

LPFA Monthly Solvency Report as at 31 May 2017 Preliminary Month End Data

Purpose and summary

This report sets out an analysis of LPFA solvency as at 31 May 2017 together with an analysis of change from the end of April 2017. It also gives an indication of the approximate sensitivity of funding level to changes in economic and demographic assumptions.

Net Asset Values and LPFA Asset Mix at 31 May 2017:

Investment Perspective:

31 May 2017	Funds		Exposure		Policy Portfolio		
	£m	%	£m	%	Benchmark	Minimum	Maximum
Global Equities:	2,338.93	43.7%	2,728.33	50.9%	47.5%	40.0%	60.0%
Private Equity:	556.56	10.4%	556.56	10.4%	7.5%	5.0%	15.0%
Fixed Income:	0.00	0.0%	0.00	0.0%	2.5%	0.0%	15.0%
Infrastructure:	241.46	4.5%	241.46	4.5%	7.5%	5.0%	15.0%
Credit:	182.84	3.4%	182.84	3.4%	7.5%	0.0%	10.0%
Real Estate:	348.95	6.5%	348.95	6.5%	10.0%	5.0%	15.0%
Total Return:	776.68	14.5%	776.68	14.5%	15.0%	0.0%	20.0%
Cash:	760.81	14.2%	371.41	7.0%	2.5%	0.0%	10.0%
<i>Diversified Growth Fund:</i>	<i>151.94</i>	<i>2.8%</i>	<i>151.94</i>	<i>2.8%</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Total	5,358.17	100%	5,358.17	100%	100.0%		

- The 31 May 2017 asset values are **provisional, based on preliminary data** from the custodian JP Morgan as at 19 June 2017 and are therefore subject to change.
- In the funds table preliminary asset data from JP Morgan has been grouped by asset class.
 - Total return includes the Insight bonds plus hedge fund and Blackrock hedge fund
 - Commodities are included in the infrastructure line
 - The Blackrock co-investment is included in credit
 - Cash includes the mark to market (MTM) of the currency hedge and the Liability Driven Investment (LDI) portfolio
- The data in the exposure table has been produced by adjusting the funds table:
 - Net synthetic equity exposure of £389m has been removed from the cash line and added to the equities line.
 - Derivative mark to market values, the Insight LDI fund and the currency hedge remain treated as being functionally equivalent to cash and included within the cash line.

- For the purposes of the sensitivity analysis in this report the exposure table is adjusted further to reflect the diversified growth fund assets as follows:

Diversified growth fund assets split 36% public equities, 31% fixed income, 31% cash, c2% real estate, and < 1% hedge funds

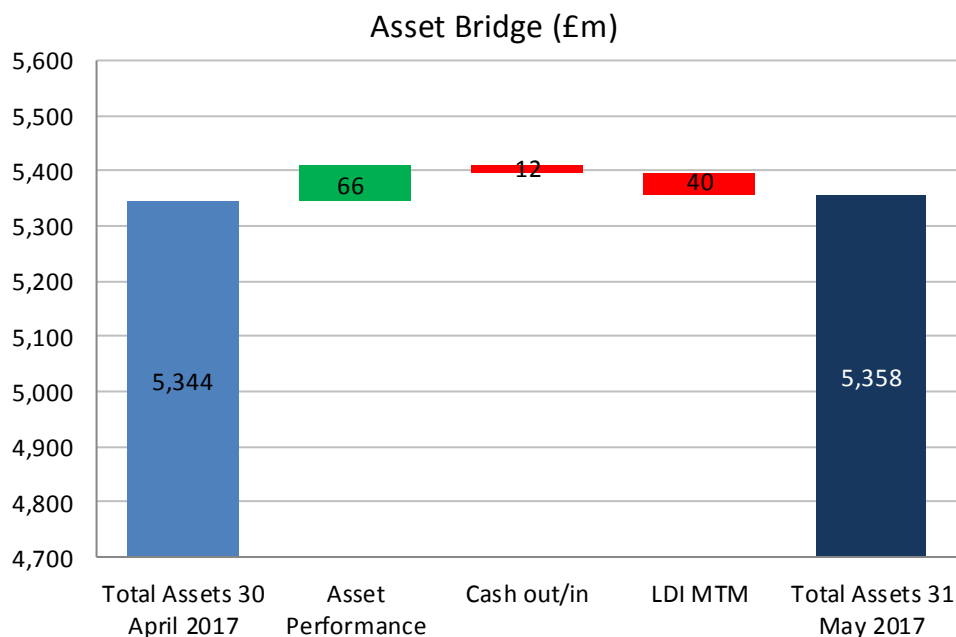
Risk Perspective:

31 May 2017	Risk Exposure		Policy Portfolio		
	£m	%	Benchmark	Minimum	Maximum
Equities:	2,783.39	51.9%	47.5%	40.0%	60.0%
Private Equity:	556.56	10.4%	7.5%	5.0%	15.0%
Fixed Income:	46.56	0.9%	2.5%	0.0%	15.0%
Infrastructure:	241.46	4.5%	7.5%	5.0%	15.0%
Credit:	182.84	3.4%	7.5%	0.0%	10.0%
Real Estate:	351.43	6.6%	10.0%	5.0%	15.0%
Total Return:	777.44	14.5%	15.0%	0.0%	20.0%
Cash:	418.49	7.8%	2.5%	0.0%	10.0%
Total	5,358.17	100%	100%		

- The risk exposure table excludes the interest rate and inflation rate exposure of the LDI portfolio. As at end May 2017 the LDI portfolio has a £0.9m per basis point interest rate exposure (PV01) and a £5.3m per basis point inflation rate exposure (IE01). The risk exposure table and the interest rate and inflation rate exposure of the LDI portfolio have been used to produce the sensitivity information on page 6.
- The LPFA credit portfolio is invested in relatively illiquid sub investment grade credit.
- Around 15% of Public and Private Equity is invested in the UK equity market, with the majority of equity exposure taken in the United States.
- LPFA has established a foreign exchange hedging program to reduce currency risk but overall, after allowance for that program, LPFA is short of around GBP1.6bn Sterling, mainly against USD (GBP 1bn) and EUR (GBP 300m).
- In the risk exposure table, over May net cash decreased from around 9.6% to 7.8% of the Fund. The movements in net cash and cash equivalents are detailed below:

	30 April 2017 £m	31 May 2017 £m	Change over May £m
Cash at bank and GLA (preliminary data from JPM)	353	312	-41
Currency hedge	38	18	-20
Net synthetic equity exposure	-380	-389	-9
Insight LDI sub-portfolio	347	311	-36
Diversified Growth Fund cash and cash equivalents	47	47	0
Cash held in Insight synthetic equity account	109	119	10
Risk Exposure Cash Total	514	418	-96

The change in total net asset value over May 2017 is explained as follows:



Inflation Hedging/LDI Portfolio

LPFA previously hedged both interest rates and inflation with the aim to protect the Swaps Flat balance sheet from falling interest rates and/or rising inflation. The interest rate hedge was subsequently closed, with a 25% inflation hedge left in place.

In December 2013 the interest rate exposure of the liability hedging benchmark was close to zero. However, since December 2013 inflation expectations have fallen and as a result interest rate exposure has emerged on the LDI portfolio.

Insight Investment manage the inflation hedge. The Insight benchmark behaves like a portfolio of inflation swaps designed to hedge inflation. As inflation expectations have fallen since the swaps were traded, the swaps have accrued negative mark to market valuations. This in turn has created a positive PV01. **This means that currently the LDI portfolio falls in value if interest rates fall.**

As at 31 May 2017, if interest rate expectations fall by 0.1% p.a. the LDI portfolio will fall by approximately £9m, (compared to £7m in December 2016 and £15m in June 2016). If inflation falls by 0.1% the LDI portfolio will fall by approximately £53m.

The PV01 of the liabilities on the Triennial valuation basis has not changed significantly over the last six months. The LDI portfolio is more sensitive to interest rate changes than the Triennial liabilities and the impact of the interest rate sensitivity of the LDI portfolio is greater on the Triennial valuation balance sheet than it is on the Swaps Flat balance sheet.

