a higher discount rate will initially increase your funding level and may decrease your target (if targeting full funding), but will require a higher asset return to maintain the funding level.

For the same target (e.g. buyout or self-sufficiency basis), a change in the technical provisions discount may not impact the probability of reaching your target.

Member experience

For example: members transferring out of the scheme and taking cash will reduce the liability and may increase the probability of reaching your target.

Similarly, closing the scheme, updated member data and liability management exercises will all impact the value and sensitivities (risks) of the liabilities.



Financial assumptions:

Changes in financial assumptions will impact both the total liability value (and therefore probability of reaching target) and liability sensitivities.

For example a reduction in inflation allowances will decrease the risk from inflation movements.

Demographic assumptions

For example: an increase in life expectancy will increase your liabilities, and interest rate and inflation sensitivity of the liabilities, potentially increasing the risk to the funding level and surplus.

Reconciling with previous exercises

Impacts
all
exercise
s

4

Market conditions

Changes in market conditions impact both asset values and our future assumptions.

Change in yields

Since previous exercises, changes in yields will have impacted not only the funding level, but also our outlook on yields.

For example: a decrease in yields will reduce the funding level but may also mean we think they are more likely to rise in future. This may increase the Scheme's outlook under certain scenarios.

Credit spreads

Higher credit spreads (if corporate bonds become cheaper relative to government bonds) may reduce the gap between technical provisions and buyout targets.

5

Modelling assumptions

We regularly update our modelling assumptions to reflect current market conditions and our updated views and outlook.

This impacts:

- Your central return expectations
- The range of returns and risk level
- The degree of risk reduction from diversification (market conditions impact whether and how much we expect different assets to move together)
- The balance of risks, across asset classes and liability movements (interest rate and inflation risk)

For example: if your strategy includes equities, a more optimistic view of equity returns will increase your median expected return.

We also regularly update our scenario analysis, which will change how your funding level moves in different scenarios.

Reconciling with previous exercises

Impacts
some
exercise
s

6

Strategy design and target

Target and Target Date

Changing your target or moving the target date will change the probability of hitting your target. For example, increasing your timescale will increase your chances.

Time

Some pension schemes focus on objectives that reference a specific date, for example a scheme may aim to be fully funded by 1 January 2020. As this date approaches, the probability of achieving this objective will change, as there is less time over which changes may occur, and eventually the objective will be hit or otherwise.

Prudence level

Changing the level of asset return allowed for in the asset return (or conversely the level of prudence built in) will impact median return outcomes.

For example: Allowing for more investment return, or equivalently decreasing the amount of prudence built into the model, will increase the return and (artificially) increase the probability of reaching target shown in the output.

Contribution allowance

Higher contributions will reduce the time needed to, and increase the probability of, hitting the target.



Dynamic investment strategy

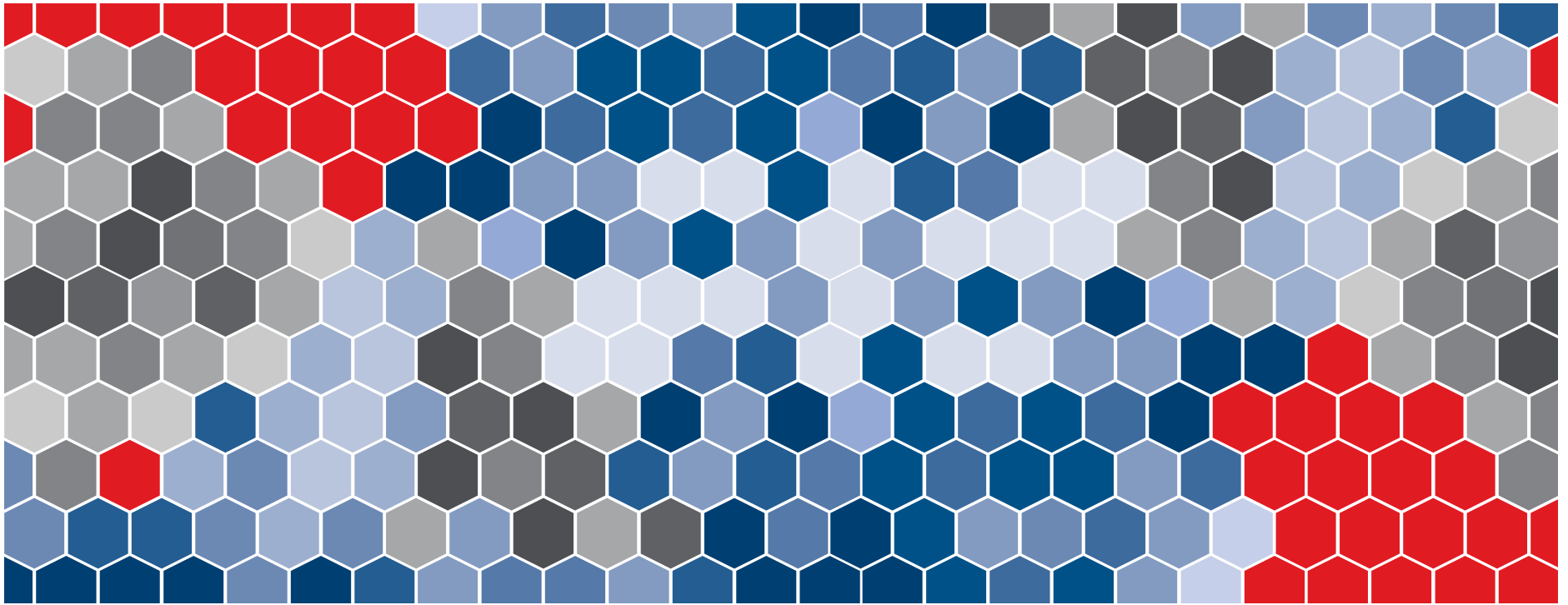
Introducing or altering a dynamic investment strategy (sometimes also referred to as a flightplan, or derisking triggers) will not change your short term risk and return, but is typically set such that it aims to reduce risk if assets perform better than expected.

