Market Price Monitor

Local Equity Markets

- European equity reached a peak for the year at the very start of the month, before declining across the rest of November.
- The slump in the Eurostoxx 50 index coincided with a strengthening of the Euro during the month. Despite the decline, the index is heading into the year end with a more than 10% gain.
- The FTSE 100 wiped out all of its gains from October, as £ Sterling strengthened against the US Dollar. Overall, it underperforms in 2017 relative to other equity markets.

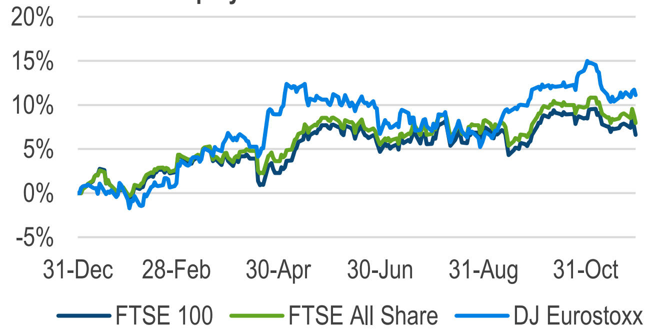
Global Equity Markets

- Outside of Europe, the markets made positive gains in November.
- The S&P 500 index posted a gain of just 3%, as the US tax reform bill is looking increasingly likely to be passed.

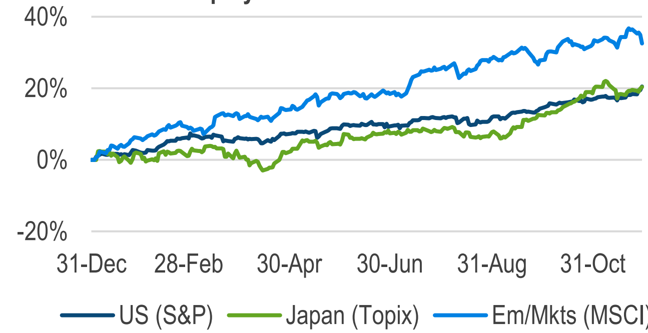
Bond/FX Markets

- Corporate and government bond values changed marginally in November. The UK government bond index is now in the positive territory for its year-to-date return.
- The £ Sterling advanced against the US Dollar and the Japanese Yen, but declined against the Euro.

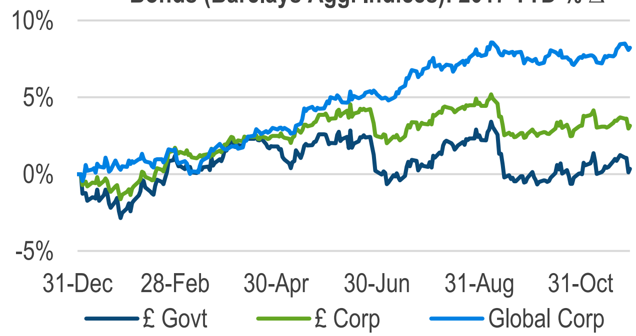
Local Equity Markets: 2017 YTD Total Return %



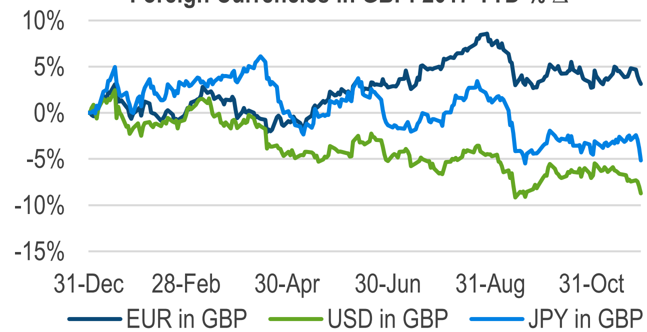
Global Equity Markets: 2017 YTD Total Return %



Bonds (Barclays Agg. Indices): 2017 YTD % Δ



Foreign Currencies in GBP: 2017 YTD % Δ



Total Returns as of November 30, 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	-1.8%	-1.7%	-2.8%	3.1%	1.5%	0.2%	0.3%	0.0%	0.6%	0.4%	-1.8%	-0.8%
3 Month	-0.7%	-0.2%	4.6%	7.6%	11.7%	3.3%	-2.1%	-1.4%	0.4%	-4.4%	-4.4%	-6.6%
1 Year	12.3%	13.4%	19.9%	22.9%	24.5%	32.8%	2.3%	5.6%	8.7%	4.0%	-7.5%	-6.0%
YTD	6.6%	7.9%	11.1%	20.5%	20.3%	32.5%	0.3%	3.1%	8.2%	3.1%	-8.7%	-5.2%

