# De-risking triggers and Implementation Process

## Introduction

This paper is addressed to the Pensions Committee ("the Committee") of the London Borough of Hackney Pension Fund ("the Fund"). It provides an updated framework for monitoring the funding level with the intention of reducing the level of risk in the investment strategy when defined triggers are reached.

It has not been prepared for use for any other purpose and should not be so used. The paper should not be released or otherwise disclosed to any third party except as required by law or regulatory obligation or without our prior written consent. We accept no liability where the report is used by, or released or otherwise disclosed to, a third party unless we have expressly accepted such liability in writing. Where this is permitted, the paper may only be released or otherwise disclosed in a complete form which fully discloses our advice and the basis on which it is given.

This paper complies with Technical Actuarial Standard 100: Principles for Technical Actuarial Work. Please see the Appendices for details of the reliances and limitations which apply to this paper.

## Background

At the Committee meetings in March 2017 we presented the results of the investment strategy review which was carried out alongside the Fund's actuarial valuation. The analysis indicated there was scope for the Fund to reduce the allocation to "growth assets" based on the updated valuation results and funding position. Following completion of the 2016 actuarial valuation and investment strategy review, we have reviewed and updated the previously agreed de-risking trigger framework.

## Executive Summary

As set out in this paper, we recommend:

- Funding level updates are provided by the Fund actuary on a quarterly basis with flexibility for more frequent monitoring should the position relative to trigger merit closer attention.
- Changes to investment strategy should be based on improvements in the funding level as set out in Table 1.
- Once a trigger level is reached, Hymans Robertson LLP will prepare a summary paper to be sent to the Committee Chair and Group Director, Finance and Corporate Resources for approval prior to implementation.
- Triggers are reviewed on a regular basis – every three years (in line with the valuation cycle) or after any triggered switches.

In summary, the most appropriate de-risking framework for the Fund may change over time. We recommend that it is reviewed at least on a triennial basis, alongside the valuation process and more frequently if there are any significant changes that may impact the Fund e.g. extreme market conditions, changes to key assumptions etc.

We look forward to discussing this paper with you and the results of our analysis of triggers at the forthcoming Committee meeting.

## Recap on review of Investment Strategy

The investment strategy review focused on a contribution strategy of:

- 34.9% in 2017/18 (no increase);
- 34.0% in 2018/19;
- 33.0% in 2019/20; and
- Then 33.0% +2%/-1% p.a. thereafter.

The results focused on a target of being 100% funded on gilts +1.65% by 2031. While the longer term target is 2034, the shorter time horizon reflects the prudent approach taken by the Committee in the management of the Fund.

We have considered six different investment strategies which are summarised below (a more detailed breakdown of each strategy is included in Appendix 1):

- 100% in growth assets (which would reflect an increase in investment risk for the Fund);
- 83% in growth assets (the current investment strategy of the Fund);
- **83% in growth/income assets (the agreed investment strategy for the Fund);** and
- Lower risk strategies with 73%, 63% and 53% in growth/income assets.

Chart 1 below illustrates expected outcomes in 2031 based on 5000 different economic scenarios for each of the six strategies.