This will reduce the scheme's long term risk in positive market conditions, but will not affect your value at risk in negative market conditions, as flightplan triggers will not be hit. It may also reduce your probability of reaching target (compared to the same strategy without a flightplan) as growth assets (and therefore return expectations) are decreased in positive conditions.

Flightplans are also path dependant: for example a scheme that derisks following positive performance early in the projection period, but later experiences negative returns will be in a different position to a scheme that experiences poor performance in early years, followed by favourable asset returns subsequently.

Specification of objectives

The user of this advice may choose to reference different objectives compared with the previous exercise, in which case there may be no direct measure to act as a comparison.



Appendix D: Stochastic Modelling

Our approach to Asset Liability Modelling

Primary goal

- Set the level of risk at the 'appropriate' and 'known' level
- Translate this into an allocation to return seeking assets and matching assets

Don't take risks that:

- are unrewarded
- you don't need to take
- the covenant will not support

Badly designed matching strategies destroy value

Where the solution involves a lot of matching assets to reduce liability risks, ALM is a powerful tool to design the matching solution.



Asset models should capture real world behaviour

Strategy should capture current conditions and views

Regular reviews can help capture significant value.

We investigate the impact of different investment solutions on whatever key metrics are important to you (e.g. funded status, value at risk).

1

Once the key risks have been identified and quantified, we can work with you to decide how much risk is tolerable and how much return is required to meet our objectives.

2

We can then explore alternative strategies to implement the most effective solution for you.

3

Build up an understanding of why a solution works and which parts are important.

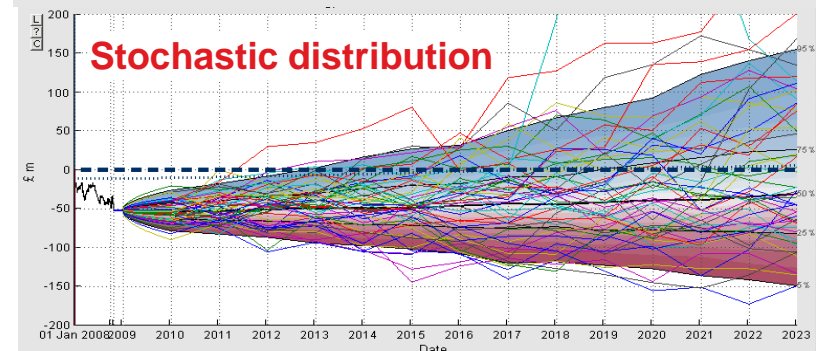
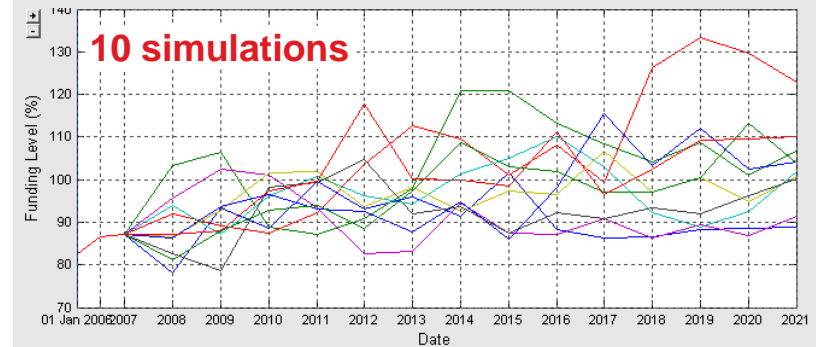
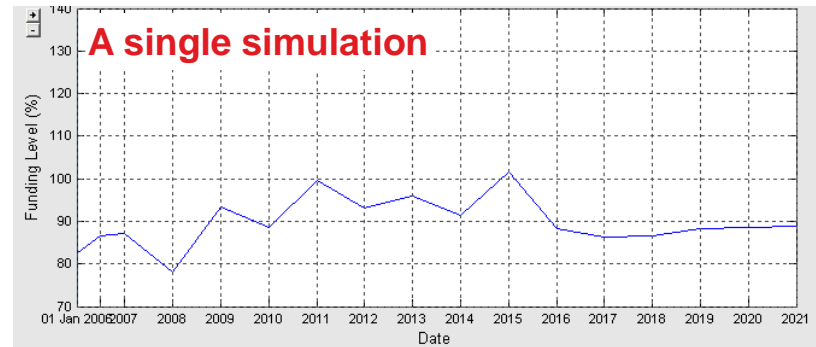
ALM is a tool
to assist with
Investment
Strategy
decisions

Stochastic Analysis (“Random” or “Probabilistic” scenario testing)

What does our model do?