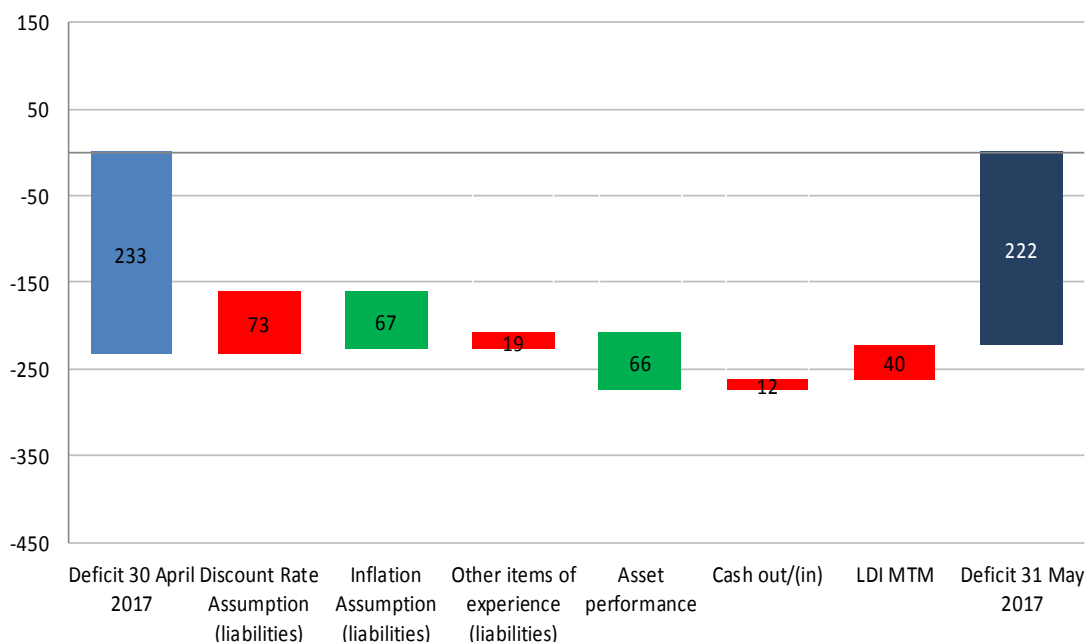
The interest rate sensitivity of the LDI portfolio is being monitored and officers are considering the action to take to manage it.

Balance Sheet Modelling

Triennial Valuation Basis

	31 May 2017	30 April 2017
Estimated liabilities triennial valuation basis	£5,136m	£5,111m
Estimated NAV	£5,358m	£5,344m**
Deficit triennial valuation basis	(£222m)	(£233m)
Estimated triennial funding level (Barnett Waddingham basis)*	104.3%	104.6%

Deficit Bridge (Unsmoothed Triennial Valuation Basis) (£m)



- **Unsmoothed 31 May 2017 Triennial valuation assumptions are supplied by Barnett Waddingham. The discount rate references the LPFA Fund's long term policy portfolio asset allocation benchmark (see table page 1).**
- During May 2017 the Triennial funding level decreased slightly to 104.3%. Decreasing inflation decreased the Triennial discount rate and increased the liabilities although the effect of this was broadly offset by a corresponding decrease in the size of expected future liability payments. Positive asset performance offset the negative MTM on the LDI inflation hedge portfolio, which was caused by decreasing inflation expectations.
- The assumption for long term future RPI inflation, based on the 20 year point of the Bank of England implied inflation curve¹, decreased from 3.7% p.a. to 3.6% p.a.

* Estimated snapshot of funding level using 2016 Triennial valuation assumptions updated for changes in market conditions, without smoothing.

