

HEALTH WEALTH CAREER

# WORCESTERSHIRE COUNTY COUNCIL PENSION FUND

EQUITY PROTECTION

September 2017

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# FUNDING & CONTRIBUTIONS AN UPDATE

The table below shows the projected deficit under the funding plan agreed as part of the 2016 valuation over the next valuation cycle (i.e. if assumptions had been borne out from the valuation date). We have compared this with the “actual” projected position where available by projecting forward the position from 30 June 2017 in line with assumptions from that point.

	31 March 2016	30 June 2017	31 March 2019
Expected (deficit)/surplus	(£654m)	(£626m)	(£648m)
Actual (deficit)/surplus	(£654m)	(£184m)	(£174m)
Difference	-	<b>+£442m</b>	<b>+£474m</b>

*\*All figures allow for actual contributions agreed, including prepayments. Actual figures allow for actual / estimated investment performance to 30 June 2017*

We have shown a reconciliation of the change in deficit/surplus to 30 June 2017 since the valuation date in the appendix. It can be seen the improvement is principally from significant gains in assets versus expected.

The table shows that at the end of June 2017, the Fund had a deficit but was c.£442m ahead of the funding plan. It is difficult to predict the expected position at future valuations with accuracy and in reality there is a spread of potential outcomes. Given that most of the improvement seen since the 2016 valuation is attributable to the rally in equity markets over the period, our recommendation is that the Fund consider using an equity protection strategy to:

1. Reduce the likelihood that further deficit contributions will be required at the 2019 valuation; and
2. Seek to “bank” some of the recent upside with a few to potentially reducing contributions at future valuations.

# FUNDING & CONTRIBUTIONS AN UPDATE CONTINUED..

## Equity Protection vs De-Risking

An alternative approach to equity protection would be to simply de-risk by moving funds from equities to other asset classes. The challenge with this approach is that it would also reduce return commensurately which would have an impact on the affordability of providing future benefits.

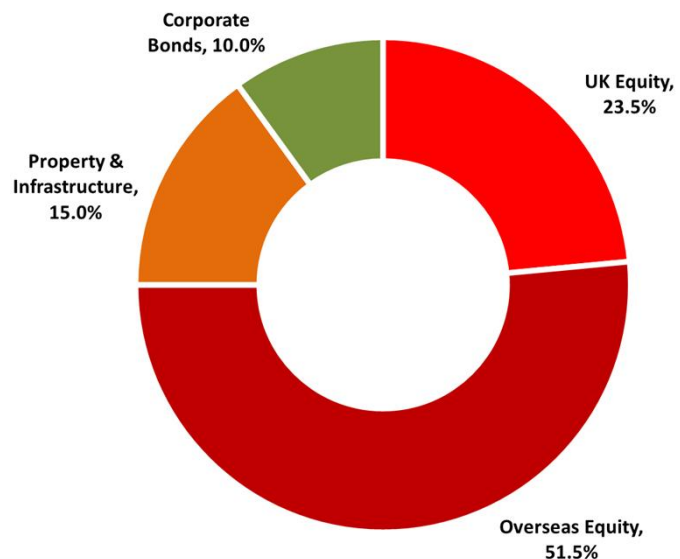
To put this into context, the **average future service** contributions payable by employers (ignoring any phasing/prepayment etc.) is **c.£50m p.a.** If significant de-risking were to take place then this would likely increase, as we could not build the same level of expected returns into the assumptions.

For example, **reducing** the expected return (due to market changes or de-risking) by **0.5% p.a.** would increase the future service contributions payable by **c.£10m p.a.** Putting equity protection in place could help mitigate this by protecting the funding position.

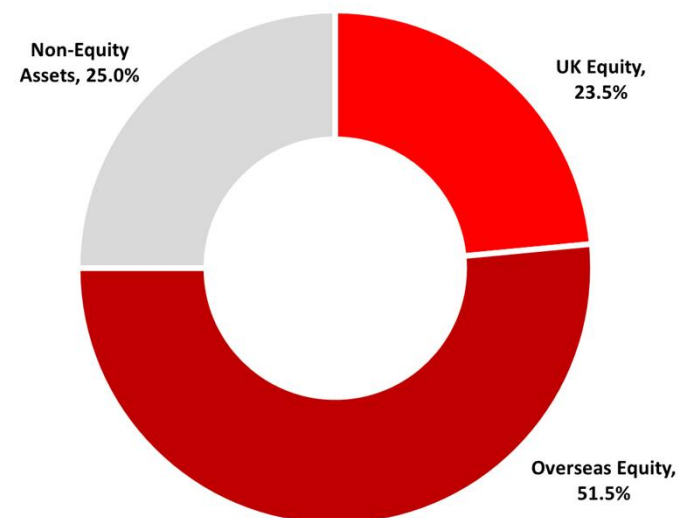
The rest of this short paper highlights how equity risk could impact the stability of contributions and a high level overview of how this position could be improved by making use of equity protection strategies.