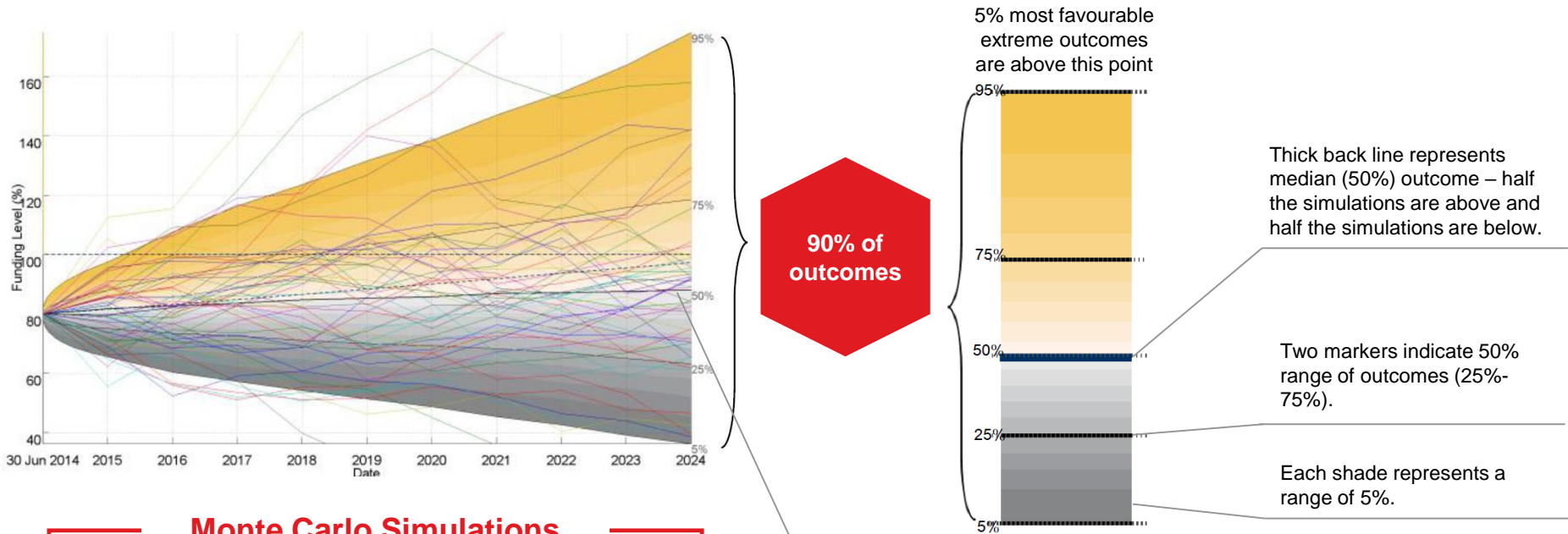
We use stochastic modelling to help quantify the investment strategy decision:

- 1 Make series of assumptions (financial and demographic)
- 2 Project assets and liabilities forward over time and examine funding level (assets/liabilities)
- 3 Run 1,000s of simulations to build up a picture of the future financial behaviour of the Fund
- 4 Provide a distribution of possible outcomes
- 5 Sort the outcomes from good to bad and plot the percentiles on a graph as shown to the right
- 6 Investigate the likelihood of meeting the Fund’s objectives under different investment strategies



Stochastic Analysis (“Random” or “Probabilistic” scenario testing)

This distribution encompasses 90% of the outcomes. In other words, there is a 5% chance (1 year in 20) that the outcome will be worse than this range and a 5% chance that it will be better. This is illustrated below:



Monte Carlo Simulations

- We perform 1,000s of simulations (typically 5,000)
- Too few simulations would be statistically insignificant
- Plotting many 1,000s of simulations in one graph would be impossible to interpret
- Ranking the simulations as above at each point over each future period produces a 'Funnel of doubt' (above) illustrating the degree of uncertainty of the Scheme's financial position over the time of the projection.

Time Horizons

Projection period

- **25 years considered**
- Long time horizons can be subjective
- Generally, the longer the time period, the greater the degree of uncertainty

