

Market Price Monitor

Local Equity Markets

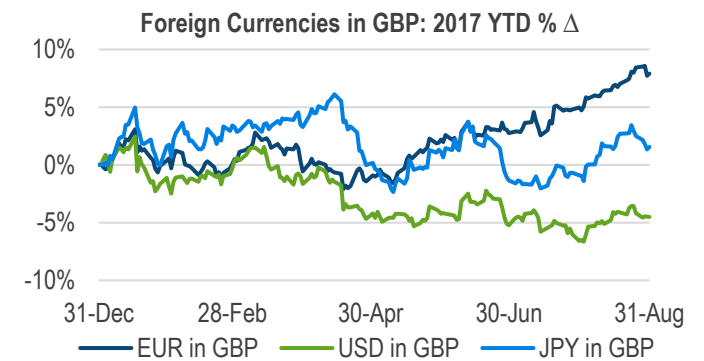
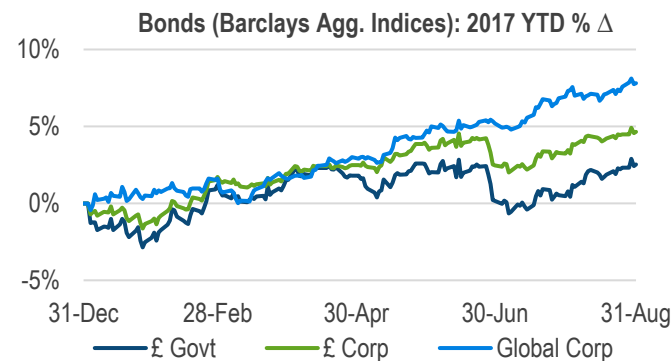
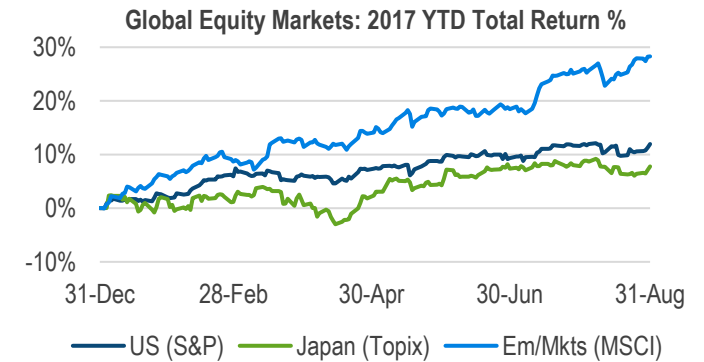
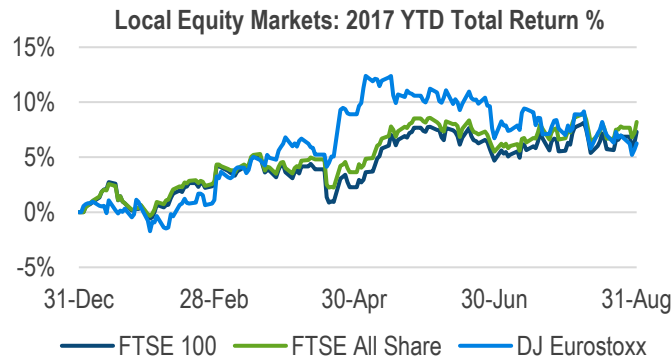
- European equity markets posted mixed results in August, with geopolitical tensions leading to increased volatility during the month.
- The FTSE 100 gained over 1.5% during August, with the continual depreciation in the £ Sterling. In contrast, the Eurostoxx fell around 0.7%, on the back of further strengthening of the Euro.

Global Equity Markets

- Despite an increase in price volatility, the US and the Japanese equity markets remained relatively unchanged over the month.
- Emerging Markets equity continues to be one of the best performing assets, gaining over 2% over in August, despite starting the month 2% down.

Bond/FX Markets

- Corporate and government bond values increased in August. The UK gilt index increased by over 2% in the month, making it one of the best performing asset classes.
- The £ Sterling depreciated more than 2% against all 3 other major currencies this month, with further recent sluggish growth data and lower-than-expected inflation meaning no change in interest rate policy yet from the Bank of England, despite unemployment being at an historic low.