# PROPOSED PORTFOLIO

## Strategic Asset Allocation



## Equity Exposure



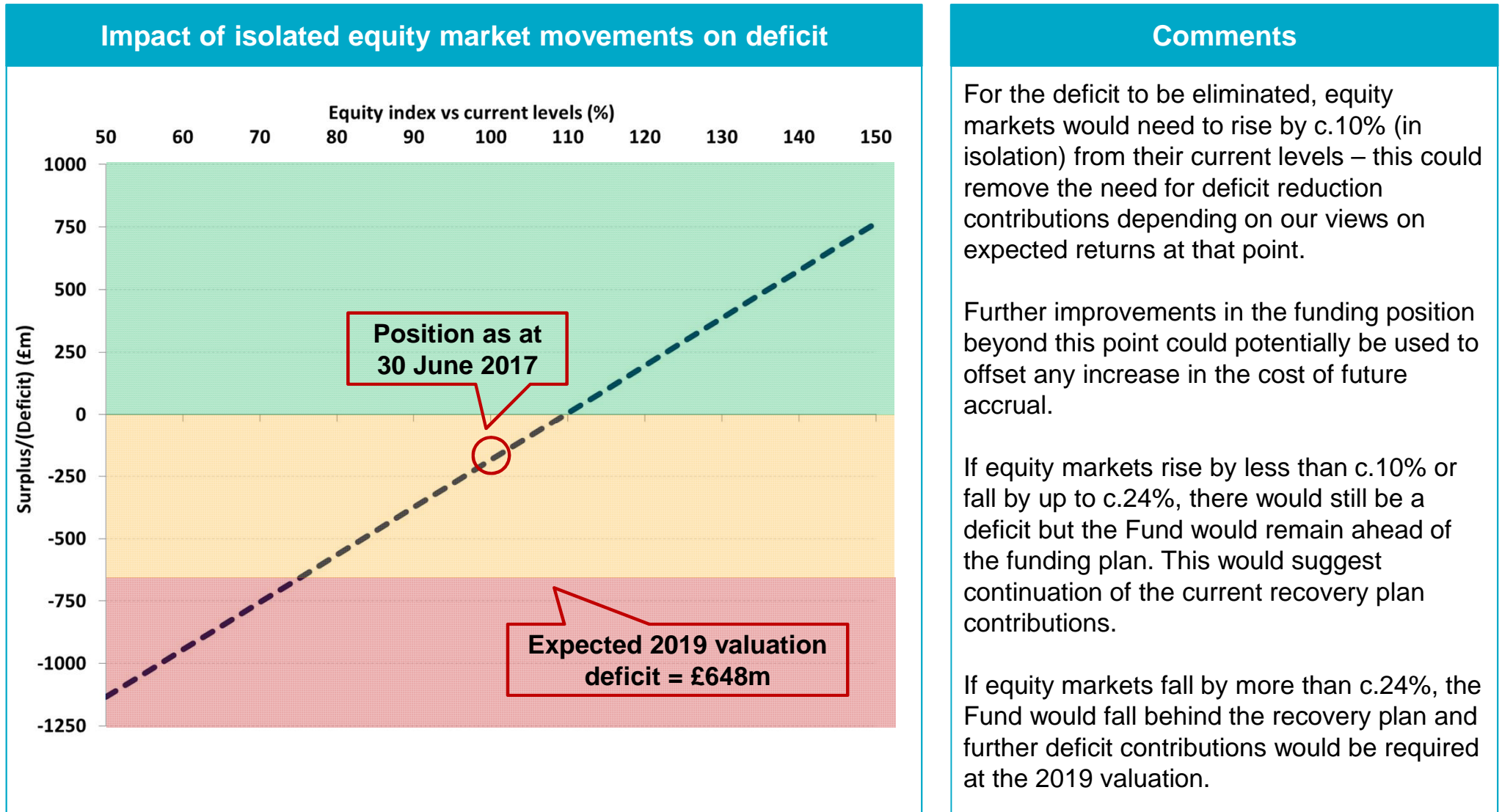
## Comments

Mercer estimate that equity exposure is the largest contributor to the overall level of risk within the Fund. For example, based on the strategy above if equity markets fell by 30%, the asset value of the Fund could fall by around £570m, which could lead to a fall in the funding level of c.21%.

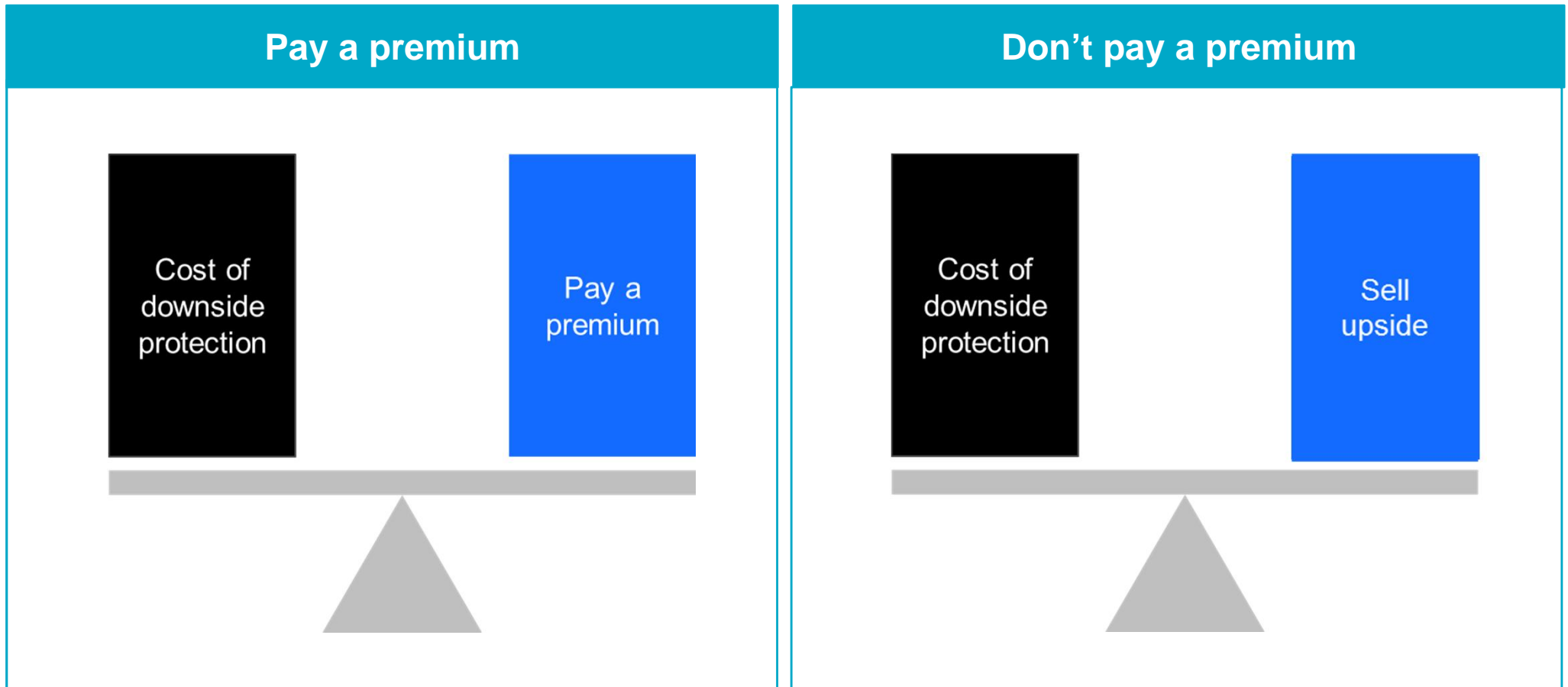
The Fund also holds a range of assets that are strongly correlated to equity markets, such as Property - this means that a fall in equity markets would likely coincide with falls in these assets, potentially causing the funding position to worsen further.