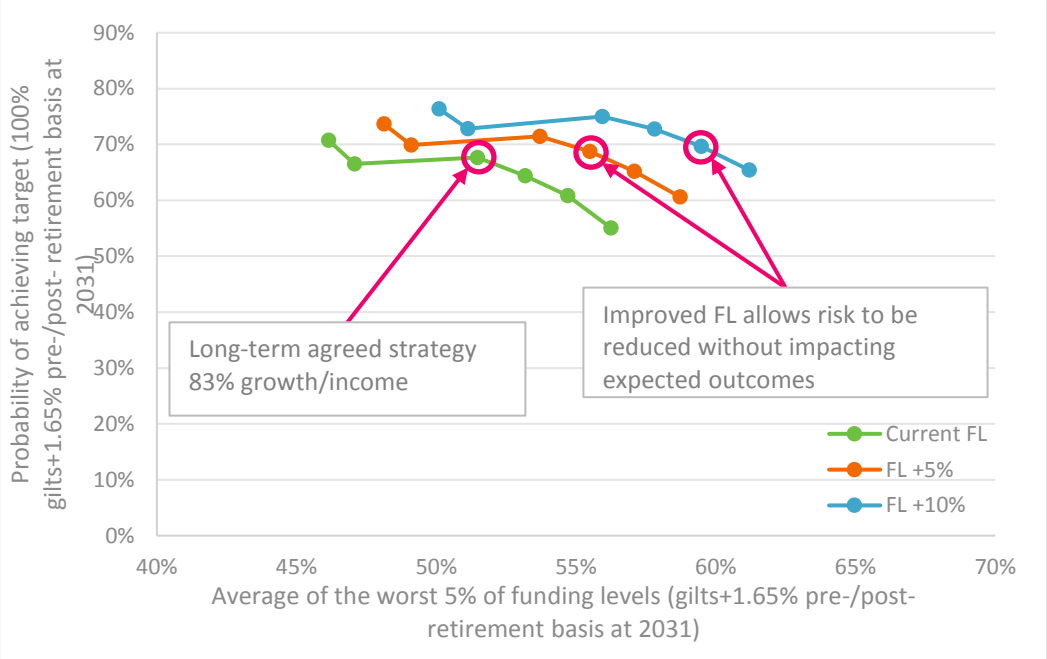
- The pink diamonds represent the probabilities of the Fund being at least 100% funded in 2031. For example the current investment strategy has a 67% probability of success. This indicates that for c3850 of the 5,000 simulations, the funding level in 2031 is 100% or above.
- The blue bars represent the average of the worst 5% of outcomes, i.e. the average of the worst 250 outcomes from the 5,000 simulations. For the current strategy, the average funding level in these scenarios is 47%.

**Chart 1 Probability of Success in 2031 at Current Funding level**

From Chart 1 we can see that taking less investment risk and introducing an allocation to liquid and illiquid debt mandates as agreed during the investment strategy review increases the average of the 5% of worst outcomes, i.e. downside risk is reduced, whilst the probability of success in 2031 remains broadly similar. **We consider this to be a sense check of the strategy review and confirms that implementation should proceed as planned.**

The green line in Chart 2 illustrates the same information but in a different way. In addition, we have considered the results were the funding level to improve by 5% (orange line) and 10% (blue line). Taking the green line for illustration, the second dot from the left represents the current investment strategy. The vertical axis represents the probability of being 100% funded in 2031 (the pink diamond from Chart 1), 67%. The horizontal axis represents the average of the worst 5% of outcomes (the blue bar from Chart 1), 47%.

**Chart 2 Probability of Success and Average worst 5% for improved funding levels**




The results indicate that if the funding level were to improve by 5%, the orange line, there is likely to be scope to consider a reduction in growth/income assets to 73% without adversely affecting expected outcomes. The one caveat is that, with a lower allocation to growth assets, the Fund actuary may wish to revisit the valuation basis and set a more stringent set of assumptions as they would no longer be able to rely on the same level of outperformance relative to gilts. In addition it would be important to consider whether the contributions would be maintained at current levels.

### Current Strategy and De-risking

The Committee has a current strategic benchmark allocation of 83% in growth assets although has previously agreed to change the composition of this strategy. As the funding level improves, the requirement to hold growth assets will reduce and there may be a desire to reduce investment risk from current levels. One way to achieve this is to reduce risk at times when the funding position is ahead of expectations, effectively capturing positive performance and taking the opportunity to crystallise gains.

In the very long term, the Committee is targeting a funding position in excess of 100% on a gilts basis and being invested with less risk relative to the liabilities of the Fund. In the “shorter term” the target is for the Fund to be 100% funded on gilts +1.65% basis by 2031. The investment strategy should be set and developed to achieve that target. If the funding position is strong enough, it may be possible to reduce the Fund’s holding in growth

assets as the return required in order to achieve the desired funding level is reduced. As a result the Fund can afford to de-risk and have a higher allocation to more defensive assets including gilts and high quality corporate bonds.

### Principles behind setting triggers

When designing and putting in place a de-risking strategy mechanism there are various considerations for the Committee to take into account. These will have an impact on the type of trigger which is put in place, the level at which it is set, how often it is monitored, and the steps to be taken if and when the trigger is met. We discuss the important areas for consideration below along with our recommended approach for discussion:

### Focus of triggers

Put simply, if the funding level improves above an agreed target, it is appropriate to reduce the Fund allocation to growth assets, provided the objectives of the Fund are maintained. The triggers will be expressed as funding levels.

### Monitoring frequency

A trigger being met will result in some action being taken, it will generally be appropriate to monitor the trigger (i.e. funding level) more frequently as a trigger level becomes closer to being hit. We recommend that the funding level update continues to be provided quarterly by the Fund actuary. This is sent to the Officers and noted at future Committee meetings. Should the level be close to a trigger point the Officers may wish to monitor more frequently. Proximity to triggers could be included in the quarterly investment updates provided by the pensions team.