Total Returns as of August 31, 2017

	FTSE 100	FTSE All Share	DJ Eurostoxx	US (S&P)	Japan (Topix)	Em/Mkts (MSCI)	£ Govt	£ Corp	Global Corp	EUR in GBP	USD in GBP	JPY in GBP
1 Month	1.6%	1.4%	-0.7%	0.3%	0.0%	2.2%	2.1%	1.4%	0.8%	2.8%	2.2%	2.5%
3 Month	0.0%	0.0%	-3.4%	3.0%	3.3%	9.4%	0.2%	0.9%	2.9%	5.6%	-0.3%	0.5%
1 Year	14.0%	14.3%	16.1%	16.2%	24.3%	24.5%	-3.5%	0.6%	3.3%	8.5%	1.6%	-4.4%
YTD	7.3%	8.2%	6.3%	11.9%	7.8%	28.3%	2.5%	4.6%	7.8%	7.9%	-4.5%	1.6%

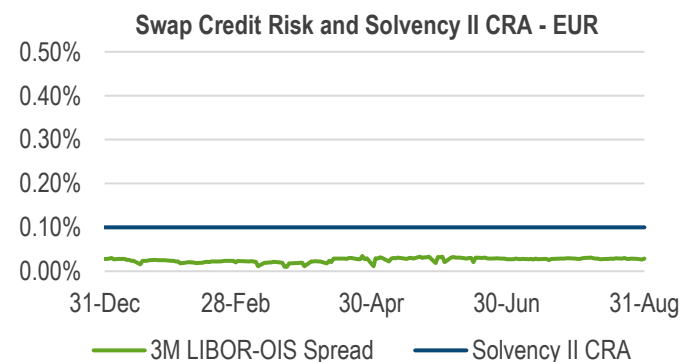
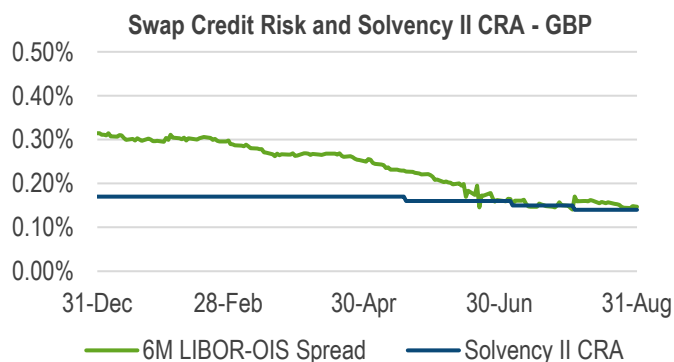
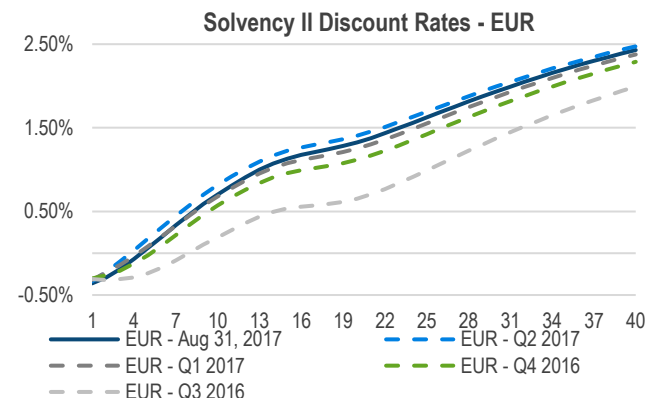
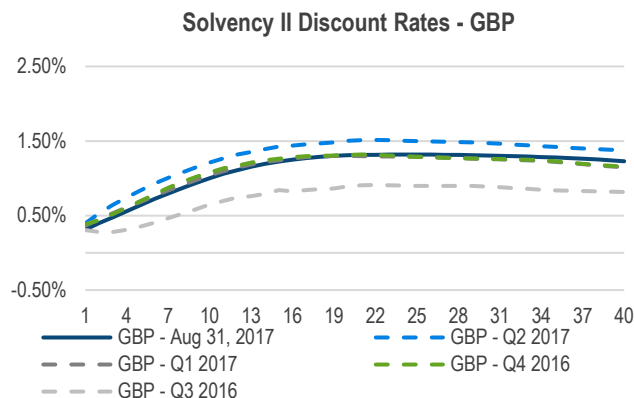
Solvency II Monitor - Rates

Risk Free Rates

- The GBP Solvency II discount curve decreased in August, with some falls in excess of 15 basis points at terms more than 10 years.
- The EUR interest rate curve also decreased, with falls of more than 15 basis points observed at terms between 10 and 20 years.