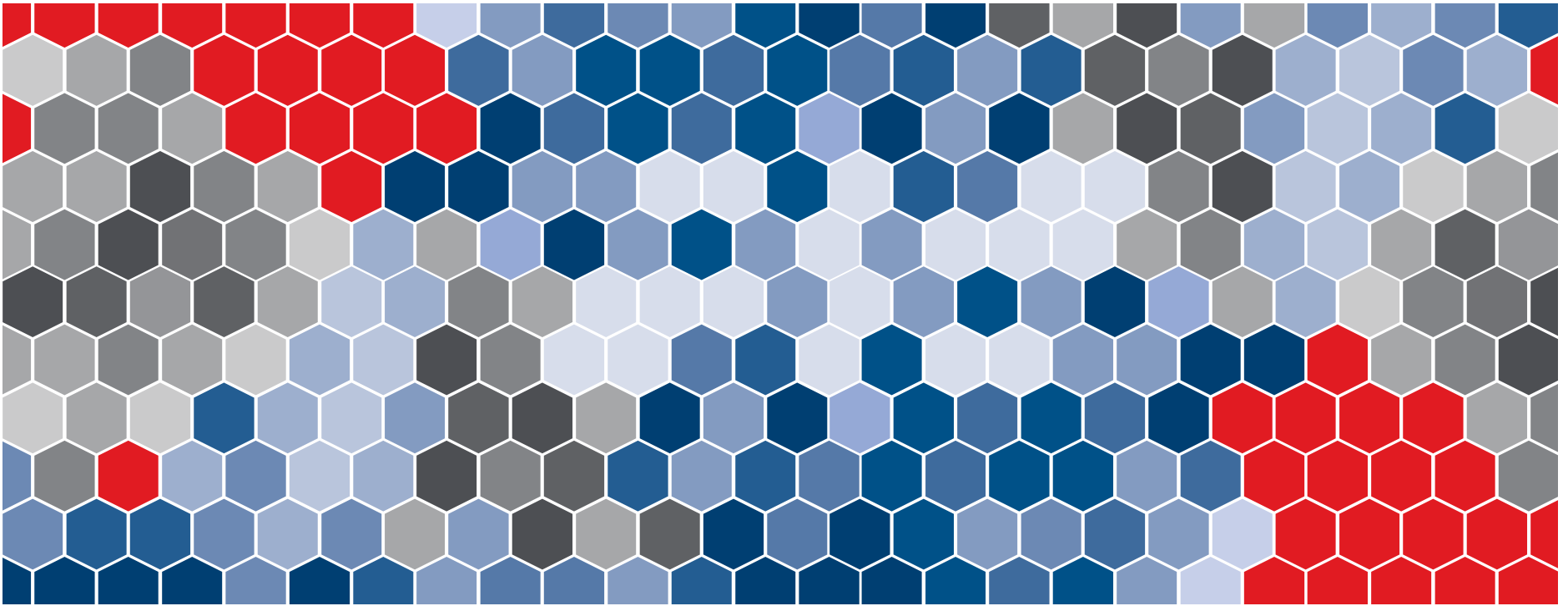
Advice

- Advice often centres around the results for the **first five years** as funds often review their strategy at time of next actuarial valuation.

Value at Risk

- Some consider Value at Risk (VaR). This is the **minimum loss** over a given period with a given probability.
- Often used with either a one year time horizon, or in relation to the forthcoming valuation



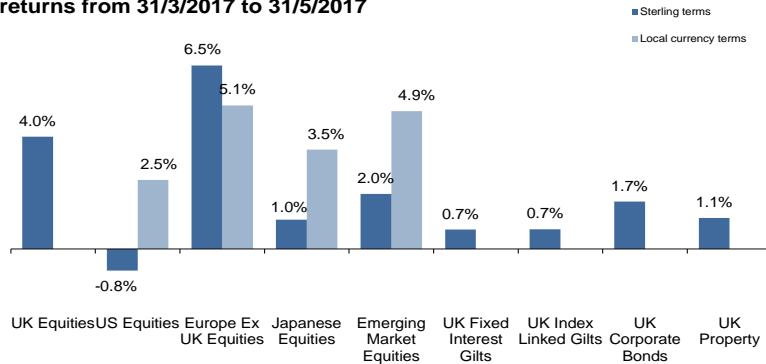


Appendix E: Market updates

What has happened since we ran the model?

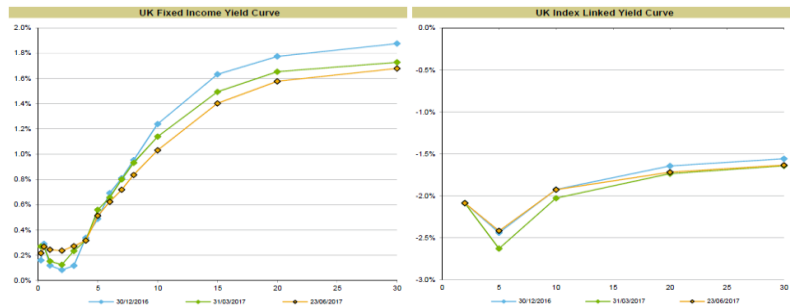
Most markets have risen since 31 March 2017, increasing asset values

Index returns from 31/3/2017 to 31/5/2017



Source: Datastream/IPD

Long dated gilt yields have decreased, increasing liability values; inflation linked gilt yields have increased at shorter dates



Changes in funding level – given market rises, your funding level may now be slightly higher, increasing the probability of reaching your target



Asset allocation – although your asset allocation has changed slightly, this will not change the results of each of the strategies modelled



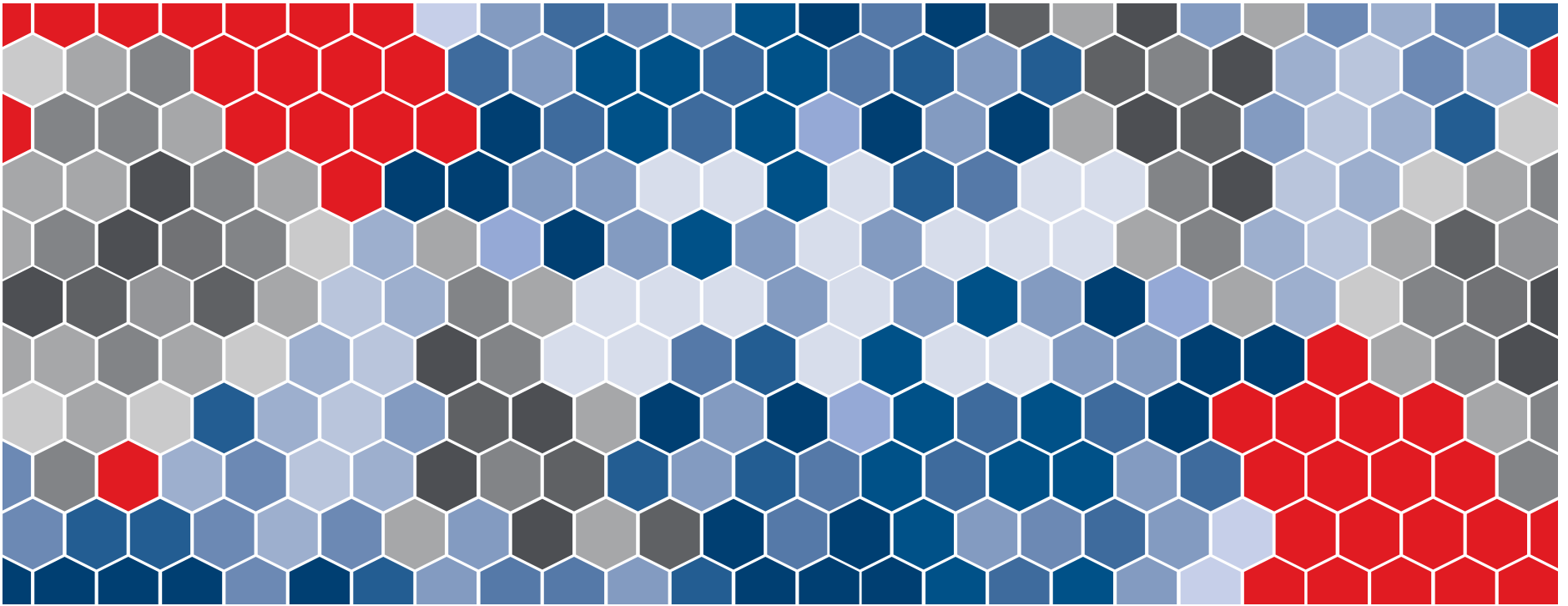
Liabilities
Non financial assumptions underlying liabilities are unchanged.



