

### Asset Price Monitor

#### Local Equity Markets

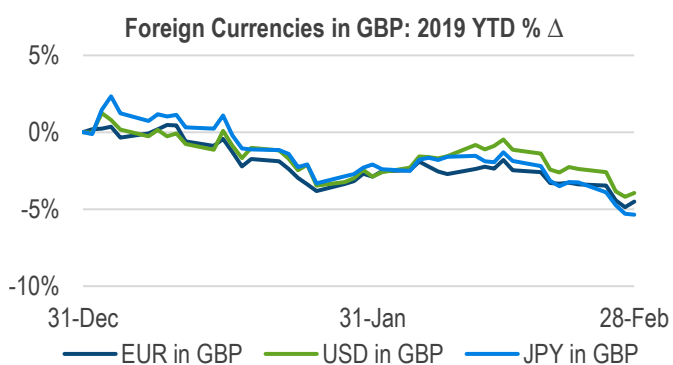
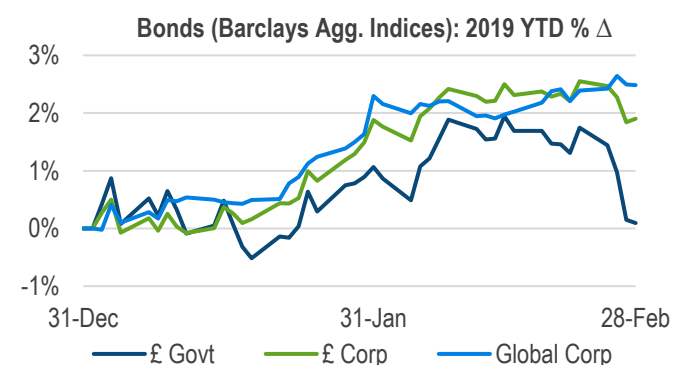
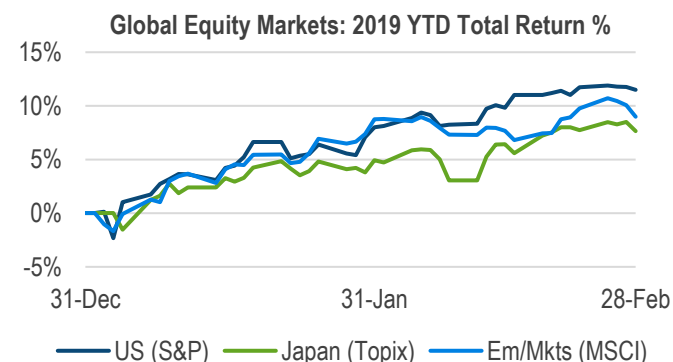
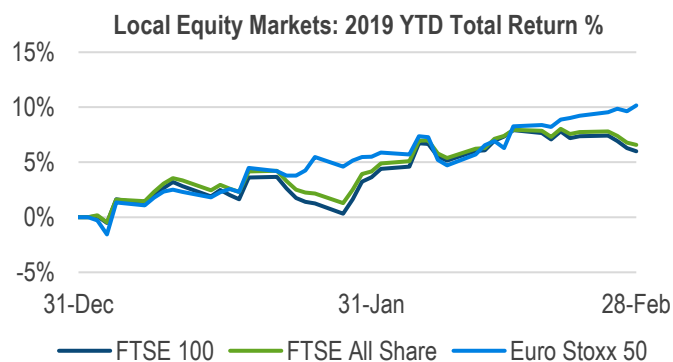
- European equity markets maintained their positive momentum in February, on the back of further progress in US-China trade talks and signals of economic stimulus in China.
- The Euro Stoxx 50 and FTSE index ended the month up by more than 4% and 2% respectively.
- With strong year-to-date performance, the Euro Stoxx 50 is getting closer to fully recovering from 2018 losses.

#### Global Equity Markets

- Equity markets across the globe finished February with positive gains.
- The US market returned over 3% during the month. In contrast, Emerging markets made marginal gains.
- The US has made a strong recovery this year. It is close to 5% higher than the level from one year ago.