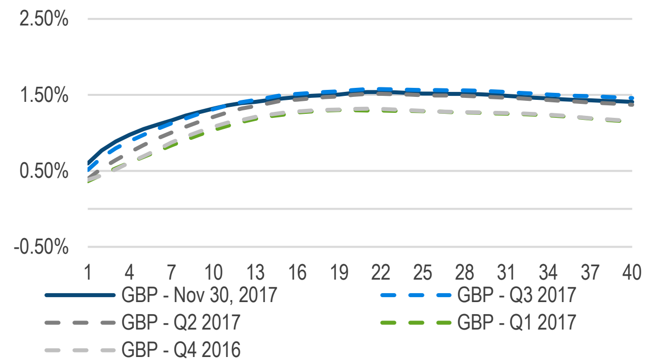
Solvency II Monitor - Rates

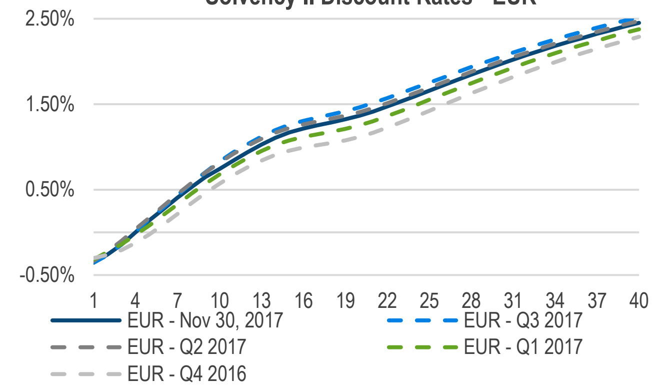
Risk Free Rates

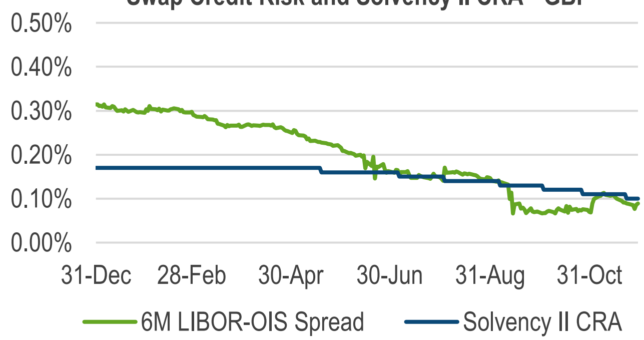
- The GBP Solvency II discount rate increased across the most of the curve, by as much as 6 basis points in the medium term. The long term rate marginally decreased. The Bank of England increased its base interest rate by 25 basis points at the start of the month. The impact to the interest rate curve was small, as the rise had largely already been priced in by the market.
- Similarly, the EUR Solvency II discount rate increased at the shorter end of the curve, and decreased for medium and long terms.

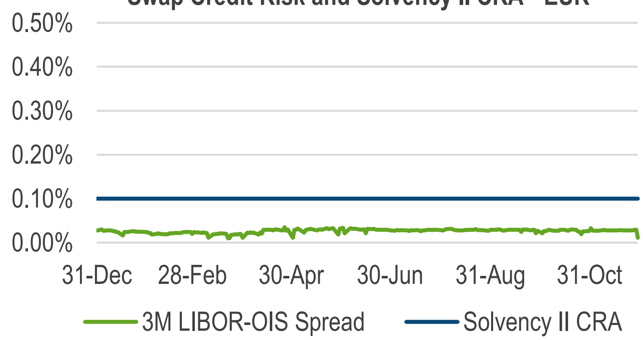
Credit Risk Adjustment

- The GBP CRA reduced by 1 basis points in October. The actual LIBOR-OIS spread remains below the 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 Q3 2017	9	8	1	-4	-5	-3
Since Q2 2017	20	21	11	2	3	-6
Since Q1 2017	23	37	28	23	24	-7
Since Q4 2016	22	36	24	21	24	-7