Modelling assumptions
Assumptions underlying modelling are unchanged.



Strategy design changes
The strategy design is unchanged.

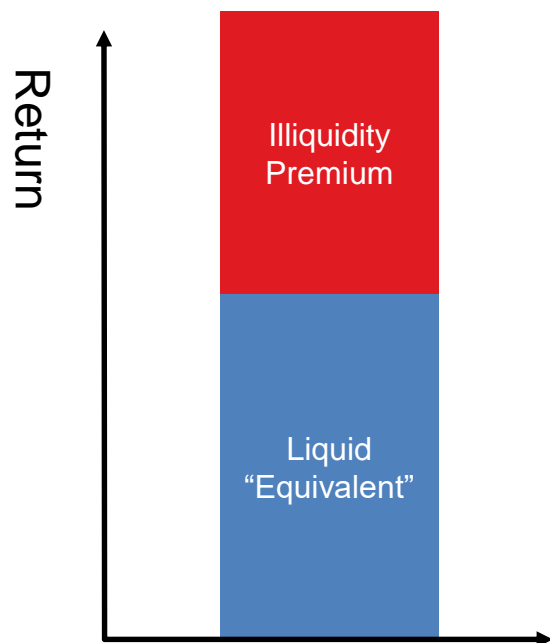


Appendix F: Alternative Assets

The illiquidity premium



Question: Can the premium be measured?
Answer? *It's Difficult!*



- Returns relative to liquid markets are influenced by three main factors:
 - **Access:** the best opportunities are rarely available via public auction. Ability to source deals off-market is a key driver of performance.
 - **Complexity:** Illiquid investments can require more manager skill to execute. The more complex a transaction, the less competition for that transaction and the more a manager is usually able to demand in expected return terms.
 - **Illiquidity:** Investors normally demand a higher return for giving up liquidity, although this is not guaranteed; you should not intrinsically be provided extra return just for giving up liquidity. In competitive markets, this component of return can be squeezed but the other two are more resilient.

Pension funds ideally placed to benefit

Infrastructure

What is it?

- Long-life, hard assets serving the backbone of the provision of services in the global ecosystem
- Examples are electricity networks, airports, seaports, roads and rail
- Characterised by the following traits:
 - Essential services;
 - Strong market position with high barriers to entry;
 - Sustainable, long term cash flows, underpinned by regulation or long-term contracts;
 - Potential for inflation correlated revenues;
 - Low correlation to other asset classes.



Why is there an opportunity?

- There is less opportunity with core/low risk assets, for example Heathrow and water utilities, due to demand from large international investors.
- There is more opportunity with core plus/value added managers, i.e. smaller/more complex deals, for example oil pipelines, or greenfield.



Looking outside of Core Property

Characteristics of alternative property investments

	UK core	Property debt	UK private rented sector	Value add / opportunistic	UK high lease value
Manager long-term expected returns (p.A.)	4% - 6%	3% - 11%	6% - 9%	10% - 15%	5% - 7%
Coupon (income distribution)	3-4.5%	3-10%	Circa 4%	Unlikely	2.5-4%
Inflation linkage	Partial, implicit	No	Partial, implicit	Partial, implicit	Yes, explicit (but typically capped)
Risk	Moderate	Low to high	Moderate	High	Moderate to low
Correlation with UK core	n/a	Very low, greater linkage with other credit opportunities	Moderate	Higher correlation, unless non-UK	Yes, but explicit inflation and long leases reduce volatility
Primary return focus	Income and capital appreciation	Income	Income	Mostly capital appreciation	Income
Property types	Commercial	Commercial and residential	Residential	Commercial + speciality (including residential)	Commercial and residential (ground rents)
Primary vehicles	Open-ended	Closed-ended	Open-ended	Closed-ended	Open-ended
Vehicle term	Perpetual	7-10 years	Perpetual	8-10 years	Perpetual
Liquidity	Moderate	Low	Low	Low	Moderate
Minimum investment	£1m	£5 - £10m	£5 - £10m	£5 - £10m	£1m
Annual management fees (p.A.)	0.6% - 0.8%	0.5% - 1.5% + profit share for higher risk strategies	0.9% - 1.3%	1.0% - 2.0% + profit share arrangement	0.4% - 0.6%

