

Asset Price Monitor

Local Equity Markets

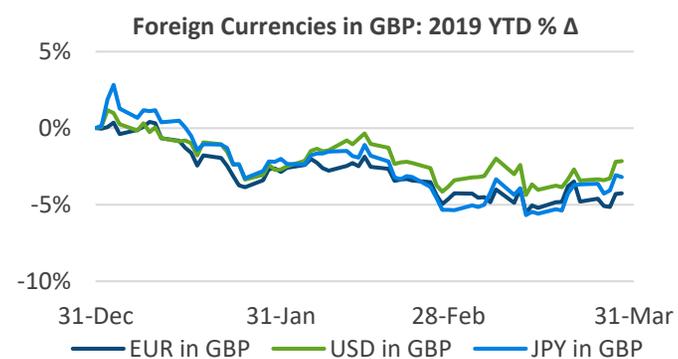
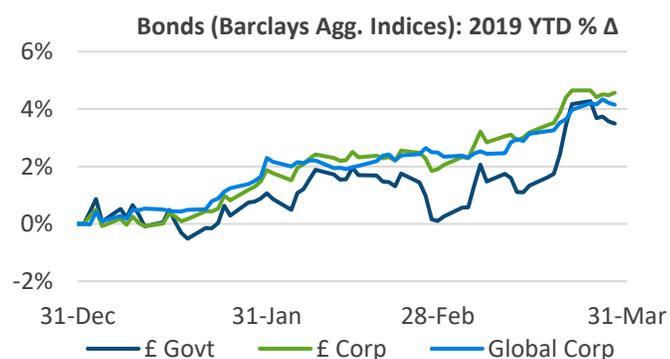
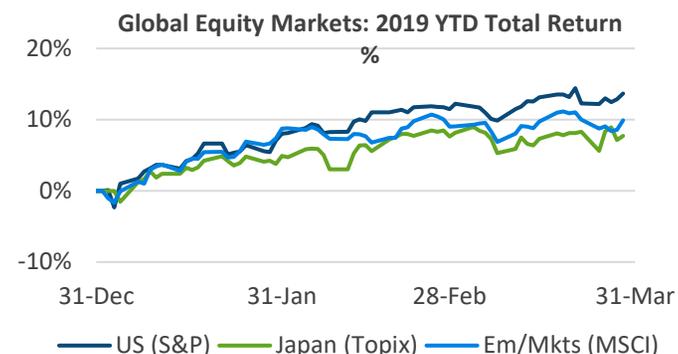
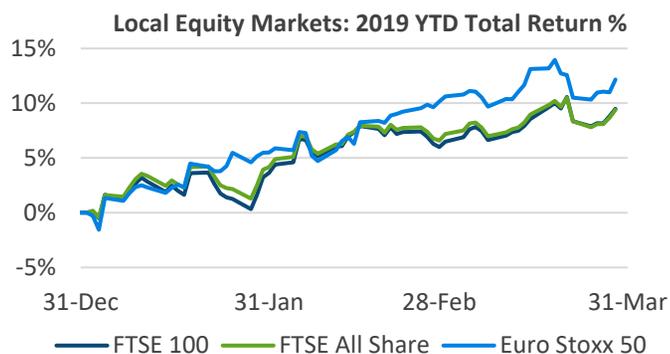
- European equity markets maintained their positive momentum in March, on the back of continued monetary policy easing from central banks and a better US-China trade relationship, despite growing uncertainty around Brexit.
- The Euro Stoxx 50 and FTSE 100 indices ended the month up by close to 2% and 3.5% respectively.
- The FTSE 100 index is close to fully recovering Q4 2018 losses.

Global Equity Markets

- Equity markets across the globe also finished March with positive gains.
- The US market returned near 2% during the month. Emerging markets continue to lag with gains of less than 1%.
- The US is making a strong recovery this year. It is has recovered almost all losses as of September 2018.

Bond/FX Markets

- Sterling corporate bonds outperformed global corporates by 1% and finished March up by 2.6%.
- The UK government bonds gained almost 3.5% in March.
- Sterling weakened against all major currencies in the month, with a drop of more than 2% against the Japanese Yen.