### Trigger measures

Triggers can be set based on funding level or deficit amount. It is possible that these two measures do not move in tandem. For example, if the funding level improves because equity markets do well, but the improvement is offset to some extent by falling real yields; it is possible to see the funding level improve and the deficit increase at the same time. As noted above, we recommend a quarterly update of the funding level is provided by the actuary. It would be simplest to continue to use the funding level as a trigger, but to be aware of what has happened to the deficit as well.

### Targeting source of improvement

Technically, if the funding level improves as a result of asset outperformance (versus expected) we may wish to target the source of that improvement in the de-risking plans e.g. if the reason for the improvement was rising real yields then we may wish to increase the allocation to bonds via the BMO mandate or perhaps consider an alternative bond mandate. If the improvement is predominantly driven by strong equity markets and bond yields remained broadly unchanged it may not be the ideal time to increase the Fund's allocation to bonds. As a result an increased allocation to Invesco/GMO or a new absolute return mandate would be preferable as a means to diversify the Fund's growth exposure.

This makes a funding level or deficit trigger more complicated as the immediate action depends on what happens and is more difficult to make mechanistic. From a practical point of view we recommend incorporating a reference to market yields levels relative to those in existence at the valuation date. Looked at in isolation these would constitute an improvement in the funding position and reserve funding level or deficit triggers for switches out of growth assets into defensive assets.

### Implementation

We recognise that there are timing and practical concerns around switches in assets at a single point in time, particularly of 10% (c£140m) or more of total assets. Whilst a transition manager could be used to implement

such a change, consideration will need to be given to how changes in strategy could be implemented within the LCIV.

### Time period

It is important to remember that any triggers effectively have a shelf life for a number of reasons, including:

1. Over time, the funding level is expected to improve given the target return from the Fund's assets coupled with contributions. Being at 80% today is "better" than being at 80% in 5 years' time.
2. Market conditions change and expectations for markets and bond yields change.
3. The data and assumptions used to set the triggers become increasingly out of date.
4. There are unexpected effects such as the deficit growing while the funding level improves.

We therefore recommend that triggers should be reviewed after each significant de-risking step is made. In addition, any trigger should be reviewed on a regular basis as a matter of course.

### Framework for action

In the event a trigger level is reached, Hymans will prepare a short paper covering, but not limited to the following areas/questions:

- The date the trigger was reached.
- What drove the improvement in funding level? What has the impact been on the deficit?
- How have markets moved since the date of the update? Have there been any material moves in equity or bond markets that may have significantly affected the position at the reporting date?
- What action is recommended? Diversifying the growth assets? Increasing the Fund allocation to matching assets? Are there any new asset classes which should be considered?
- Implementation. Should a transition manager be used? Can the CIV facilitate implementation? Are futures the most efficient and timely fashion to implement over the short term to ensure that the opportunity is not missed? Is a further procurement process required?

Once each of these areas has been considered, the summary paper will be sent to the Committee Chair and Group Director, Finance and Corporate Resources for approval prior to implementation. If approval is given the Officers and Hymans Robertson LLP will work together to implement as soon as reasonably practical.

### Triggers

In setting a trigger, it is important that the probability of achieving the funding level target in 2031 remains above a certain threshold, even at the lower risk strategy. The key question is what constitutes an acceptable probability of success (and therefore the level at which switches might be made)? In previous discussions with the Investment Committee a desire to maintain a c.70% probability of achieving a funding level of 100% in 2031 has been discussed. It is therefore necessary to assess where we are in relation to that objective now, before we consider triggers for further reductions in risk in the future.

As detailed above, we have based our analysis on seeking to maintain an equivalent likelihood of achieving the long term objective as under the current strategy and taking account of the funding level as at the analysis date of 31 December 2017. The graph below shows how the funding level has evolved since the valuation date.

Progression in funding level since last valuation


We note that the funding level at 31 December 2017 had improved to c83%. From the analysis above, we note that if the funding level were to improve by 5% relative to where the Fund expects to be (on a gilts +1.65% basis), then a 10% reduction in growth/income assets would retain an equivalent likelihood of success whilst also improving the downside risk metric.