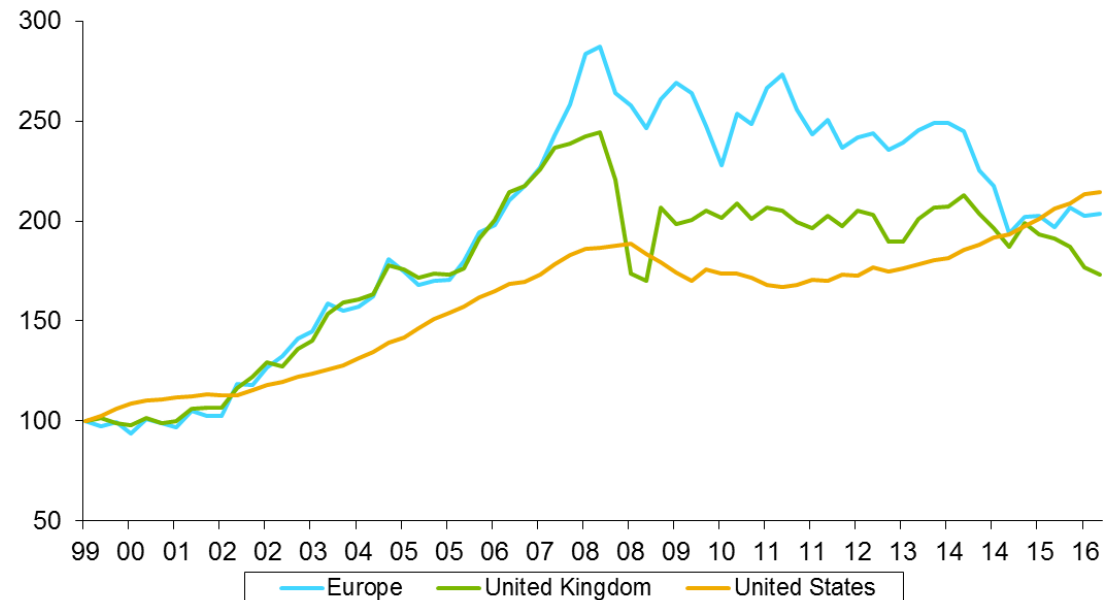
We think pension schemes would benefit from diversifying and/or expanding their allocation within property for the following reasons:

- Alternative property strategies offer better income and return potential than more traditional asset classes/strategies
- Diversified property portfolio reduces reliance on UK commercial property
- Portfolio can be tailored to meet specific needs (income, return, inflation linkage)

Bankers lose interest

- More stringent regulations are forcing banks to lend less but there are many economically viable projects looking for other providers of the debt financing they need.
- This is creating attractive investment opportunities for those who can step in where banks are exiting.
- With such opportunities, investors need to lock up their money for some time but this is expected to be rewarded in the form of higher returns or less risk.
- The range of opportunities is wide, from lending to property and infrastructure projects through to providing finance to companies which are too small to issue bonds.
- This trend of bank deleveraging has been more pronounced in Europe recently, where banks have lagged their U.S. counterparts in selling non-core assets and de-levering their balance sheets.

Total bank credit to the non-financial sector, indexed 100 = 1999



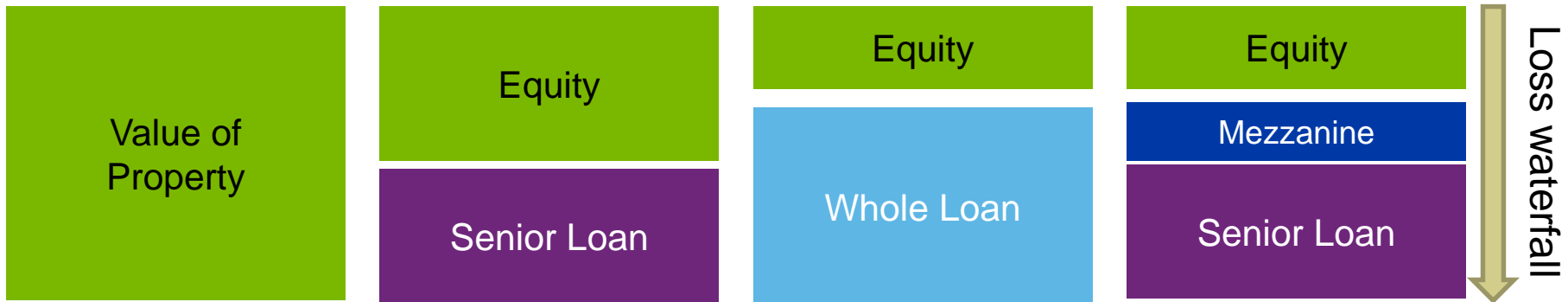
Property Debt

What is it?

- Direct loans secured against commercial properties and their income
- Majority of total return comes from the coupon payments which are distributed quarterly
- Loans are not marked-to-market and can have fixed or floating (over LIBOR) coupons

Why is there an opportunity?