** Updated post delivery of end April solvency report to reflect final month end assets from the custodian, JP Morgan.

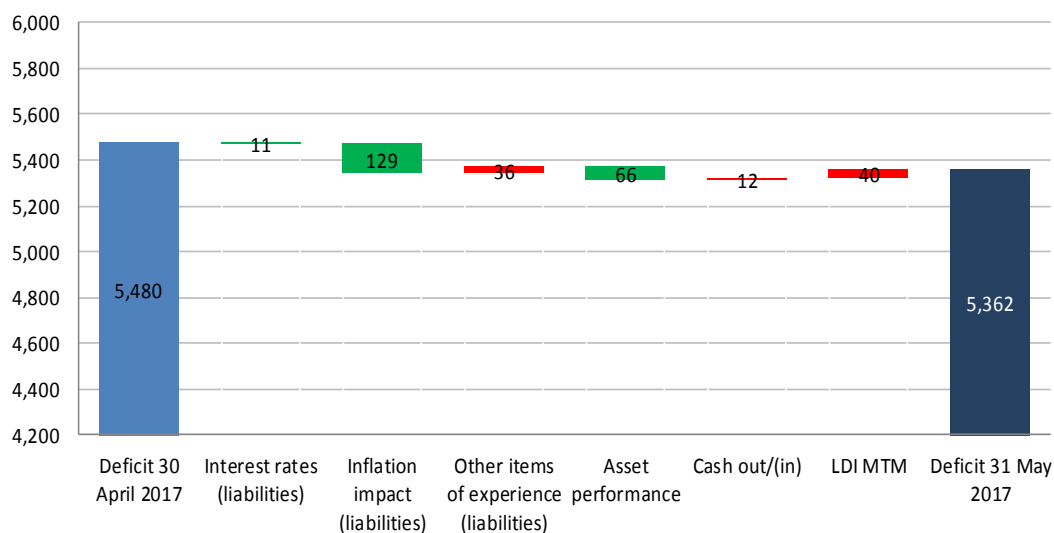
¹ Please note that the Bank of England has temporarily suspended the publication of their implied inflation curve while they carry out a review of their methodology. It's not clear how long this review will take. Barnett Waddingham has estimated the BoE implied inflation curve using Merrill Lynch data.

Swaps Flat (Swaps + 0%) Basis

At the request of the Board, as well as reporting on the Triennial valuation basis, we report results on a Swaps Flat basis. Please note that the primary focus of the Board and the Board's main duty is to manage the Fund's Triennial balance sheet.

	31 May 2017	30 April 2017
Estimated liabilities Swaps Flat (swaps +0%) basis	£10,720m	£10,824m
Estimated NAV	£5,358m	£5,344m**
Deficit swaps + 0% basis	£5,362m	£5,480m
Estimated funding level swaps + 0% basis*	50.0%	49.4%

Deficit Bridge (Swaps + 0% Basis) (£m)



- The Swaps Flat funding level increased by 60bp during May 2017.
- Inflation expectations decreased at nearly all durations (see graphs in appendix 3), which decreased the liabilities.

** Updated post delivery of end April solvency report to reflect final month end assets from the custodian, JP Morgan.

Approximate Risk Sensitivities

	Unsmoothed Triennial Valuation Basis	Swaps Flat Valuation Basis
Equities fall by 10%		
Assets	decrease by £306m	decrease by £306m
Liabilities	decrease by £113m	unchanged
Deficit	increases by £193m	increases by £306m
Interest rates (swaps and gilts) fall by 1%		
Assets	decrease by £66m	decrease by £66m
Liabilities	increase by £135m	increase by £2,400m
Deficit	increases by £201m	increases by £2,466m
Inflation rises by 1%		
Assets	increase by £530m (LDI portfolio inflation hedge)	increase by £530m (LDI portfolio inflation hedge)
Liabilities	increase by £490m	increase by £2,350m
Deficit	decreases by £40m	increases by £1,820m
Long term rate of mortality improvement increases by 1.0%		
Assets	unchanged	unchanged
Liabilities	increase by £208m	increase by £815m
Deficit	increases by £208m	increases by £815m
10% decrease in member mortality rates		
Assets	unchanged	unchanged
Liabilities	increase by £136m	increase by £447m
Deficit	increases by £136m	increases by £447m
Property decreases by 10%		
Assets	decrease by £35m	decrease by £35m
Liabilities	unchanged	unchanged
Deficit	increases by £35m	increases by £35m
Sterling weakens by 10% against all other currencies		
Assets	increase by £160m	increase by £160m
Liabilities	unchanged	unchanged
Deficit	decreases by £160m	decreases by £160m