#### Bond/FX Markets

- Sterling and global corporate bonds made marginal returns this month.
- The UK government bonds lost 1% in February.
- Sterling strengthened again vs all major currencies in the month, with a gain of more than 3% against the Japanese Yen.



	Total Returns as of February 28, 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	2.3%	2.3%	4.4%	3.2%	2.6%	0.2%	-1.0%	0.0%	0.2%	-1.7%	-1.1%	-3.3%
3 Month	2.3%	2.6%	4.3%	1.4%	-3.3%	6.1%	2.5%	3.2%	3.8%	-3.3%	-3.9%	-2.0%
1 Year	2.1%	1.7%	-1.4%	4.7%	-7.1%	-9.9%	2.6%	1.7%	0.1%	-3.1%	3.9%	-0.4%
YTD	6.0%	6.6%	10.2%	11.5%	7.6%	9.0%	0.1%	1.9%	2.5%	-4.5%	-3.9%	-5.4%

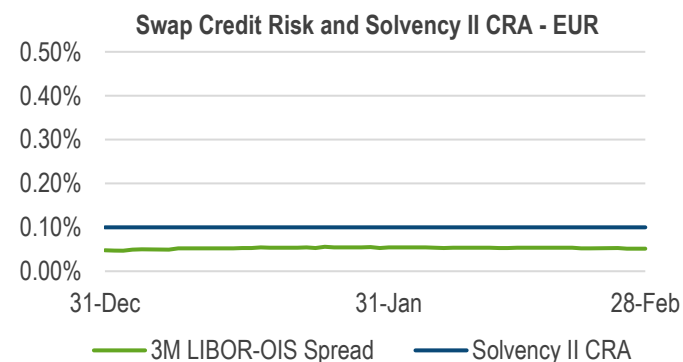
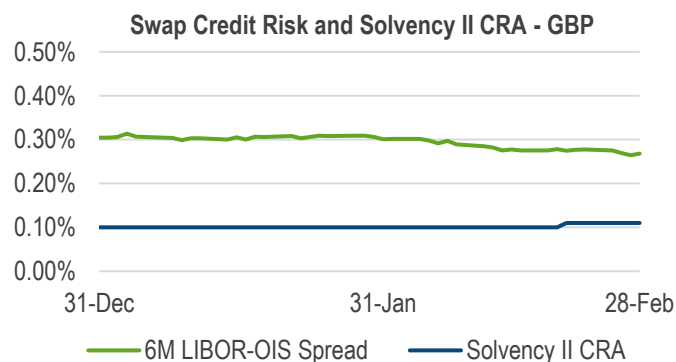
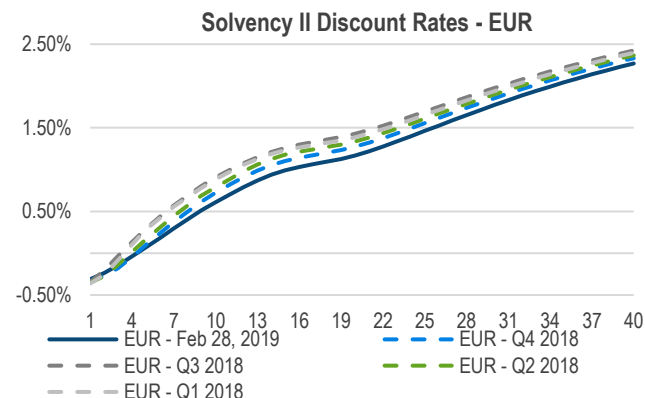
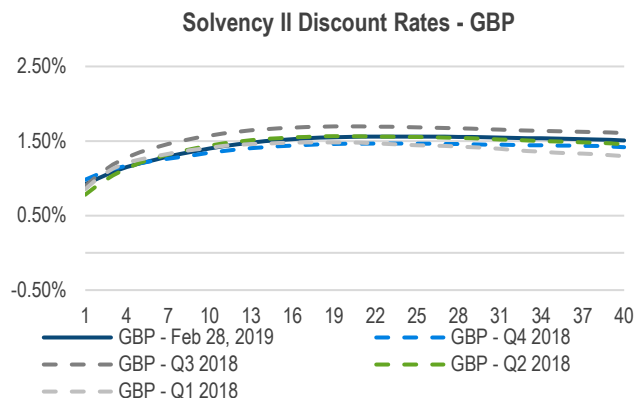
### Solvency II Monitor - Rates