# SENSITIVITY BASED ON STRATEGIC ALLOCATION

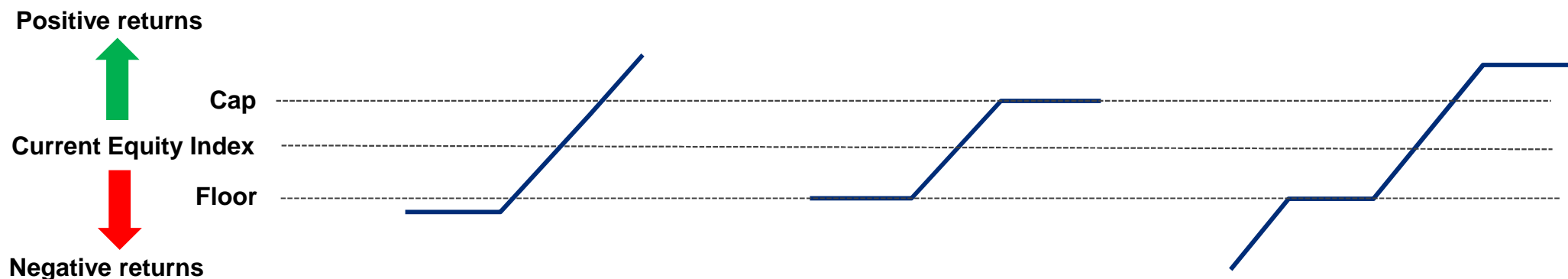
## EQUITY RISK IMPACT ON THE DEFICIT



# EQUITY RISK MANAGEMENT DOWNSIDE PROTECTION + FINANCING



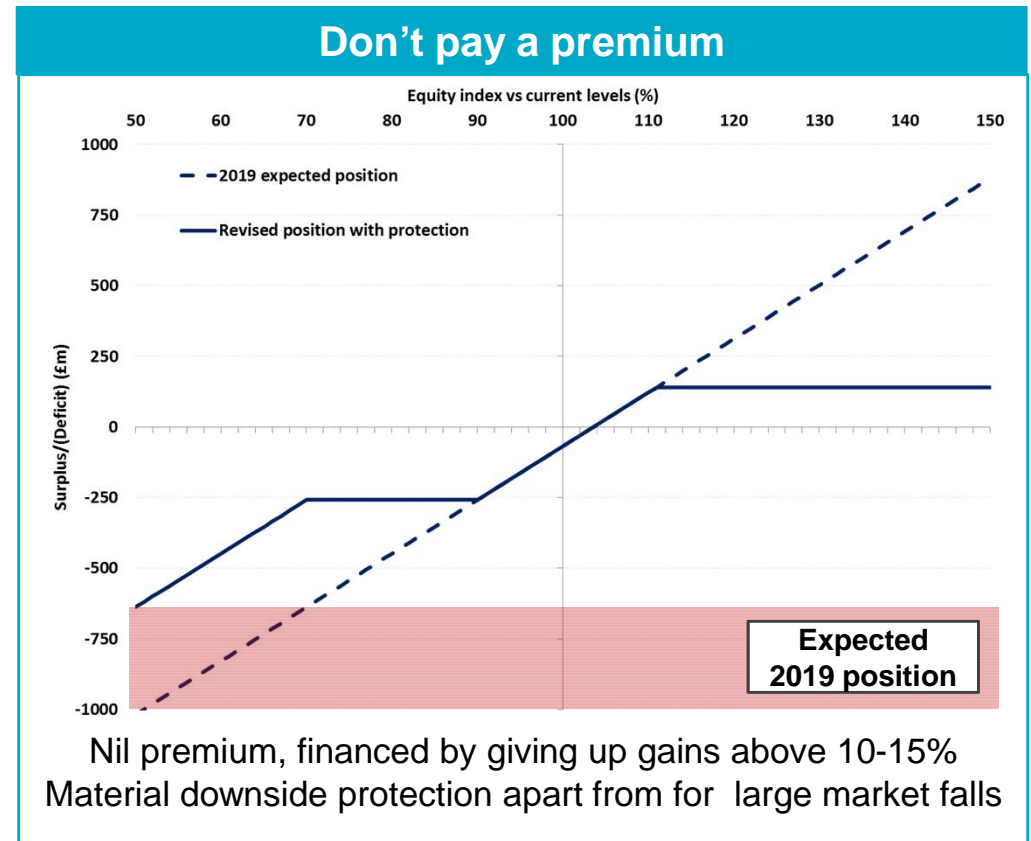
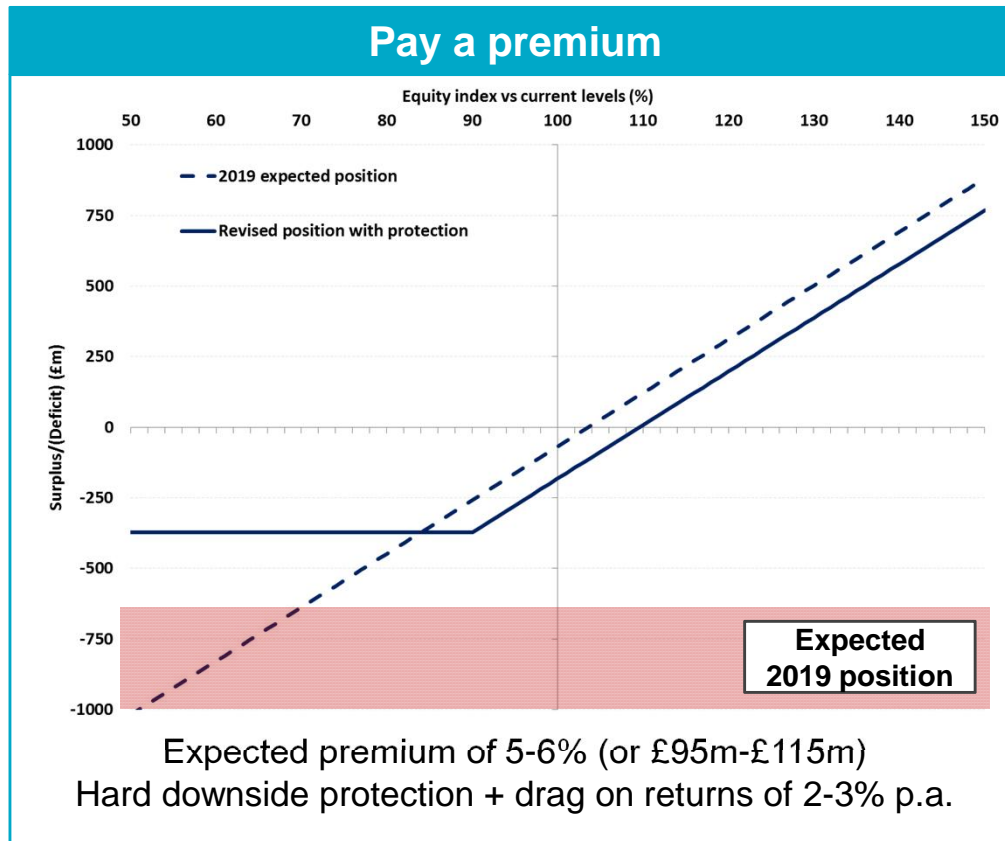
# EXAMPLE STRUCTURES AN OVERVIEW