This analysis is based on the LPFA risk adjusted asset mix at 31 May 2017. As such, the Triennial sensitivities shown in the table are slightly inconsistent with the Triennial solvency results shown earlier. If the 2016 Triennial solvency calculation was to be re-performed using the risk adjusted asset mix as at 31 May 2017, it is estimated that the unsmoothed Triennial discount rate would be 5.50% rather than the discount rate of 5.6% supplied by Barnett Waddingham, which uses the LPFA policy portfolio benchmark. The analysis considers the approximate funding level immediately after each event. Allowance is made for changes to the assets and discount rate as a result of the market movements described and for the discount rate to reflect the immediate effect on asset allocation **before any rebalancing to the long term policy portfolio benchmark.**

Recommendations:

[1] Executive Committee is asked to note this report.

Report date: 21 June 2017

Lead Officer: Tom Richardson

Compliance Checks

Governance issues:

The monthly solvency report is provided to all Board Members and is published on LPFA's website monthly. It is a key document to track the financial development of the fund.

Financial implications:

Implicit in this report.

Legal implications:

None – The production of this report is voluntary in nature.

Risk implications:

This report is part of the process to manage and monitor the key investment and financial risks facing the fund.

Equalities impact:

Scheme Members will have the opportunity to request alternative formats as required.

Social, environmental, health and ethical issues:

The move to greater online publication is in line with LPFA's environmental initiatives.

Communication issues:

The report is published monthly on the LPFA website.

Other relevant / supporting documentation:

None.

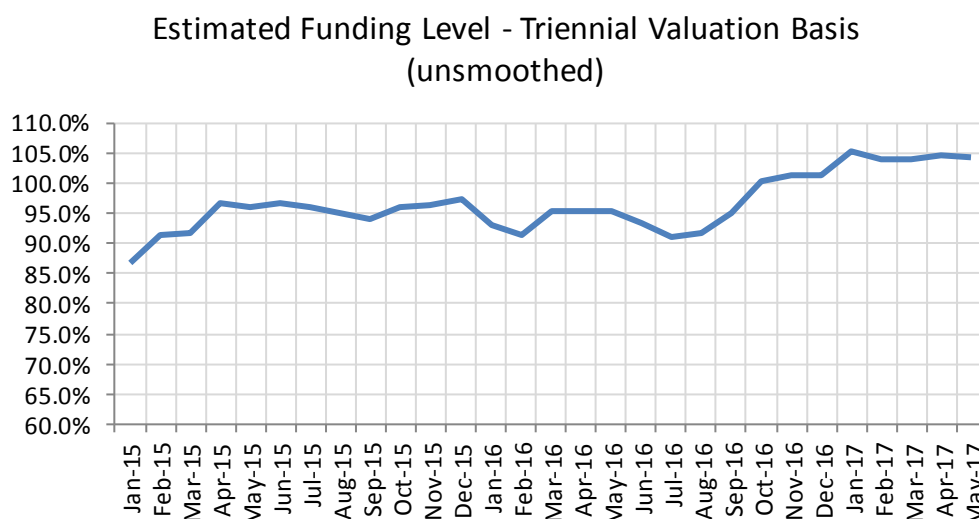
This report has been prepared for the LPFA and LPP Boards and it is for their exclusive use.

Its purpose is to provide an analysis of LPFA Fund solvency. The report has been prepared for the benefit of providing information to LPFA and LPP only. It does not provide advice and should not be relied upon for any other purpose without seeking further advice.

No other parties may rely or make decisions based on the content of this document. LPP and its employees acknowledge no liability to other parties.