#### Risk Free Rates

- The GBP interest rates increased in all but the shortest terms in February. The medium and long-term rates increased by close to 10 basis points.
- The EUR rates increased in all terms in February. The medium and long-term rates increased by 5 basis points.

#### Credit Risk Adjustment

- The GBP CRA raised to 11 basis points this month. The adjustment value had previously been at the floor level of 10 basis points since November 2017.
- 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	-6	0	6	9	10	1
Since Q3 2018	3	-15	-17	-14	-11	1
Since Q2 2018	14	-1	-4	-1	2	1
Since Q1 2018	7	-5	-1	7	14	1

Change in EUR Discount and CRA (bps)						
	1Y	Y5	Y10	Y20	Y30	CRA
Since Q4 2018	2	-3	-12	-11	-8	0
Since Q3 2018	3	-22	-30	-26	-20	0
Since Q2 2018	4	-9	-18	-17	-13	0
Since Q1 2018	5	-21	-27	-22	-17	0

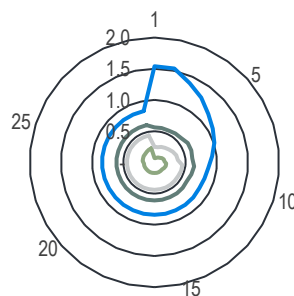
Solvency II Monitor - Spreads

Fundamental Spreads

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

Fundamental Spreads %

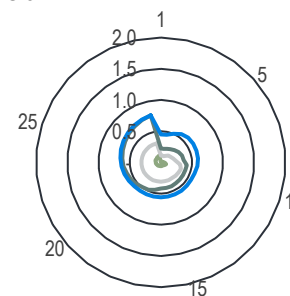
GBP - Financial



— 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	0.65

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

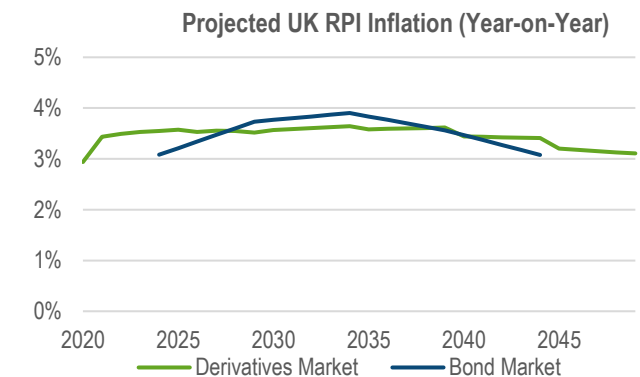
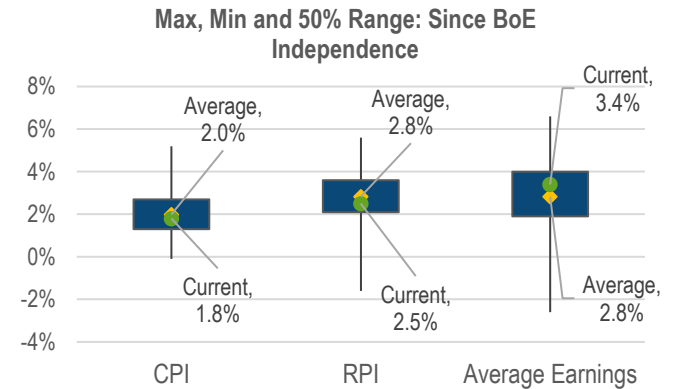
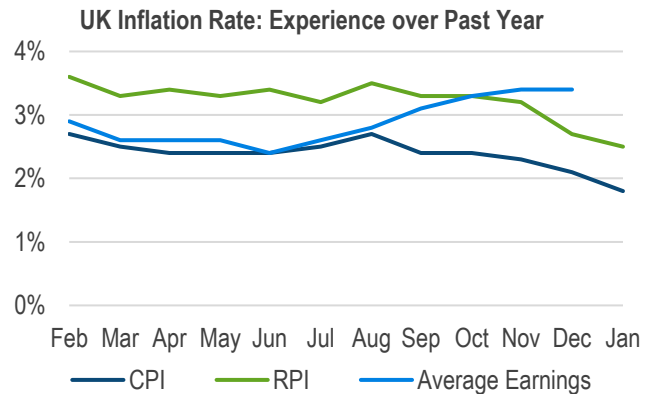
The **Solvency II risk-free discount rates** are based on applying the Smith-Wilson Extrapolation to LIBOR swap rates sourced from Bloomberg (current curve is for 28/02/19) and applying the Credit Risk Adjustment as defined in the Technical Specs.