Change in EUR Discount and CRA (bps)

	1Y	Y5	Y10	Y20	Y30	CRA
Since Q3 2017	0	-2	-8	-10	-8	0
Since Q2 2017	-2	-3	-7	-4	-3	0
Since Q1 2017	-4	6	7	11	10	0
Since Q4 2016	-5	17	17	25	21	0

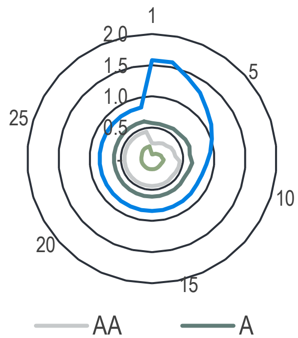
Solvency II Monitor - Spreads

Fundamental Spreads

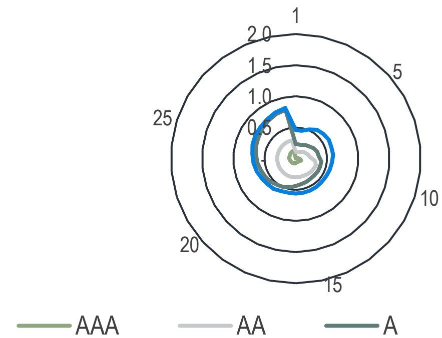
- The fundamental spread data shown is for end of October.
- There were some marginal changes compared to the end of September.

Fundamental Spreads %

GBP - Financial



GBP - Non-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	0.57	0.59	0.62	0.61	0.61
BBB	1.58	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 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	0.59	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 30/11/17) 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.

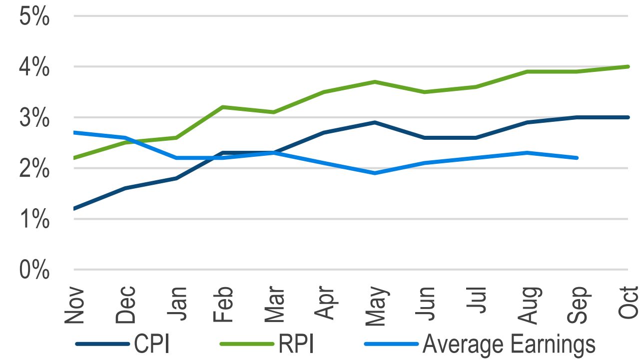
EIOPA fundamental spreads show the credit spread corresponding to the risk of default or downgrading of an asset. This is shown here across financial and non-financial assets, credit quality steps 0-3 and durations of 1-30 years. The data is provided by EIOPA and as of 31/10/17. **Fundamental spread** = 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.

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

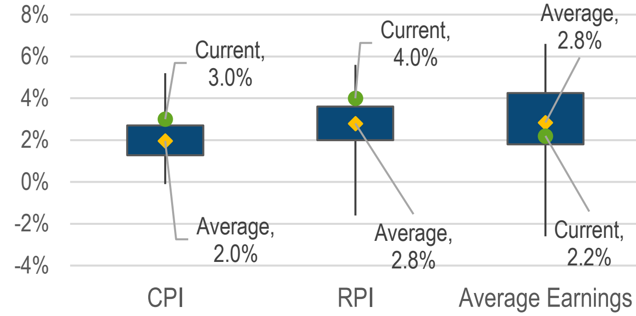
UK Inflation Monitor

- UK CPI price inflation rate remained at 3.0% in October. The 25 basis point increase in Bank of England's base interest rate this month is aimed at helping to limit further inflation increases.
- The annual earnings inflation decreased by 10 basis points, to 2.2% in September.
- According to ONS: *Rising prices for food and, to a lesser extent, recreational goods provided the largest upward contributions to change in the rate between September 2017 and October 2017. The upward contributions were offset by falling motor fuel and furniture prices.*
- 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.