Estimated Funding Position – 2016 Triennial Valuation Basis

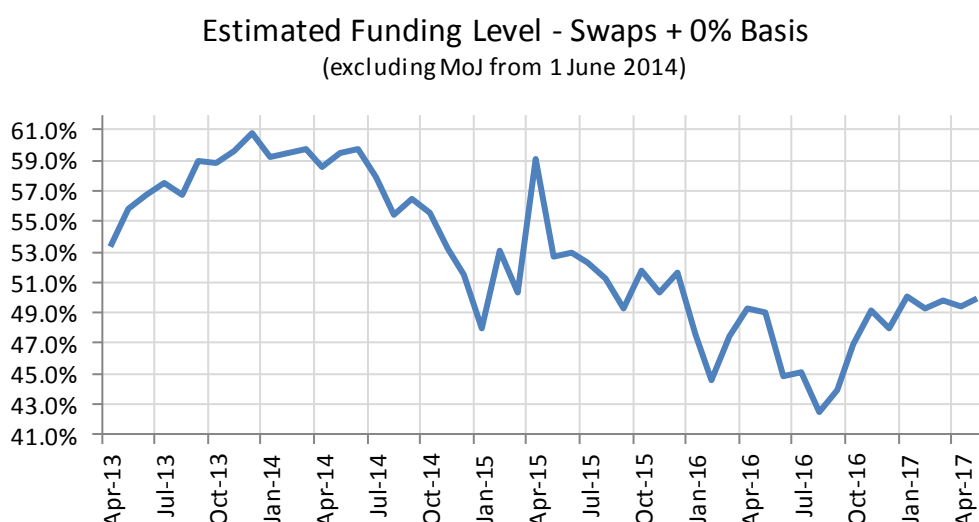
The graph below shows the estimated Triennial funding level since January 2015.



Details of the Triennial valuation assumptions are in appendix 2.

Estimated Funding Position – Swaps Flat (Swaps + 0%) Basis

The graph below shows the estimated Swaps Flat funding level progression. The funding position after 1 June 2014 excludes the MoJ liabilities and after 1 February 2015 also excludes the Serco liabilities as part of the MoJ transfer.



The May Swaps Flat and (unsmoothed) Triennial liabilities were calculated using the Barnett Waddingham Valuations on Demand (VoD) system developed for LPFA. **The liability output from VoD has been adjusted this month to allow approximately for estimated 31 March 2017 renewal data changes.**

Whilst the funding calculations allow for movements in assets and movements in liabilities resulting from changes in interest rates, inflation and membership information, the funding update information must only be viewed as approximate.

Data

The 31 May 2017 liabilities have been calculated using 31 March 2016 membership data. **The output from VoD has been adjusted this month to allow approximately for estimated 31 March 2017 renewal data changes. Annual renewal data is not expected to be reflected in full on the membership database until at least end June 2017 as it is put through a checking and cleaning process once it is received from the Fund employers.**

Assets

The value of the assets used to calculate the funding level is a preliminary estimate provided by JP Morgan of net asset value at the month end. Estimates of the assets used in prior months may be updated once the assets have been reconciled by the custodian.

Assumptions

2016 Triennial Valuation Basis:

For the purpose of estimating the funding position on the Triennial Valuation basis the financial assumptions and assets have not been smoothed. For the formal Triennial valuation of the Fund at 31 March 2016 the financial assumptions and the assets are smoothed over the six month period from 31 December 2015 to 30 June 2016.

The unsmoothed financial assumptions at 31 May 2017, **supplied by Barnett Waddingham** were as follows:

Discount Rate	5.6% p.a.
Retail Prices Index Inflation (RPI)*	3.6% p.a.
Consumer Prices Index (CPI) Inflation	2.7% p.a.
Long Term Salary Increases post 2020	4.2% p.a.

***Please note that the Bank of England has temporarily suspended the publication of their implied inflation curve while they carry out a review of their methodology. It's not clear how long this review will take. Barnett Waddingham has estimated the BoE implied inflation curve using data from Merrill Lynch.**

The asset mix used to calculate the discount rate is based on the LPFA Fund's policy portfolio benchmark as detailed on page 1.

The demographic assumptions are those used for the 31 March 2016 Triennial Fund valuation. Details of the assumptions are contained in Barnett Waddingham's final results paper dated 24 March 2017.