	Put	Collar	Spread Collar
Return profile	Buy downside protection	Buy downside protection, sell upside to offset the cost	Buy downside protection. Sell upside to offset the cost <b>but</b> participate in downside beyond a certain level to achieve greater upside potential.
Rationale	<ul style="list-style-type: none"> <li>Participation in all upside potential/ only accept a small level of loss</li> <li>Key drawback is the cost of the protection (i.e. like an insurance contract)</li> </ul>	<ul style="list-style-type: none"> <li>Gains above a certain level may not be required (i.e. if the Fund will achieve full funding)</li> <li>Can be structured to be zero cost</li> </ul>	<ul style="list-style-type: none"> <li>Gain extra upside compared to a vanilla collar by only capping downside loss to a given point</li> <li>Can be structured to be zero cost</li> </ul>

# EQUITY RISK MANAGEMENT

## EXAMPLE 2-YEAR STATIC PROTECTION



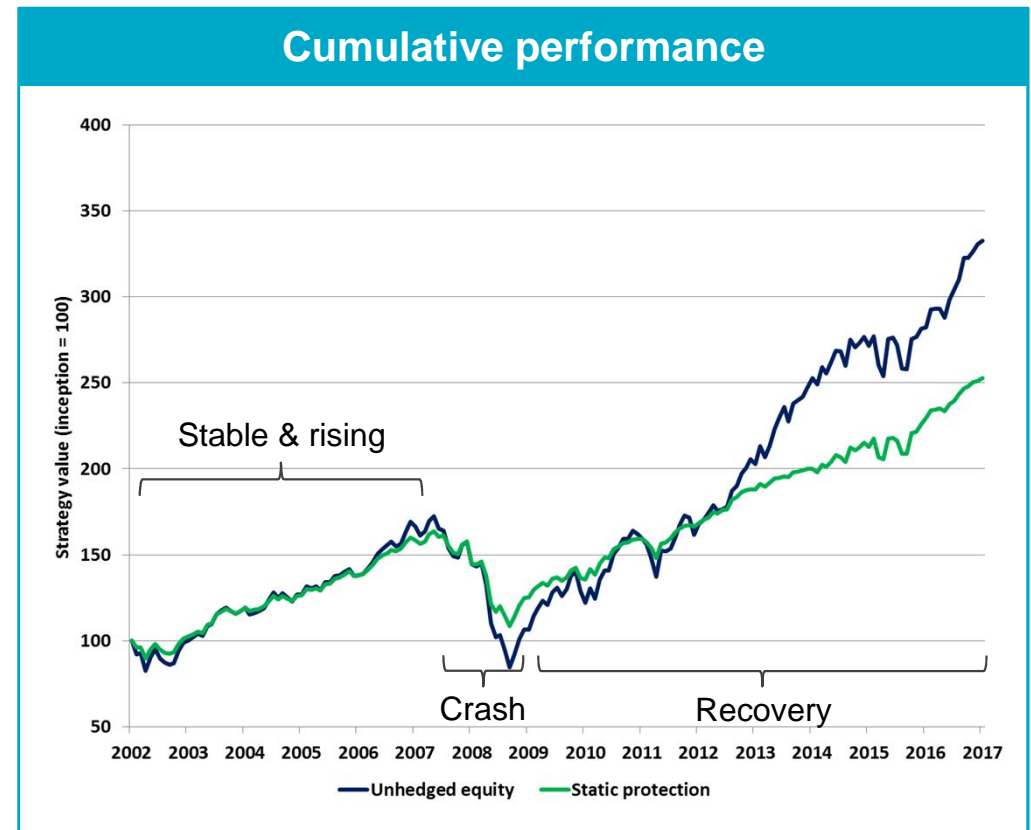
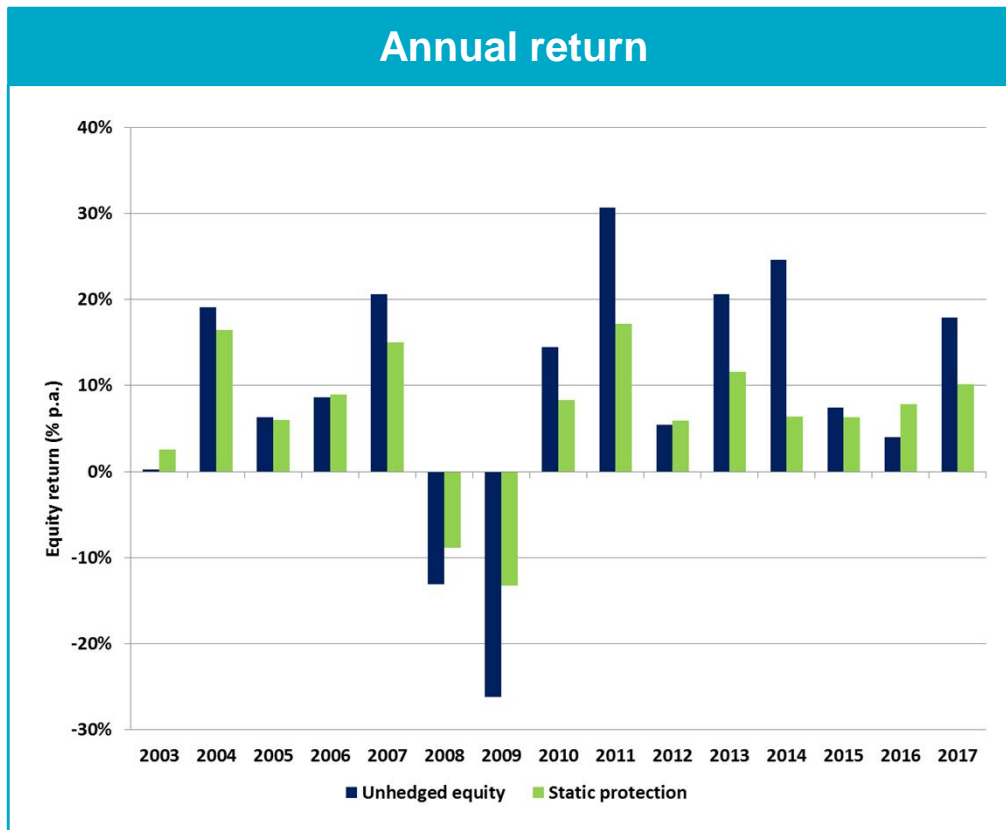
### Comments