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 31/01/19. **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 and RPI price inflation decreased by 30 and 20 basis points to 1.8% and 2.5% in January.
- The earnings inflation was unchanged in December, at 3.4%.
- According to the ONS: *“The largest downward contribution to the change ... came from electricity, gas and other fuels, with prices overall falling between December 2018 and January 2019 ... These downward effects were partially offset by air fares...”*
- The market implied view of future inflation remains unchanged from last month.



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

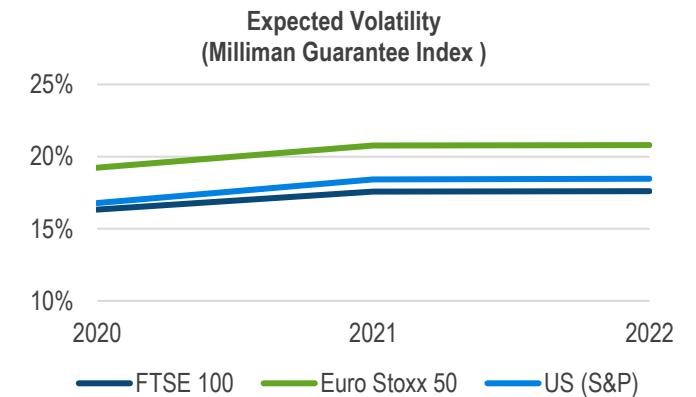
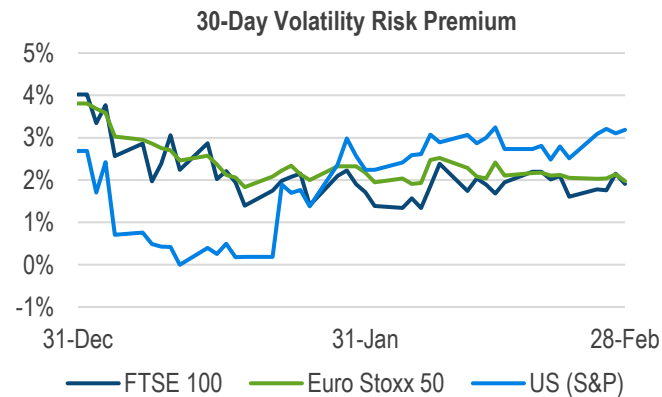
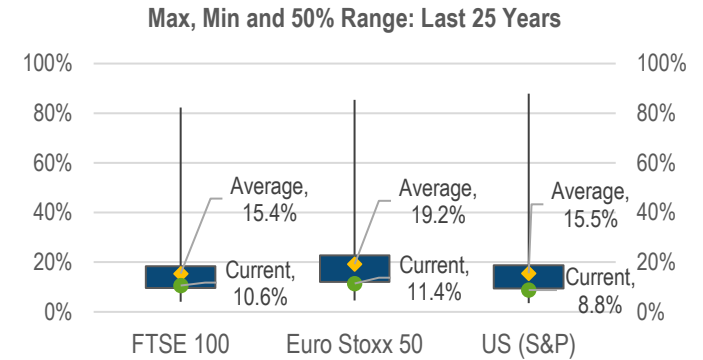
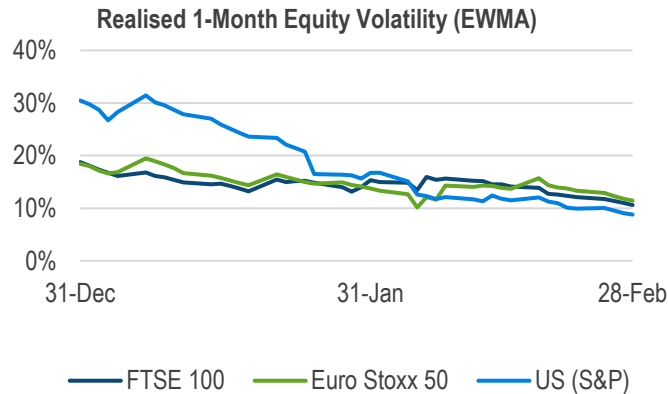
- **Consumer Price Index (CPI)** – measuring the monthly price of a basket of consumer goods and services
- **Retail Price Index (RPI)** – similar to CPI, but the main difference due the addition of mortgage payments, council tax and other housing costs
- **Average Earnings** – measuring the average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