- Opportunity created by reduced lending by traditional bank lenders
- Loans are used for different reasons including acquisitions, refinancing, bridge loans and capital expenditure



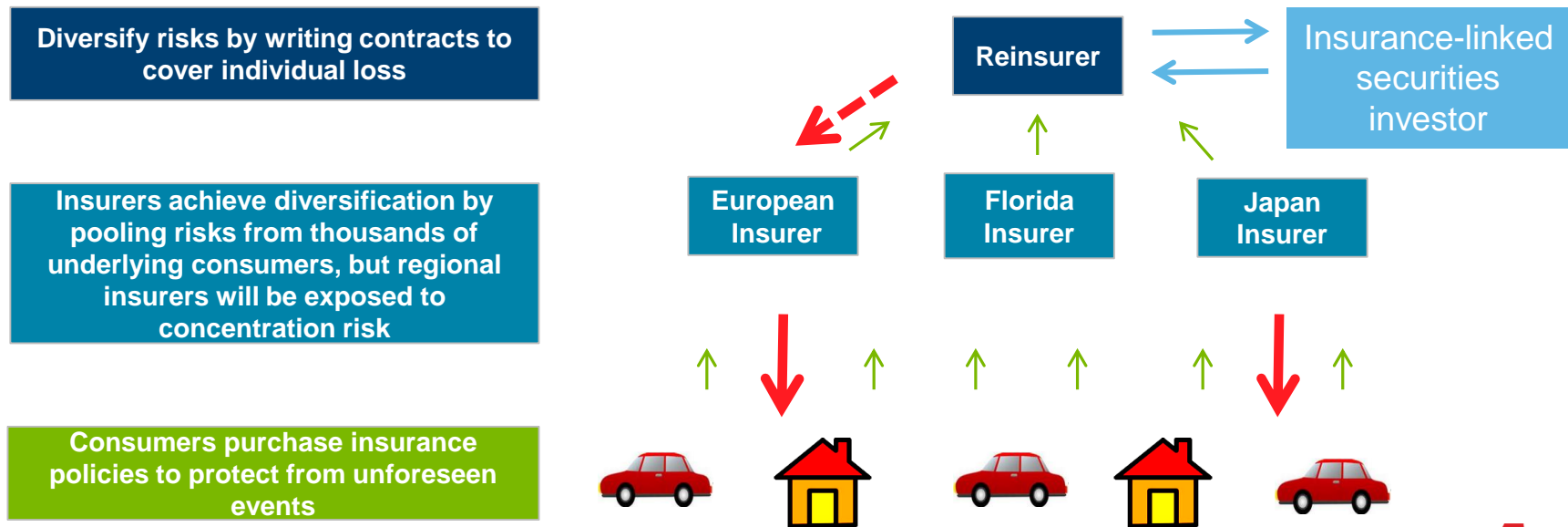
Insurance Linked Securities

What is it?

- Insurance-linked securities (ILS) are financial instruments whose values are driven by property losses caused by natural and man-made disasters, such as earthquakes or aviation disasters
- ILS pay coupon income unless there is a severe disaster
- Investors only start to lose money once layers below that invested into (insurers and potentially reinsurers) have been exhausted by losses from significant events.

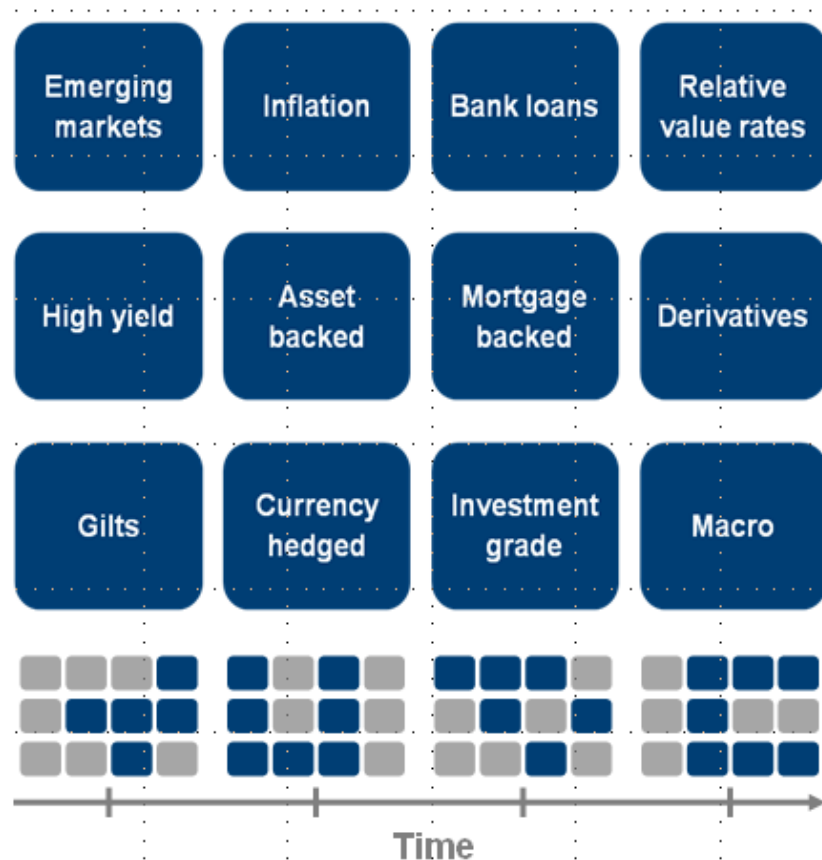
Why is there an opportunity?