These structures are known as “static” protection strategies by which means they are implemented for a fixed period of time and then are not usually altered over the period. Given this feature “timing” of implementation has a significant bearing on the outcome of the protection strategy. To demonstrate the impact of timing we have modelled the nil premium put spread structure above assuming it was implemented in June 2002 and then rolled at the end of each period – the results are shown overleaf.



# STATIC EQUITY HEDGING STRATEGY

## ILLUSTRATIVE BACK-TESTING RESULTS



	Stable & Rising 2003 – 2007	Crash 2008 – 2009	Recovery 2010 – 2017	Total	Volatility	Return/ risk
<b>S&amp;P 500</b>	10.7%	-19.9%	15.3%	8.3%	14.7%	0.6x
<b>Static protection</b>	9.7%	-11.1%	9.2%	6.4%	8.4%	0.8x
<b>Relative</b>	<b>(1.0%)</b>	<b>8.8%</b>	<b>(6.1%)</b>	<b>(1.9%)</b>	<b>(6.3%)</b>	<b>+0.2x</b>

# EQUITY PROTECTION INTRODUCTION TO DYNAMIC HEDGING

Initial downside agreed at outset to provide certainty



Downside financed by selling upside on a monthly/quarterly basis



Downside and upside protection adjusted monthly/quarterly



Implemented via a bank rather than via a manager



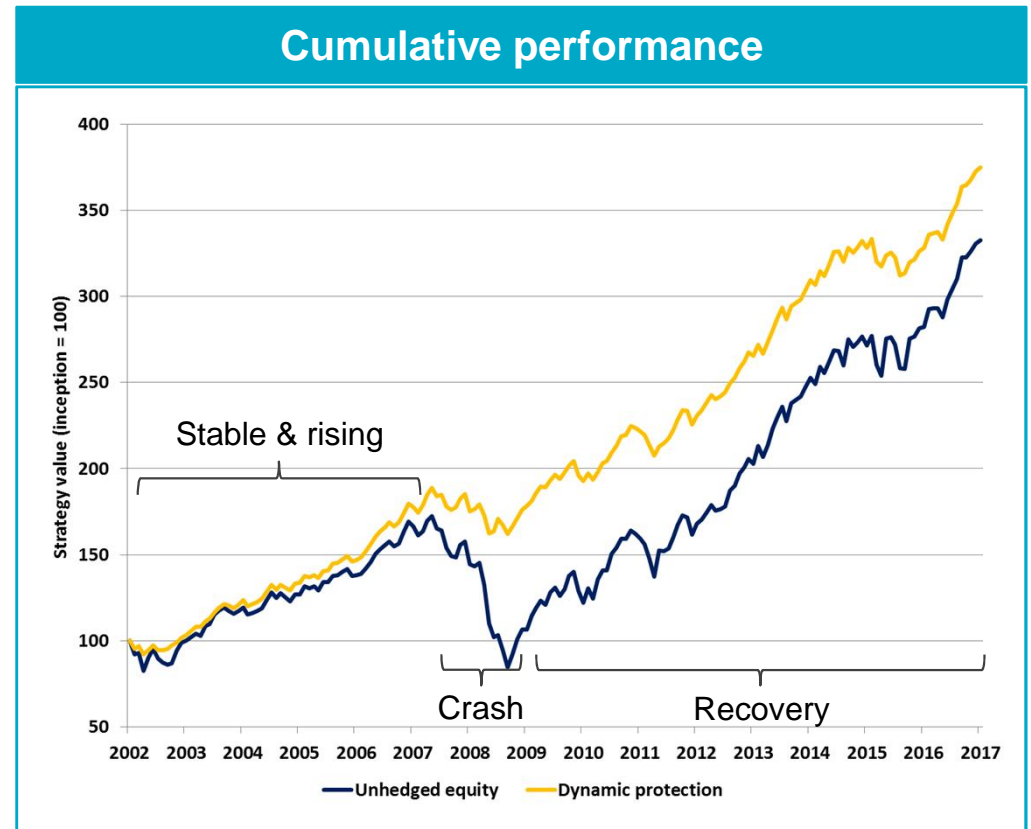
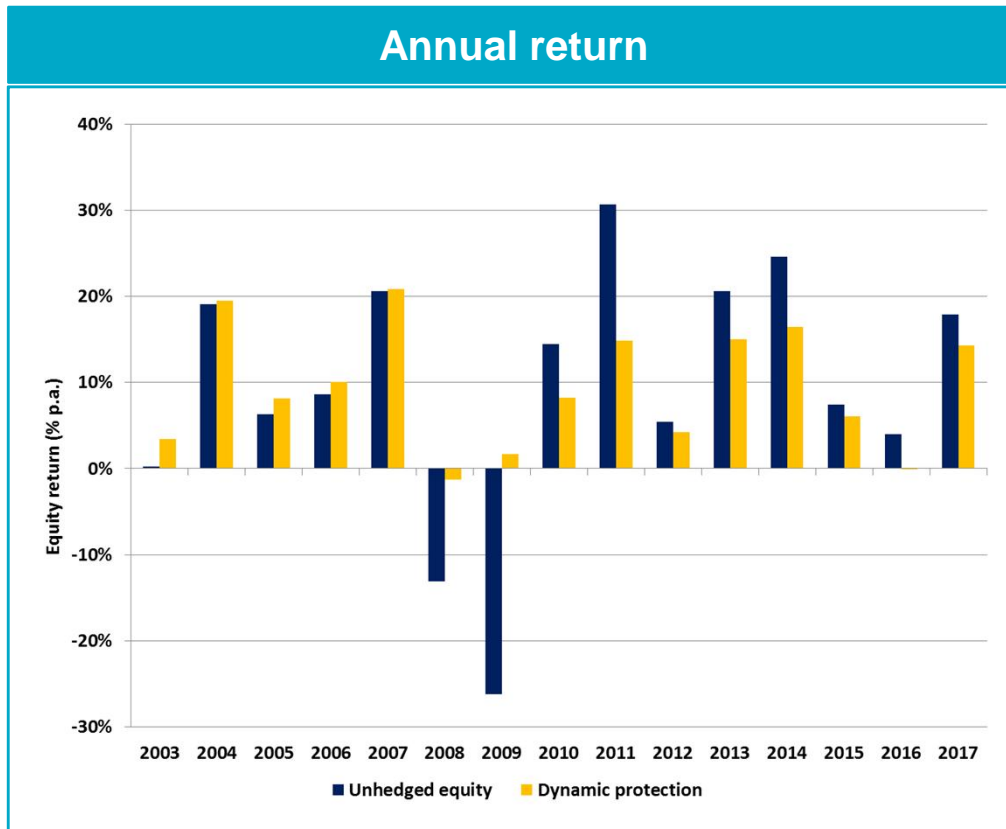
Strategy codified in a simple set of rules