**Volatility and Hedging Cost Monitor**

- Volatility across the globe declined further in February from the highs in December 2018, as equity markets continue to rebound.
- Realised volatilities in the US and Europe are now around 10%, moving further below their long-term average levels.
- Volatility risk premium in Europe and the UK remained broadly the same around 2%. The volatility premium of the S&P ended the month around 3%.



**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.

Milliman Financial Risk Management LLC / Milliman Financial Strategies Ltd. is a global leader in financial risk management to the retirement savings industry. Milliman FRM provides investment advisory, hedging, and consulting services on \$141.9 billion in global assets (as of December 31, 2018).

Milliman is among the world's largest providers of actuarial and related products and services. The firm has consulting practices in healthcare, property & casualty insurance, life insurance and financial services, and employee benefits. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe.

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

### [MILLIMAN.COM/FRM](http://MILLIMAN.COM/FRM)

#### Chicago

71 South Wacker Drive  
Chicago, IL 60606  
+1 855 645 5462

#### London

11 Old Jewry  
London  
EC2R 8DU  
UK  
+44 0 20 7847 1557

#### Sydney

32 Walker Street  
North Sydney, NSW 2060  
Australia  
+610 2 8090 9100

Recipients must make their own independent decisions regarding any strategies or securities or financial instruments mentioned herein.

The products or services described or referenced herein may not be suitable or appropriate for the recipient. Many of the products and services described or referenced herein involve significant risks, and the recipient should not make any decision or enter into any transaction unless the recipient has fully understood all such risks and has independently determined that such decisions or transactions are appropriate for the recipient.

Past performance is not indicative of future results. Index performance information is for illustrative purpose only, does not represent the performance of any actual investment or portfolio, and should not be viewed as a recommendation to buy/sell. It is not possible to invest directly in an index. Any hypothetical, backtested data illustrated herein is for illustrative purposes only, and is not representative of any investment or product.

Any discussion of risks contained herein with respect to any product or service should not be considered to be a disclosure of all risks or a complete discussion of the risks involved.

The recipient should not construe any of the material contained herein as investment, hedging, trading, legal, regulatory, tax, accounting or other advice. The recipient should not act on any information in this document without consulting its investment, hedging, trading, legal, regulatory, tax, accounting and other advisors.

The materials in this document represent the opinion of the authors and are not representative of the views of Milliman, Inc. Milliman does not certify the information, nor does it guarantee the accuracy and completeness of such information. Use of such information is voluntary and should not be relied upon unless an independent review of its accuracy and completeness has been performed. Materials may not be reproduced without the express consent of Milliman.

Milliman Financial Strategies Ltd. is authorised and regulated by the Financial Conduct Authority. Firm Registration Number 539399