It should also be noted that, relative to the position at 31 March 2016, the funding level is expected to improve by around 1.5% p.a. in order to achieve a funding level of 100% in 2031, i.e. the funding level at the valuation date was 77% with an objective of being 100% funded by 2031 (in 15 years' time). This equates to an expected 1.5% annual increase in funding level as a result of time passing.

The following table details the initial triggers that could be adopted to retain a c70% chance[1] of achieving the longer term objective, within the constraints of practicality and simplicity, based on changes in funding level and the reflecting the time factor.

**Table 1 De-Risking Triggers**

| Required Funding level on gilts +1.65% | | | Target Growth/ Income Allocation |
|---|---|---|---|
| **From 31/12/17** | From 31/12/18 | From 31/12/19 | |
| **88.0%** | 89.5% | 91.0% | 73% |

Our analysis suggests that a funding level of 88% today would allow a 73% growth/income strategy to be adopted and retain a c70% chance of achieving full funding on a gilts +1.65% basis in 2031.

In order that this trigger has some validity over time, we have extended the table to indicate the levels over the next two years, building in the principle that the funding level would be expected to improve over time, even if just on track for a given strategy.

[1] Any calculation of the probabilities depends on the model used and the calibrations of that model. These probabilities refer to the model as calibrated at the end of December 2017. Should evidence about the market or economy come to light that would suggest a major change to the long term parameters in the model, the parameters may change. We would recommend checking any major changes as part of a periodic review.

## Funding Update

The navigator report at the end of December 2017 indicates that the funding level on a gilts +1.65% basis was 83.2% and the deficit was c£310m. This represents a 6% improvement in funding level and a reduction of c£40m in deficit since the valuation date. Our modelling analysis took into account the changes in market conditions and increase in asset levels between 31 March 2016 (valuation date) and 31 December 2017, as a result we see this as a sensible starting point.

## Next steps

We recommend that the Committee consider and approve the following:

- The de-risking triggers for the Fund, i.e. 88% now, increasing to 89.5% from 1/1/19 and to 91% from 1/1/20;
- The principle of regular review of triggers;
- The process for implementing changes to the Fund asset allocation should the trigger level be breached, i.e. report to the Chair and Group Director, Finance and Corporate Resources for approval; and
- Delegate responsibility for reviewing the transition management arrangement for the Fund to ensure efficient implementation to the Officers.

If the Committee is in agreement with the recommendations detailed above, we would be pleased to work with the Officers regarding the remaining actions to ensure the Fund is in a position to capture future funding level improvements.

We look forward to discussing this paper with the Committee at the March meeting.

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For and on behalf of Hymans Robertson LLP

# Appendix 1: Investment Scenarios tested

| Asset Class | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 | Scenario 5 | Scenario 6 |
|---|---|---|---|---|---|---|
| | 100% growth | 83% growth (Current) | 83% growth/income | 73% growth/income | 63% growth/income | 53% growth/income |
| Equities | 68% | 61% | 51% | 45% | 40% | 33% |
| Absolute Return | 23% | 12% | 23% | 20% | 18% | 15% |
| Property | 10% | 10% | 10% | 8% | 6% | 5% |
| **Total growth** | **100%** | **83%** | **83%** | **73%** | **63%** | **53%** |
| Bonds | 0% | 17% | 17% | 27% | 37% | 47% |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

# Appendix 2: Reliances and limitations

### Data – Cashflows

To project forward the evolution of the Scheme we have used the same cashflows that were provided to us for use in the previous ALM exercise carried out in November 2016 as at 31 March 2016. We understand that these cashflows were generated using Hymans' actuarial valuation system and based on information provided for the 2016 actuarial valuation of the Scheme.

### Data – ESS

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

Key subjective assumptions are the average excess equity return over the risk free asset (tending to approximately 3% p.a. as the investment horizon is increased), the volatility of equity returns (approximately 18% p.a. over the long term) and the level and volatility of yields, credit spreads, inflation and expected (breakeven) inflation, which affect the projected value placed on the liabilities and bond returns. The market for CPI linked instruments is not well developed and our model for expected CPI in particular may be subject to additional model uncertainty as a consequence. The output of the model is also affected by other more subtle effects, such as the correlations between economic and financial variables.

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

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

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

We would be happy to provide fuller information about the scenario generator, and the sensitivities of the results to some of the parameters, on request.

### 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 in order to focus on the high level investment strategy decision.

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

### Assumptions

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

There are a number of different types of increases applied before and after retirement to benefits payable from the Scheme. We have made some simplifying assumptions when modelling the various types of increases.