Better risk adjusted return but more complex



# DYNAMIC EQUITY HEDGING STRATEGY ILLUSTRATIVE BACK-TESTING RESULTS



	Stable & Rising 2003 – 2007	Crash 2008 – 2009	Recovery 2010 – 2017	Total	Volatility	Return/ risk
<b>S&amp;P 500</b>	10.7%	-19.9%	15.3%	8.3%	14.7%	0.6x
<b>Dynamic protection</b>	12.2%	0.2%	9.7%	9.2%	7.1%	1.3x
<b>Relative</b>	<b>1.5%</b>	<b>20.1%</b>	<b>(5.6%)</b>	<b>0.9%</b>	<b>(7.6%)</b>	<b>+0.7x</b>

# COMPARISON OF APPROACHES EQUITY RISK MANAGEMENT

Feature	Do nothing	Static hedging	Dynamic hedging
Nature of strategy	No protection	Overall structure set at outset	Based on a simple set of rules
Certainty over protecting recovery plan	Low	High	High
Period of protection	None	Fixed	On-going
Financing of protection	None	Sell upside over fixed period	Sell upside over short time periods
Potential regret risk	Lowest	Highest	Low
Protection provider	None	Investment manager	Bank + collateral manager
Complexity	Low	Medium	Medium/high
Return from 2002-2017	8.3% p.a.	6.4% p.a.	9.2% p.a.
Return per unit of risk	0.6x	0.8x	1.3x

# SUMMARY & NEXT STEPS

## EQUITY PROTECTION

### Summary

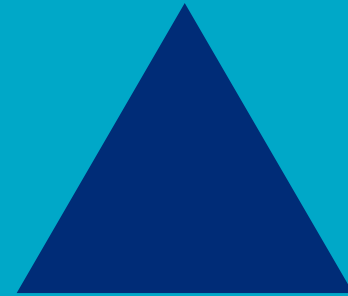
We estimate that the Fund's equity holdings are the largest contributor to the overall level of risk. With equity markets at or close to all time high levels, we believe that now is an opportune time to protect against market falls and therefore protect the contribution position. We estimate that the Fund currently has available additional resources of around £442m based on the actual position as at 30 June 2017. By implementing an equity protection strategy, this level of resource can be achieved without the need to amend the long-term strategic allocation.

We strongly recommend this as a positive risk management strategy given current market conditions. If this is taken forward, further work should be undertaken to determine the optimal structure for the Fund (including consideration of how this would be delivered in the current manager framework). Implementation of an equity protection strategy could be achieved within a relatively short timeframe once the particulars of the strategy have been agreed.

### Next steps

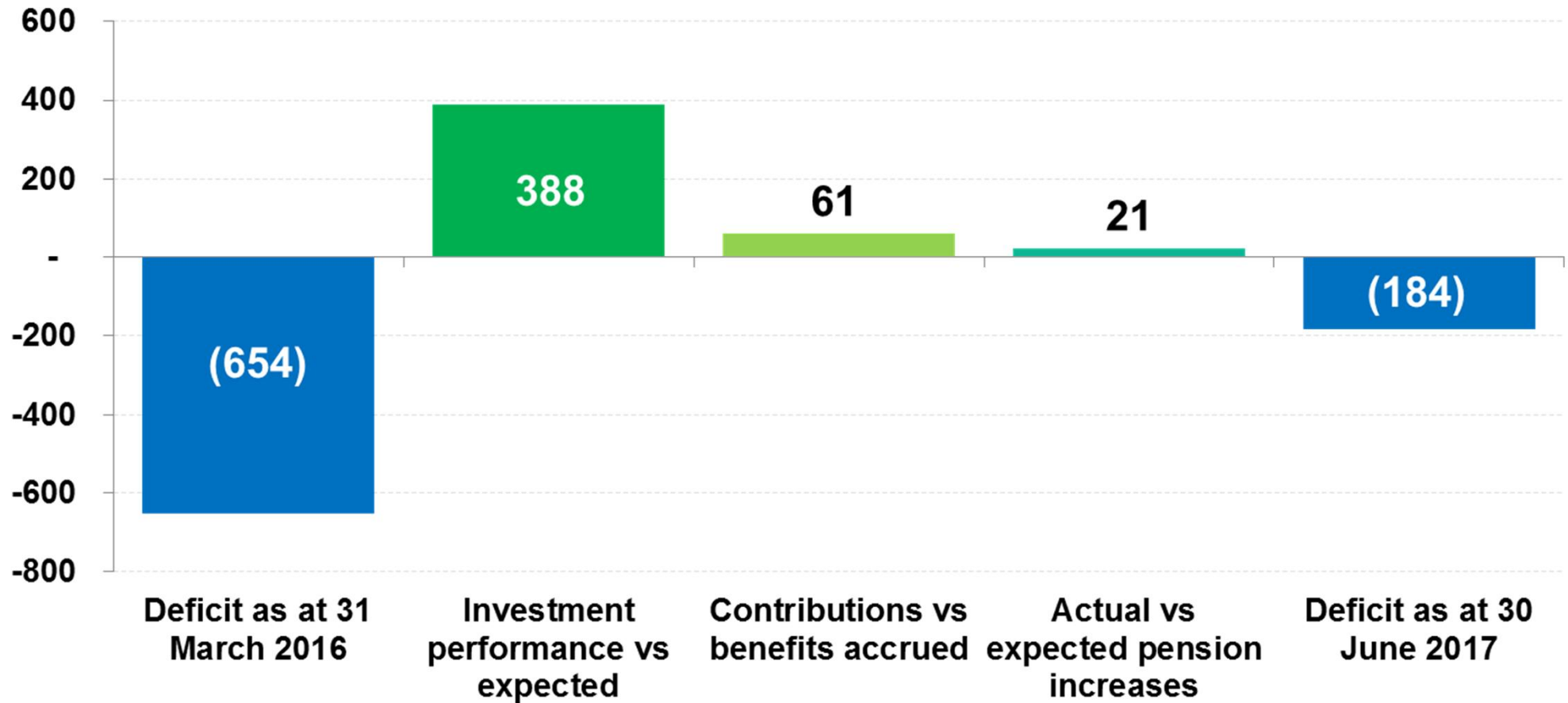
- Seek approval from Pension Committee for Officers to move forward and implement equity spread protection strategy.
- Mercer to input where necessary to provide:
  - Rationale for adopting the protection strategy (to advisers and members);
  - The recommended level and structure of the protection (if taken forward);
  - Consideration of the implications of the different levels and structures on the funding plan; and
  - Input to implementation of the strategy (overview or more detailed assistance)