Total Returns as of March 31, 2019

	FTSE 100	FTSE All Share	Euro Stoxx 50	US (S&P)	Japan (Topix)	Em/Mkts (MSCI)	£ Govt	£ Corp	Global Corp	EUR in GBP	USD in GBP	JPY in GBP
1 Month	3.3%	2.7%	1.8%	1.9%	0.1%	0.8%	3.4%	2.6%	1.6%	0.4%	1.7%	2.2%
3 Month	9.5%	9.4%	12.2%	13.6%	7.7%	9.9%	3.5%	4.6%	4.2%	-4.3%	-2.1%	-3.2%
1 Year	7.7%	6.4%	2.6%	9.5%	-5.0%	-7.4%	3.9%	3.8%	1.3%	-2.1%	7.5%	3.1%
YTD	9.5%	9.4%	12.2%	13.6%	7.7%	9.9%	3.5%	4.6%	4.2%	-4.3%	-2.1%	-3.2%

Milliman Financial Risk Management

London Market Monitor – 31 March 2019

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

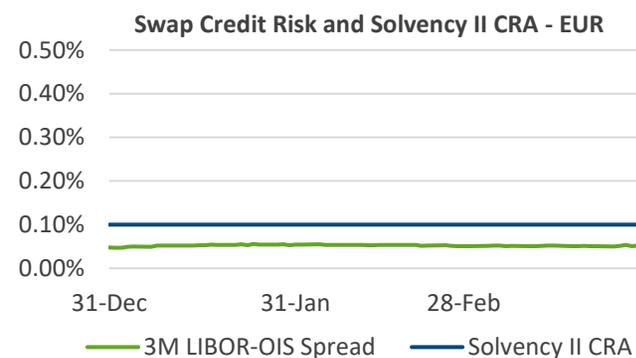
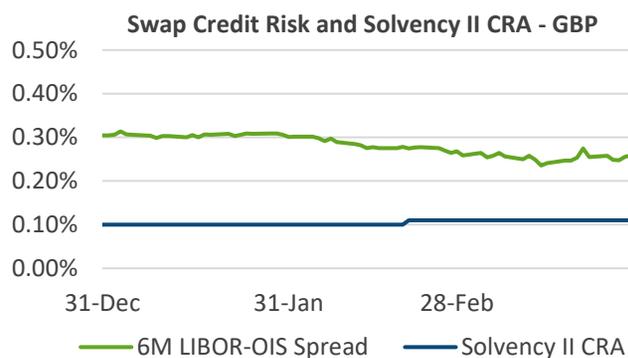
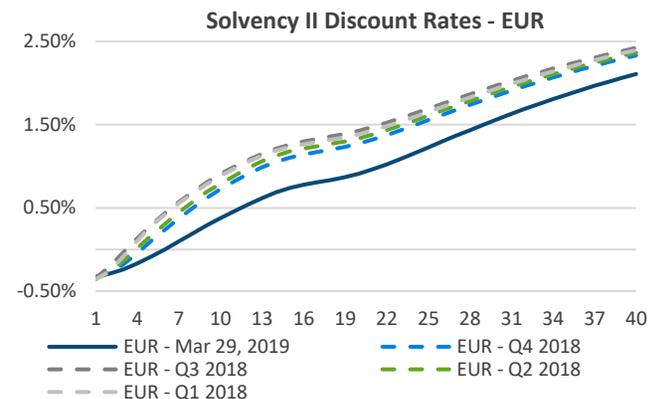
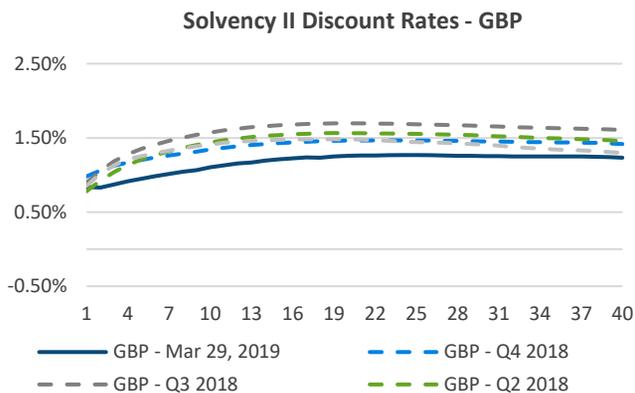
Solvency II Monitor - Rates

Risk Free Rates

- GBP interest rates decreased at all terms in March. The medium and long-term rates dropped by 30 basis points.
- The EUR rates decreased at all terms in March. The medium and long-term rates dropped by 20-25 basis points.

Credit Risk Adjustment

- The GBP CRA stayed at 11 basis points this month.
- EUR LIBOR-OIS continues to remain below the 10 basis points floor.