Credit Risk Adjustment

- The GBP CRA decreased by 1 basis point this month. The actual LIBOR-OIS spread has now converged to the Solvency II CRA level.
- The EUR CRA continues to remain at the 10 basis points floor, with the actual LIBOR-OIS spread remaining close to 0%.



Change in GBP Discount and CRA (bps)						
	1Y	Y5	Y10	Y20	Y30	CRA
Since Q2 2017	-8	-20	-21	-19	-17	-2
Since Q1 2017	-5	-4	-4	1	5	-3
Since Q4 2016	-7	-5	-8	-1	4	-3
Since Q3 2016	0	29	35	42	42	-2

Change in EUR Discount and CRA (bps)						
	1Y	Y5	Y10	Y20	Y30	CRA
Since Q2 2017	-3	-11	-12	-8	-6	0
Since Q1 2017	-4	-2	3	7	7	0
Since Q4 2016	-6	9	13	21	18	0
Since Q3 2016	-5	30	52	67	56	0

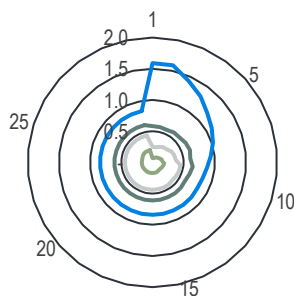
Solvency II Monitor - Spreads

Fundamental Spreads

- The fundamental spread data shown is for end of July.
- There were no material changes compared to the end of June.

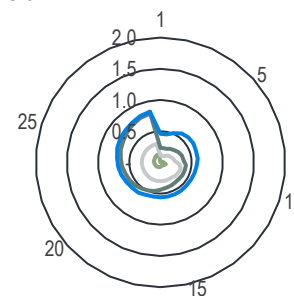
Fundamental Spreads %

GBP - Financial



GBP Financial Fundamental Spread %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.07	0.11	0.18	0.17	0.2
AA	0.25	0.31	0.45	0.44	0.44
A	0.58	0.59	0.62	0.61	0.61
BBB	1.59	1.18	0.84	0.84	0.84
GBP Financial 'Before Floor' %					
	1Y	Y5	Y10	Y20	Y30
AAA	0	0.04	0.07	0.14	0.2
AA	0.04	0.07	0.11	0.19	0.28
A	0.07	0.14	0.22	0.37	0.51
BBB	0.18	0.29	0.4	0.57	0.7

GBP - Non-Financial



GBP Non-Financial Fundamental Spread %					
	1Y	Y5	Y10	Y20	Y30
AAA	0	0.02	0.09	0.09	0.13
AA	0.11	0.16	0.34	0.3	0.3
A	0.23	0.29	0.41	0.55	0.8
BBB	0.46	0.6	0.57	0.61	0.83
GBP Non-Financial 'Before Floor' %					
	1Y	Y5	Y10	Y20	Y30
AAA	0	0.02	0.04	0.09	0.13
AA	0	0.04	0.08	0.17	0.26
A	0.04	0.15	0.29	0.55	0.8
BBB	0.12	0.24	0.38	0.61	0.83

The **Solvency II risk-free discount rates** are based on applying the Smith-Wilson Extrapolation to LIBOR swap rates sourced from Bloomberg (current curve is for 31/08/17) and applying the Credit Risk Adjustment as defined in the Technical Specs.

The **Credit Risk Adjustment** is a component of the risk-free discount curve defined by EIOPA. It is calculated from actual experience in the 'LIBOR-OIS' spread (3 months for EUR, 6 months for GBP), and is bounded between 0.10 and 0.35. We show actual LIBOR-OIS spread levels and the defined CRA, for both GBP and EUR.

EIOPA fundamental spreads show the credit spread corresponding to the risk of default or downgrading of an asset. This is shown here across financial and non-financial assets, credit quality steps 0-3 and durations of 1-30 years. The data is provided by EIOPA and as of 31/07/17. **Fundamental spread** = maximum (probability of default + cost of downgrade; 35% of long-term average spread). In the tables we show the 'before floor' measure = probability of default + cost of downgrade.