# APPENDIX



# APPENDIX

## RECONCILIATION SINCE THE VALUATION DATE



## APPENDIX

# ILLUSTRATIVE IMPACT ON EMPLOYER CONTRIBUTIONS BASED ON 31 MAY UPDATE

	Current Contributions for 2017/18	Illustrative Contributions for 2017/18	
Source	2016 Valuation Outcomes	30 June 2017 Update	30 June 2017 Update - allowance for de-risked future service discount rate
Discount Rates (i.e. expected return)			
- Past service	CPI + 2.15% p.a.	CPI + 2.15% p.a.	CPI + 2.15% p.a.
- Future service	CPI + 2.75% p.a.	CPI + 2.75% p.a.	CPI + 2.25% p.a.
<b>Total Employer Deficit Contributions *</b>	<b>c.£38m</b>	<b>c.£11m</b>	<b>c.£11m</b>
<b>Average Employer Future Service Contribution Rate 2017/18 **</b>	<b>c.14.7%</b>	<b>c.14.7%</b>	<b>c.17.4%</b>
<b>Projected 2017/18 Payroll ***</b>	<b>c.£340m</b>	<b>c.340m</b>	<b>c.£340m</b>
<b>Employer Future Service Contributions</b>	<b>c.£50m</b>	<b>c.£50m</b>	<b>c.£59m</b>
<b>Total Employer Contributions</b>	<b>c.£88m</b>	<b>c.61m</b>	<b>c.£70m</b>

\* Based on a 18 year recovery period from 1 April 2017.

\*\* Ignores any phasing plans or prepayment implemented as part of the 2016 valuation.

\*\*\* Based on the data provided for the 2016 actuarial valuation.



# EQUITY HEDGING STRATEGY BACK-TESTING ASSUMPTIONS

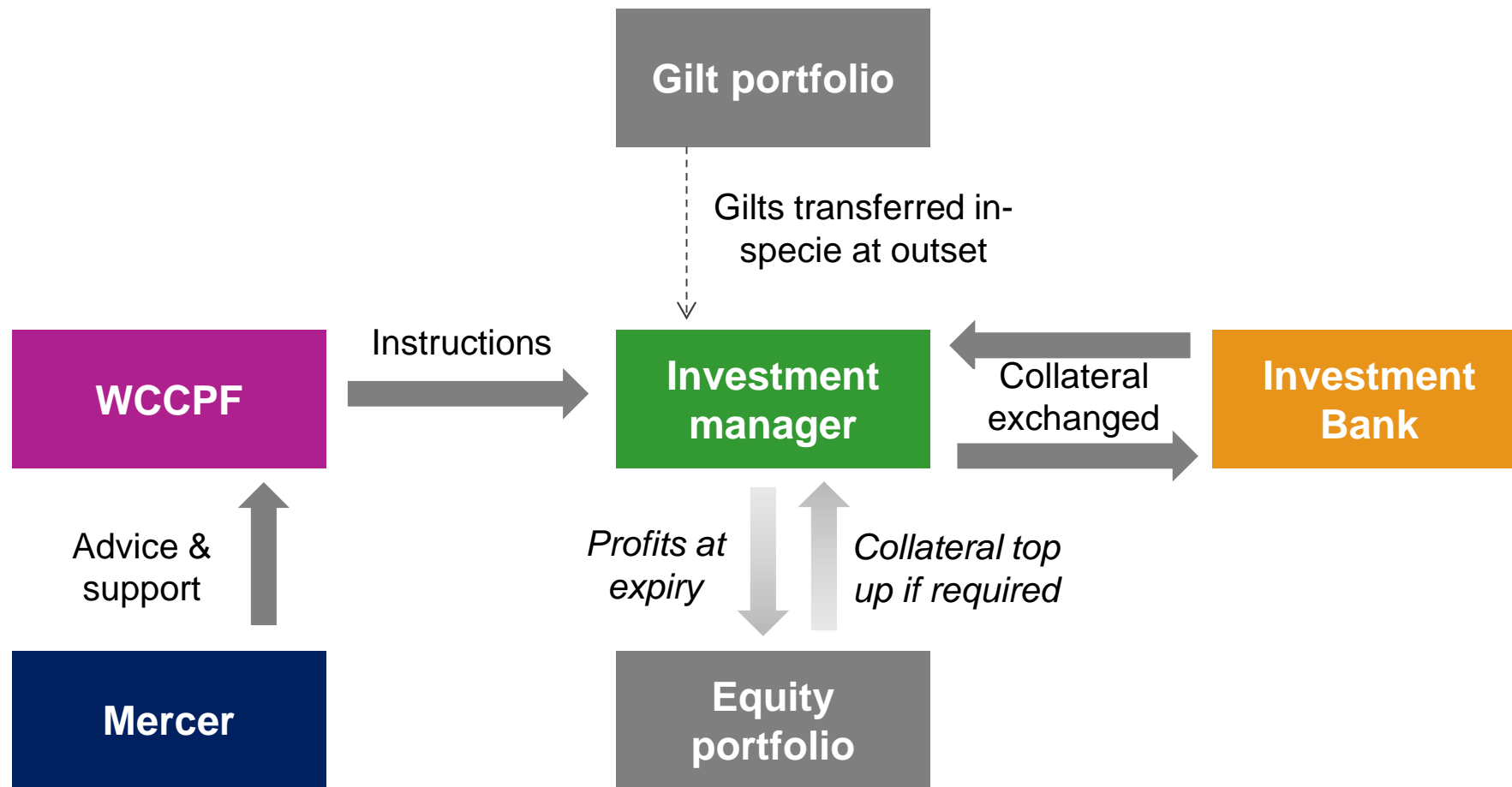
We have back-tested the following strategies over the period 30 June 2002 – 30 June 2017:

- **Physical Equity:** S&P 500 Total Return Index
- **Strategy 1 (“Static Protection”):** S&P 500 Total Return Index + 2-year zero premium 90%-70% put-spread collar. The 2-year structures are single contracts that are then renewed at maturity.
- **Strategy 2 (“Dynamic Protection”):** S&P 500 Total Return Index + 2-year overlapping 90% puts bought every two months (each on 1/12<sup>th</sup> of the notional) + 1-month 104% short calls (notional amount revised monthly, no leverage).

The back-test assumes the following:

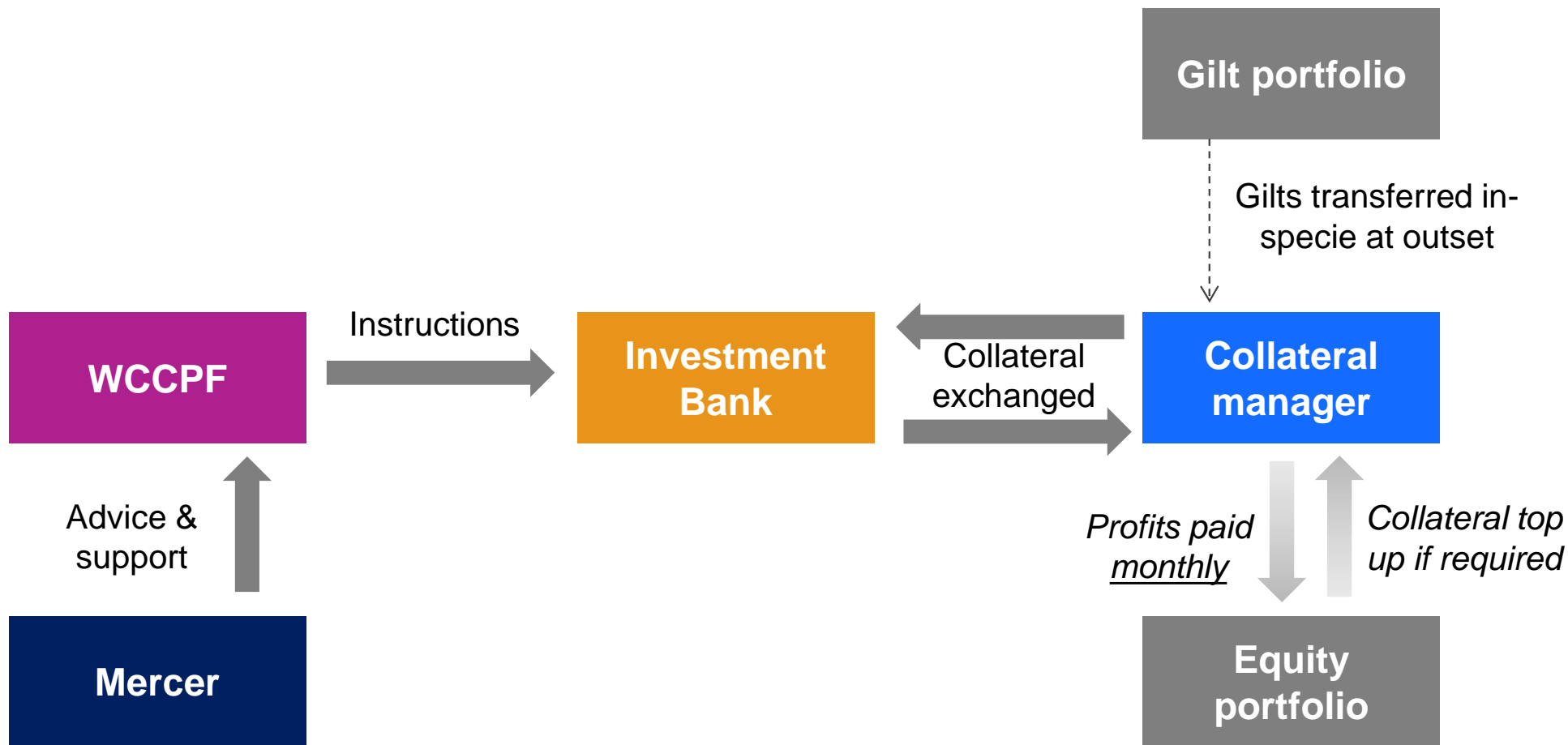
- All options are on the S&P 500 Price Index
- Starting value of physical equity equal to 100 and increasing (or decreasing) with equity market performance
- Starting value of option strategy notional equal to 100, increasing (or decreasing) in line with equity exposure
- Option premiums and pay-outs are paid into and out of cash and earn 3-month US LIBOR
- The currency exposure is fully hedged
- We do not assume any transaction costs

# STATIC EQUITY HEDGING STRATEGY IMPLEMENTATION SCHEMATIC



Expected t-costs, asset manager fees and advice of around 0.10%-0.15% per annum

# DYNAMIC EQUITY HEDGING STRATEGY IMPLEMENTATION SCHEMATIC



Expected t-costs, asset manager fees and advice of around 0.10%-0.15% per annum

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