In the modelling we have assumed that the Scheme 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 Scheme 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.

Judgement has been applied when deciding on suitable asset classes from the ESS to model the investment strategies under consideration. These are set out in Appendix A.

### Data

The current ALM uses the same cashflows as previously although we have allowed for accrual between the two sets of modelling.

The ESS reflects the December 2017 calibration. Expected returns and risk is shown below for both this time’s and last time’s modelling.

The current ALM takes into account the Scheme’s asset value as at 31 December 2017.

Contributions modelled this time are similar to the stabilised and fixed contributions modelled previously.

The “83% growth (Current)” investment strategy modelled is reasonably similar to the “Current” investment strategy modelled previously. The other investment strategies differ to varying degrees.

## Expected Rate of Returns and Volatilities

The following figures have been calculated using 5,000 simulations of the Economic Scenario Service, calibrated using market data as at 31 December 2017. All returns are shown net of fees. Percentiles refer to percentiles of the 5,000 simulations and are the annualised total returns over 5, 10 and 20 years, except for the yields which refer to the (simulated) yields in force at that time horizon.

| | | Annualised total returns | | | | | | | | | | | | Inflation | 17 year real yield | 17 year yield |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index Linked Gilts (medium) | Index Linked Gilts (long) | Fixed Interest Gilts (medium) | Corporate bonds (medium) | UK Equity | Overseas Equity | Structured Equity | Emerging Markets Equity | Multi Asset (Invesco/ GMO) | Multi Asset Credit (sub inv grade) | Private Lending | Property | | | |
| 5 years | 16th %'ile | -2.2% | -3.1% | -2.7% | -2.8% | -4.0% | -4.0% | -1.8% | -7.0% | -1.1% | 0.9% | 1.4% | -3.5% | 1.4% | -2.4% | 1.0% |
| | 50th %'ile | 0.5% | 0.4% | 0.4% | 0.5% | 3.9% | 4.1% | 3.3% | 4.3% | 3.0% | 3.7% | 4.0% | 2.4% | 2.9% | -1.5% | 2.3% |
| | 84th %'ile | 3.4% | 4.1% | 3.4% | 3.6% | 12.6% | 12.4% | 8.6% | 17.0% | 7.1% | 5.7% | 5.8% | 8.8% | 4.4% | -0.6% | 3.9% |
| 10 years | 16th %'ile | -1.5% | -2.5% | -1.0% | -0.7% | -1.2% | -1.2% | 0.2% | -3.1% | 0.6% | 2.0% | 2.2% | -1.3% | 1.6% | -1.9% | 1.4% |
| | 50th %'ile | 0.3% | -0.3% | 0.5% | 1.0% | 4.8% | 4.9% | 4.2% | 5.2% | 3.6% | 4.0% | 4.3% | 3.3% | 3.0% | -0.7% | 2.9% |
| | 84th %'ile | 2.2% | 1.9% | 2.0% | 2.6% | 11.1% | 10.9% | 8.2% | 13.9% | 6.8% | 5.8% | 6.2% | 8.0% | 4.6% | 0.4% | 5.0% |
| 20 years | 16th %'ile | -0.9% | -1.9% | 0.4% | 0.9% | 1.4% | 1.5% | 2.2% | 0.3% | 2.1% | 3.5% | 3.5% | 0.7% | 1.9% | -0.7% | 2.2% |
| | 50th %'ile | 0.5% | -0.4% | 1.3% | 2.0% | 5.9% | 5.9% | 5.3% | 6.3% | 4.7% | 5.2% | 5.5% | 4.4% | 3.1% | 0.8% | 4.0% |
| | 84th %'ile | 2.2% | 1.3% | 2.2% | 3.2% | 10.5% | 10.5% | 8.5% | 12.7% | 7.4% | 7.1% | 7.5% | 8.3% | 4.6% | 2.3% | 6.3% |
| | Volatility (Disp) (1 yr) | 7% | 9% | 10% | 10% | 16% | 16% | 10% | 25% | 9% | 7% | 5% | 14% | 1% | | |

It is important to be aware that the volatilities shown are the first year's volatilities and should only be used as such. The probability distributions for different asset classes are complex and attempting to extrapolate this first year volatility over a longer time period will almost certainly result in significant errors.

The current calibration of the model indicates that a period of outward yield movement is expected. For example, over the next 20 years our model expects the 17 year maturity annualised real (nominal) interest rate to rise from -1.7% (1.7%) to 0.8% (4.0%).