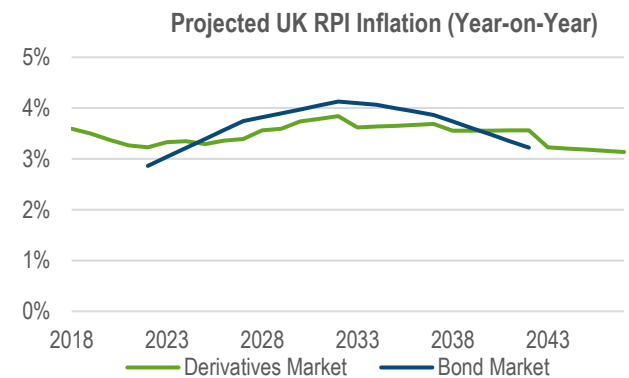
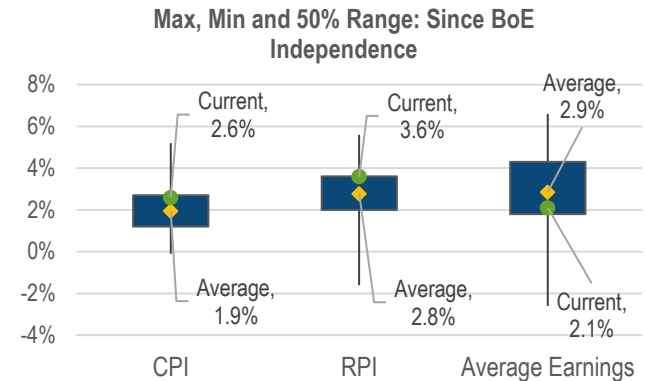
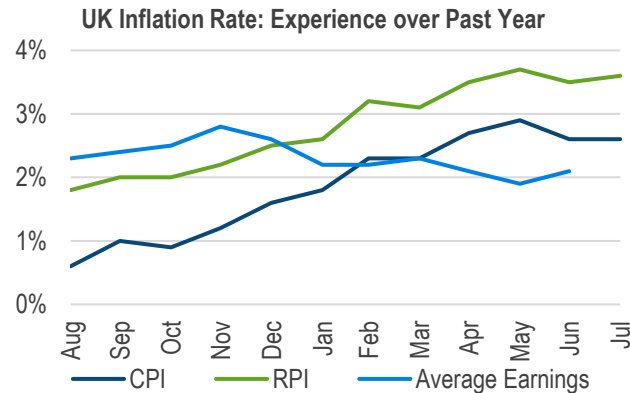
Milliman Financial Risk Management

London Market Monitor – 31 August 2017

Data sources: Bloomberg; Barclays; EIOPA; Oxford-Man Institute; ONS; Milliman FRM

UK Inflation Monitor

- UK CPI price inflation rate was 2.6% in July, unchanged from June.
- The annual earnings inflation has bounced up slightly from its lowest level for the year, narrowing the gap slightly with price inflation.
- According to ONS: *The price of motor fuel continued to fall and provided the largest downward contribution to change... This was offset by smaller upward contributions from a range of goods and services.*
- The market implied view shows expectation that RPI will remain above 3% for some years to come. This is broadly consistent with the view from the previous month.



Historical year-on-year inflation rate is assessed by the % change on:

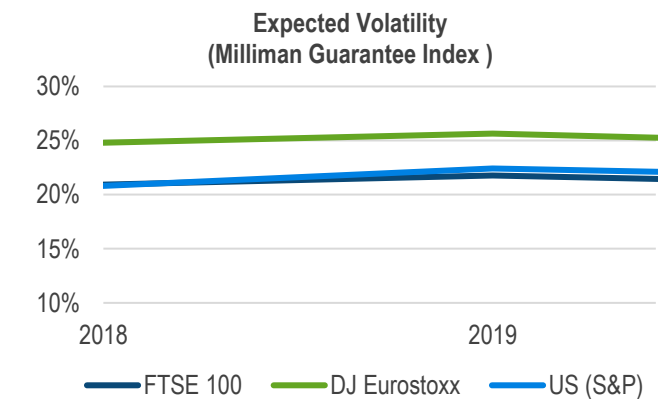
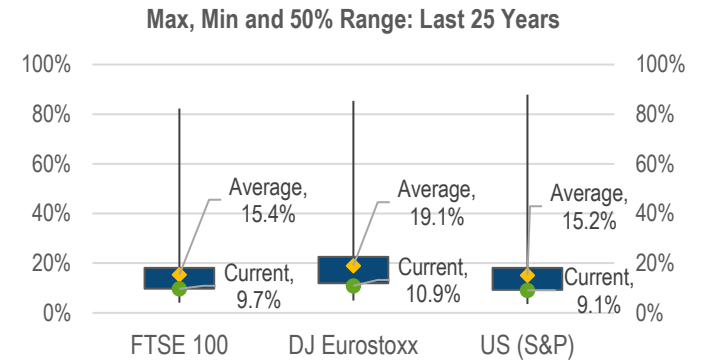
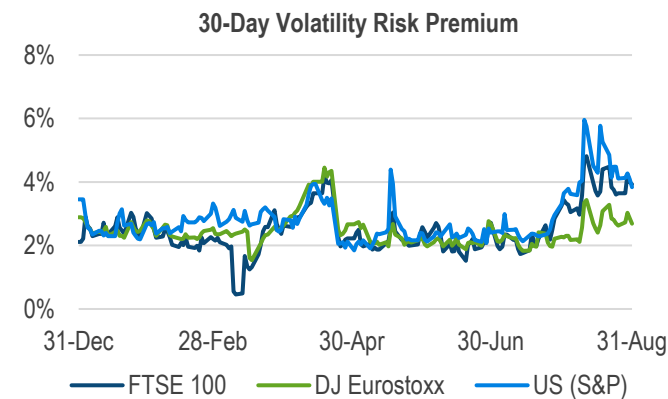
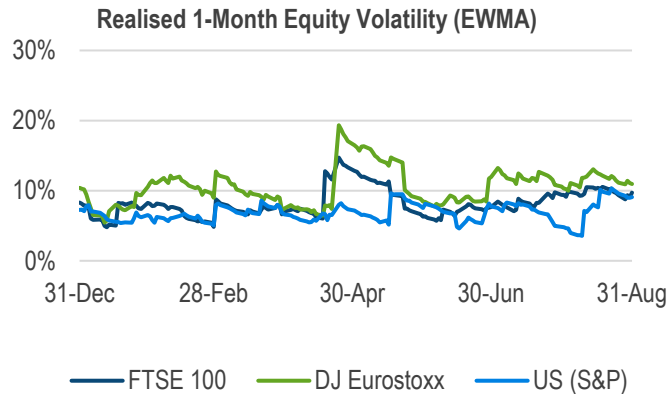
- **Consumer Price Index (CPI)** – measuring the monthly price of a basket of consumer goods and services
- **Retail Price Index (RPI)** – similar to CPI, but the main difference due the addition of mortgage payments, council tax and other housing costs
- **Average Earnings** – measuring the average total weekly employee remuneration over the previous 3 months.

Projection year-on-year inflation rate is the forward rate calculated from market data:

- **Derivatives Market View** – constructed from zero coupon inflation par swap rates against the RPI index at various tenors
- **Bond Market View** – constructed from the difference between the nominal rates implied by the conventional gilts and the real rates implied by the index-linked (RPI) gilts.

Volatility and Hedging Cost Monitor

- Realised volatility on the major equity indices picked up towards the end of the month. In particular, the S&P index's realised volatility jumped from a 2017 low at the start of the month to a 2017 high at the end of the month, in part driven by various geopolitical events, with the terrorist attack in Spain and escalating tensions in the Korean peninsula.
- These events also elevated the base level for all equity implied volatilities, more so than realised volatilities. Consequently, the volatility risk premiums have trended upwards in the month, with large spikes signalling risk aversion on days with heightened tensions. The FTSE 100 and S&P index sustained some of its highest risk premium levels for the year.



Actual realised equity volatility is measured by the weighted standard deviation of 1 month daily index change. The Exponentially Weighted Moving Average (EWMA) methodology places more importance to the recent returns in the calculation of the volatility.

Volatility Risk Premium is estimated as the difference between 30-day implied volatility and projected realised volatility (on data from the Oxford-Man Institute). This reflects the additional cost of hedging from purchasing a basket of options, in comparison to managing a dynamic delta hedge with futures (ignoring rolling transaction costs).

Expected realised volatility is an intermediate result from the [Milliman Guarantee Index™ \(MGI\)](#), which provides volatility parameters for variable annuity guarantee (VA) valuation and risk management. The levels shown are on an expected basis, and do not reflect any risk adjustment.