Change in GBP Discount and CRA (bps)						
	1Y	Y5	Y10	Y20	Y30	CRA
Since Q4 2018	-14	-25	-24	-21	-20	1
Since Q3 2018	-6	-40	-47	-44	-40	1
Since Q2 2018	6	-26	-34	-31	-27	1
Since Q1 2018	-1	-30	-31	-22	-15	1

Change in EUR Discount and CRA (bps)						
	1Y	Y5	Y10	Y20	Y30	CRA
Since Q4 2018	0	-19	-35	-36	-29	0
Since Q3 2018	1	-38	-53	-52	-41	0
Since Q2 2018	2	-25	-41	-43	-33	0
Since Q1 2018	3	-37	-51	-48	-37	0

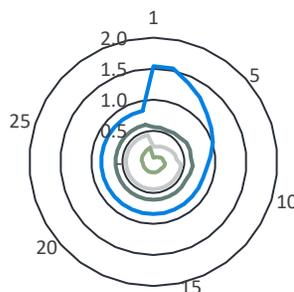
Solvency II Monitor - Spreads

Fundamental Spreads

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

Fundamental Spreads %

GBP - Financial

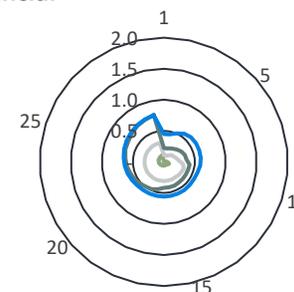


— AAA — AA — A — BBB

GBP Financial Fundamental Spread %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.07	0.11	0.19	0.17	0.23
AA	0.25	0.31	0.45	0.44	0.44
A	0.56	0.58	0.62	0.61	0.61
BBB	1.54	1.16	0.84	0.84	0.84

GBP Financial 'Before Floor' %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.00	0.04	0.08	0.16	0.23
AA	0.04	0.06	0.11	0.19	0.27
A	0.06	0.13	0.21	0.35	0.47
BBB	0.16	0.27	0.37	0.54	0.66

GBP - Non-Financial



— AAA — AA — A — BBB

GBP Non-Financial Fundamental Spread %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.00	0.01	0.09	0.07	0.11
AA	0.11	0.16	0.34	0.31	0.31
A	0.22	0.29	0.41	0.52	0.77
BBB	0.45	0.59	0.57	0.57	0.77

GBP Non-Financial 'Before Floor' %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.00	0.01	0.04	0.07	0.11
AA	0.00	0.04	0.08	0.17	0.25
A	0.04	0.15	0.28	0.52	0.77
BBB	0.11	0.22	0.35	0.57	0.77

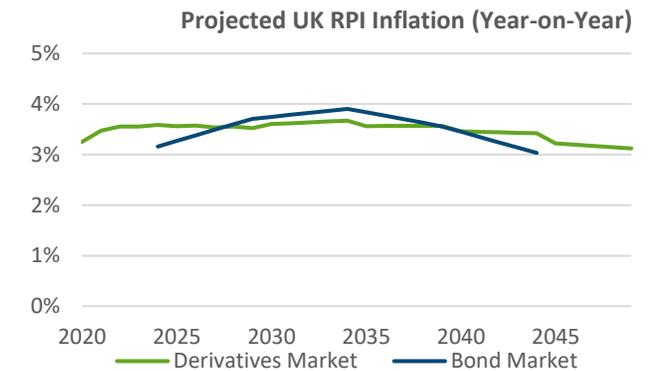
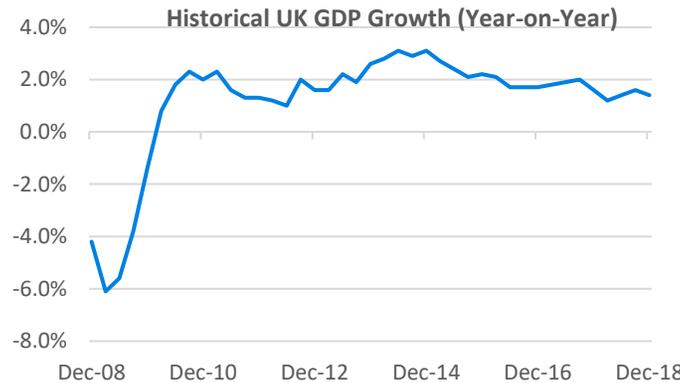
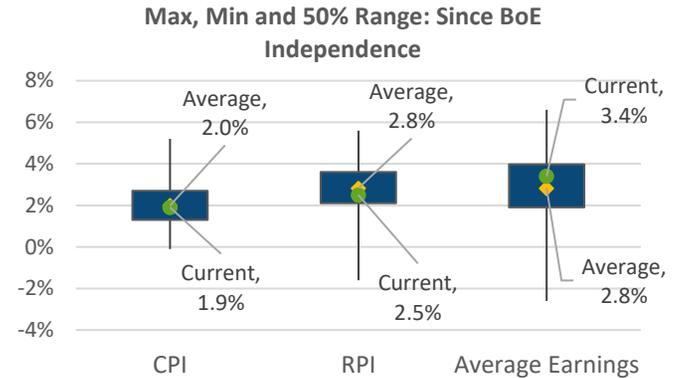
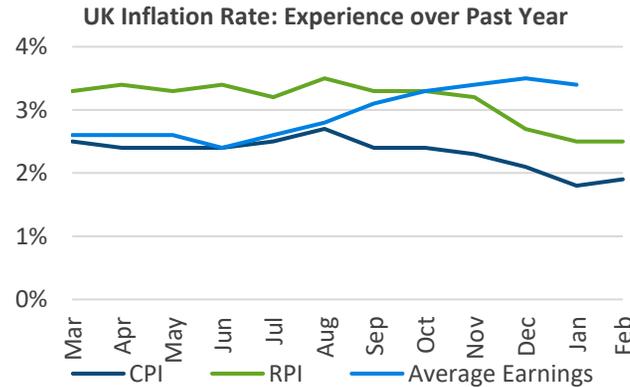
The **Solvency II risk-free discount rates** are based on applying the Smith-Wilson Extrapolation to LIBOR swap rates sourced from Bloomberg (current curve is for 29/03/19) and applying the Credit Risk Adjustment as defined in the Technical Specs.