UK Inflation Rate: Experience over Past Year

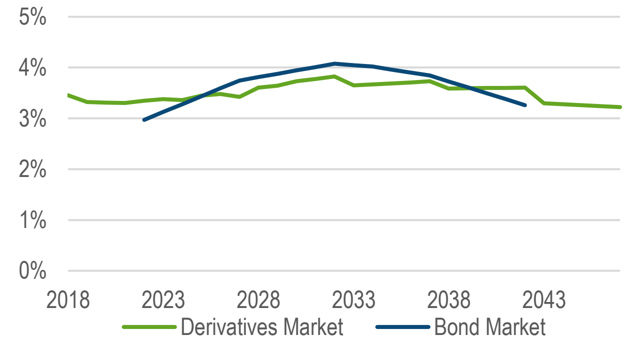


Max, Min and 50% Range: Since BoE Independence



Historical UK GDP Growth (Year-on-Year)

Projected UK RPI Inflation (Year-on-Year)



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.

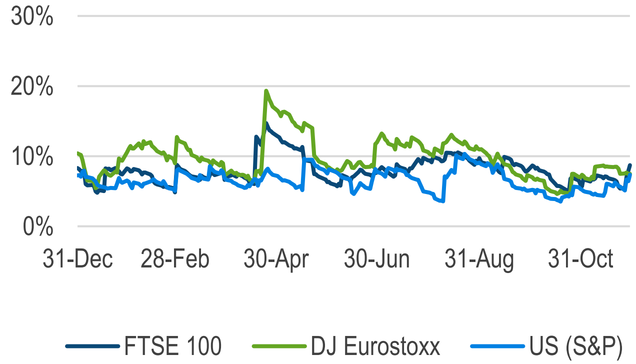
Data sources: Bloomberg; Barclays; EIOPA; Oxford-Man Institute; ONS; Milliman FRM

Volatility and Hedging Cost Monitor

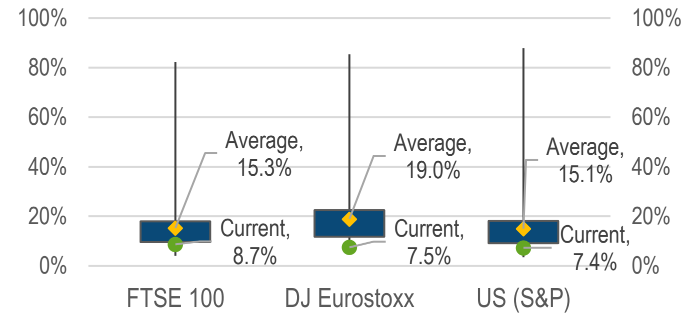
- Realised volatility on the major equity indices increased marginally in November, as stocks fluctuated more than the previous month.
- Implied volatilities increased at the start of November when the stocks made most of their losses, but fell away later in the month. The volatility risk premiums mirrored most of the changes in implied volatilities.

Please contact Milliman for more information on the basis and methodology used for these results.

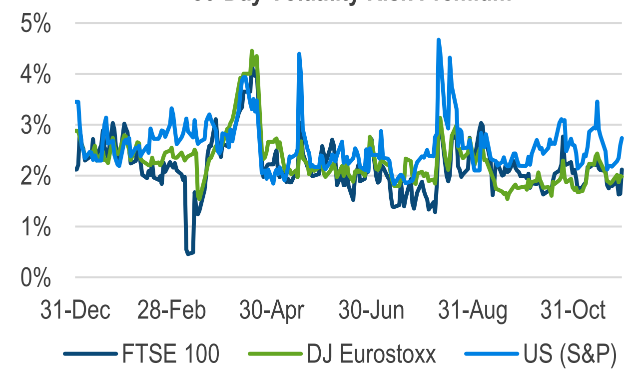
Realised 1-Month Equity Volatility (EWMA)



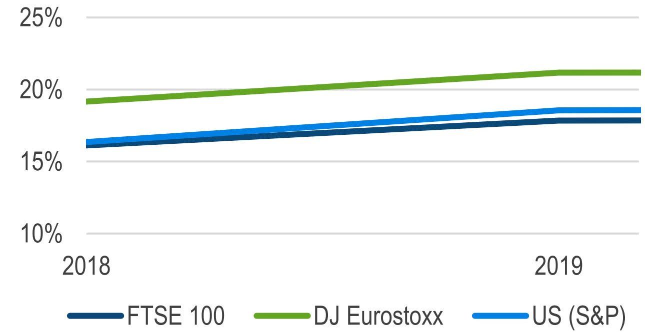
Max, Min and 50% Range: Last 25 Years



30-Day Volatility Risk Premium



Expected Volatility (Milliman Guarantee Index)



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.