- Possibility of increased premiums post Hurricane Harvey and Irma (TBC)



Absolute Return Bond (ARB) funds

- A bond fund with an objective of preserving capital and providing positive returns in all market conditions (an absolute return).
- ARB's tend to have low volatility.
- ARB' can provide diversification to equities and other fixed income.
- The manager shifts allocations between different sectors as views and market conditions change whilst traditional bond managers have at their core a large duration (interest rate) and credit quality tilt
- Has a 'cash plus' performance target (e.g. 3 month LIBOR + 4% p.a.) rather than a relative performance target (e.g. iBoxx Sterling Non-Gilts Index + 0.75% p.a.).
- They achieve this by:
 - a) Active management of a wide universe of fixed income securities
 - b) Using sophisticated techniques, including derivatives to implement



Currency hedging

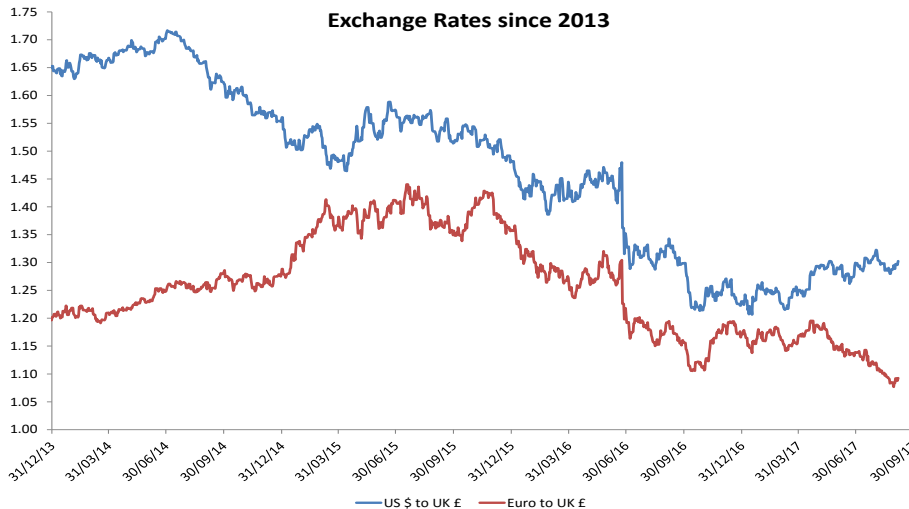
Currency returns from overseas equities



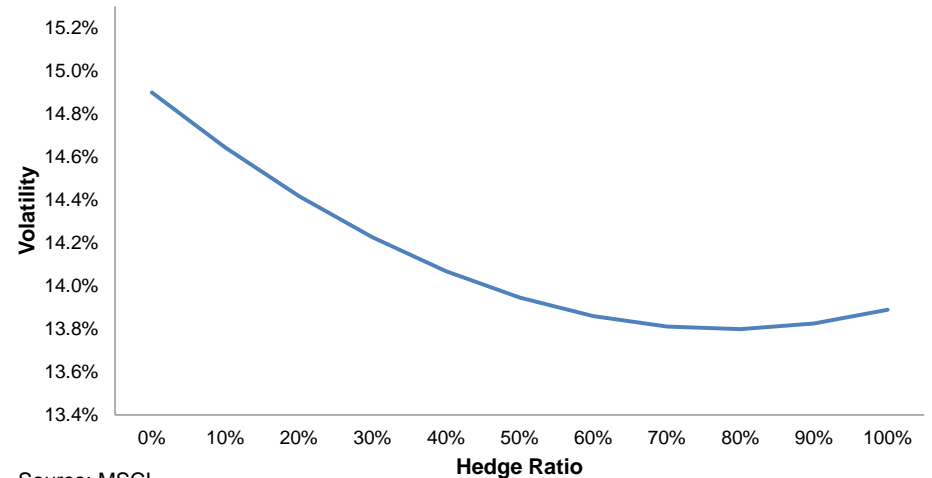
Source: MSCI. Currency cumulative return indices are approximated from MSCI World ex UK hedged and unhedged indices. Blue shaded areas denote periods of currency gain.

- Sterling has fallen significantly against both the US Dollar and the Euro.
- The tolerance for currency risk is an important consideration before implementation of any hedging.
- 50% is an appropriate level of currency hedging for developed market equity exposure.
- For global equities, most of the risk reduction is realised by increasing the level of hedging from zero up to about half.

Exchange Rates since 2013



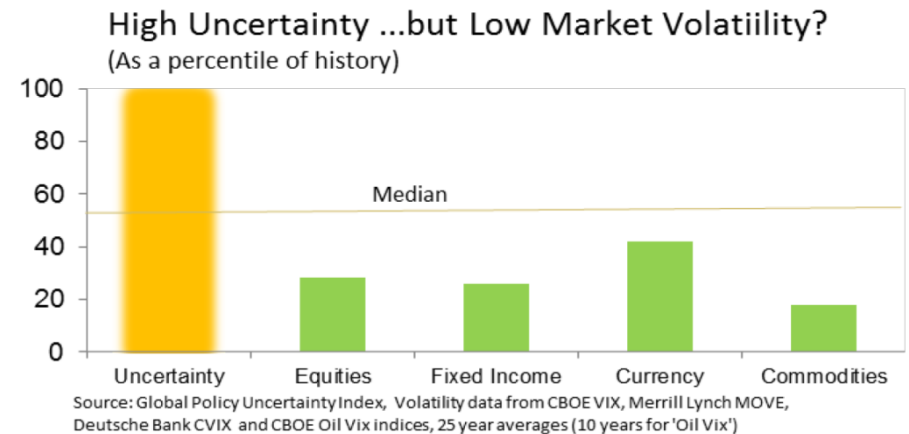
Global Equity Volatility Across Different Hedge Ratios (1/88 - 6/16)



Source: MSCI

Equity options

- The rally in equity markets has generally coincided with a period of relatively low actual equity market volatility. It is now at a multi-year low.
- The cost of protecting against equity falls using options has fallen significantly.



- Our view is that we should expect volatility to rise.
 - Examples catalysts are the end of global monetary support to the markets and political uncertainty.

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