Swaps Flat (Swaps + 0%) Basis:

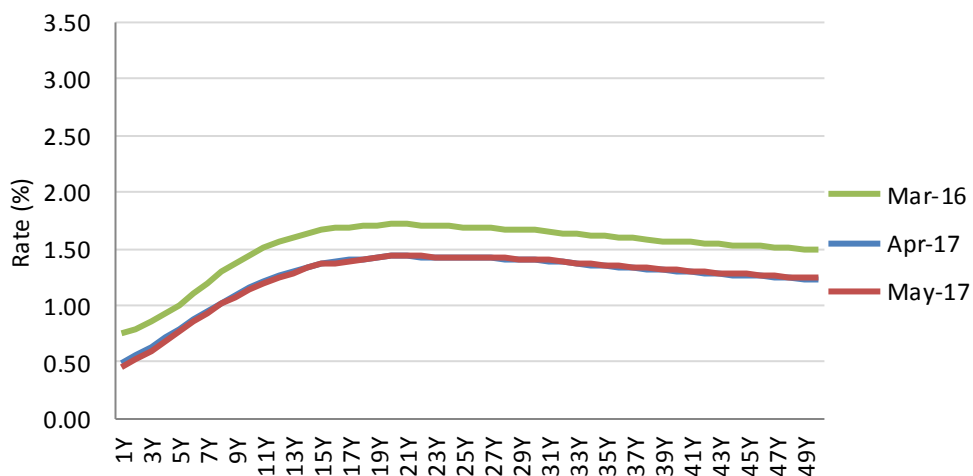
The liabilities are calculated by discounting expected future cashflows using a swap² yield curve (based on a GBP LIBOR zero curve) obtained from Bloomberg and allowing for market expectations of Retail and Consumer Price Inflation (CPI). Retail Price Inflation (RPI) has been based on a swap inflation curve based on the UK RPI swap market, with pricing provided by Bloomberg. The CPI assumption is equal to the RPI assumption with a deduction of 0.9% per annum. Demographic assumptions are those used for the LPFA Fund's 31 March 2016 Triennial valuation.

² A swap is an agreement between two parties to exchange cashflows in the future with the swap rate being the fixed rate paid in exchange for a floating rate

The graphs below show the current swap yield and swap inflation curves (used to calculate the liabilities for the Swaps Flat basis) along with the curves from March 2017 and the previous Triennial valuation date, for comparison.

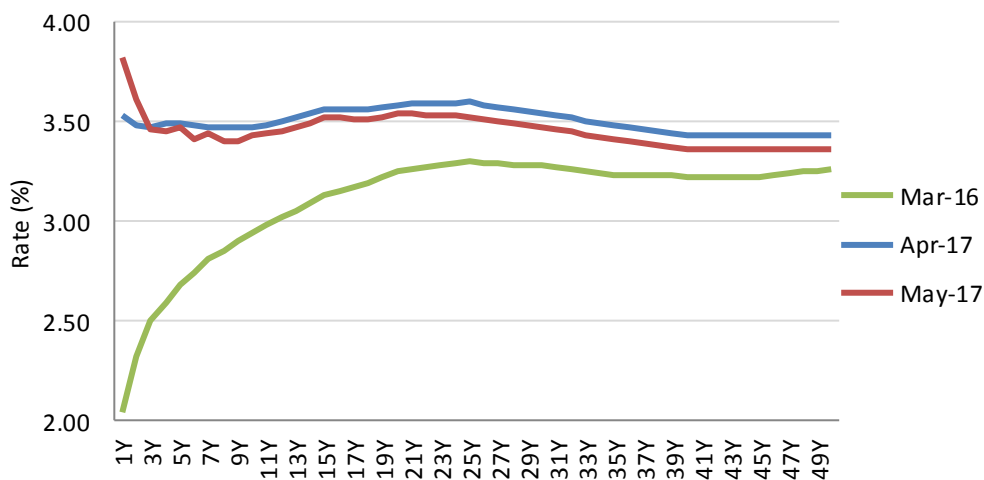
The curves only exist for durations up to 50 years and it is assumed that the rates are flat beyond this point, where rates are not available in earlier years then these have been calculated using linear interpolation.

Interest Rate Curves (Spot Rates)



Source: Bloomberg

Inflation Curves (Spot Rates)



Source: Bloomberg

Liability Cashflows

The graph below shows undiscounted expected future liability cashflows. These cashflows allow for future expectations of inflation as assumed in the Swaps Flat basis. The cashflows if inflation was 0.1% p.a. higher at all points along the curve are also shown in order to show the cashflows' sensitivity to inflation.