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 28/02/19. **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.

UK Inflation Monitor

- CPI price inflation increased by 10 basis points to 1.9% in February. RPI price inflation remained at 2.5%.
- The earnings inflation was down by 0.1% in January, to 3.4%.
- According to the ONS: *“Rising prices for food, alcohol and tobacco, and across a range of recreational and cultural goods produced the largest upward contributions to change in the rate between January and February 2019. ... offsetting, downward contribution came from clothing and footwear...”*
- The market implied view of future inflation remains largely unchanged from last 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.

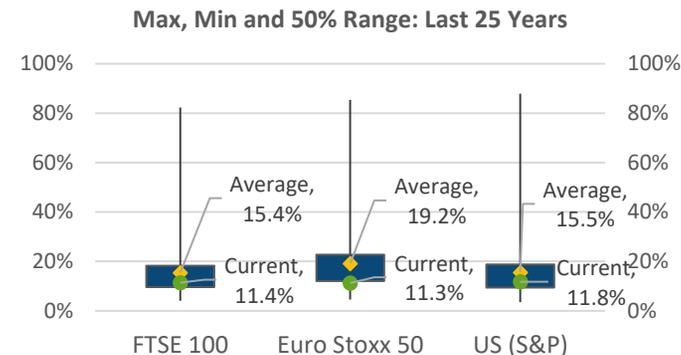
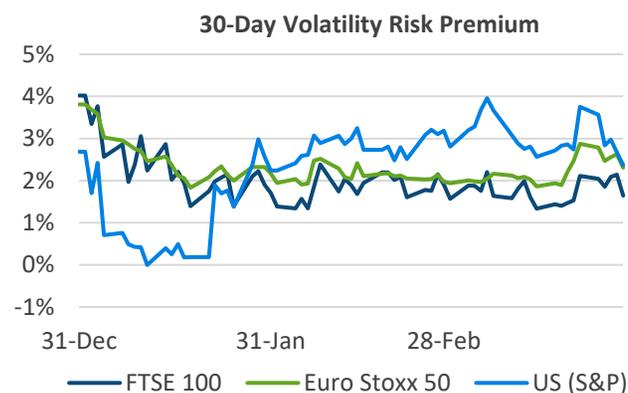
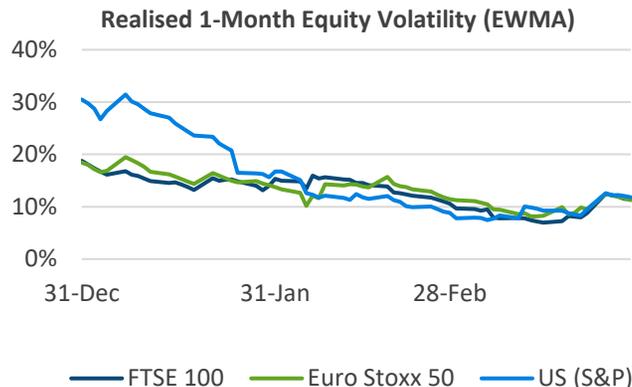
Milliman Financial Risk Management

London Market Monitor – 31 March 2019

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

Volatility and Hedging Cost Monitor

- Volatility across developed markets slightly increased in March after February lows levels.
- Realised volatilities in the US and Europe are now slightly above 10%, still below their long-term average levels.
- The volatility risk premium in Europe moved up to mid-2% levels. The volatility premium of FTSE 100 remained broadly unchanged in March.



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.

Creating transformational improvement in the retirement savings industry.

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Established in 1998, the practice includes professionals operating from three trading platforms around the world (Chicago, London, and Sydney).

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