

Market Price Monitor

Local Equity Markets

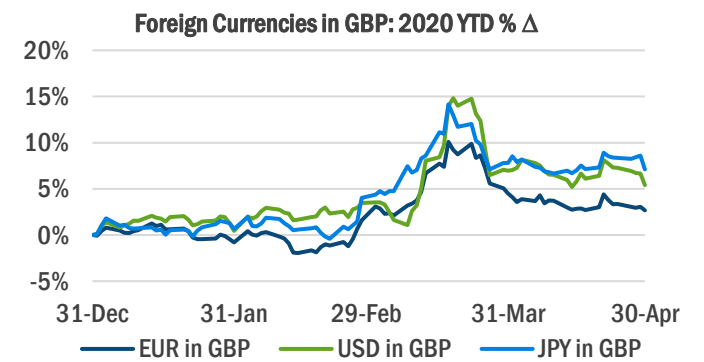
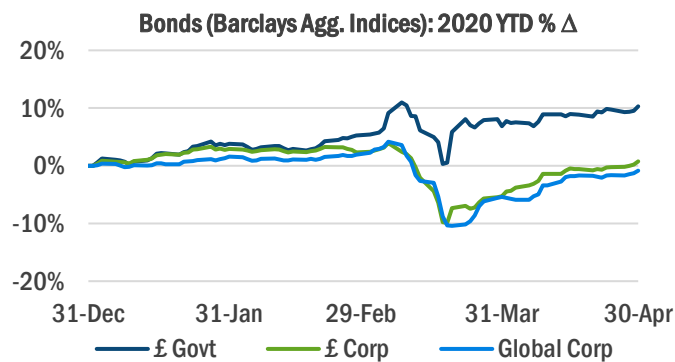
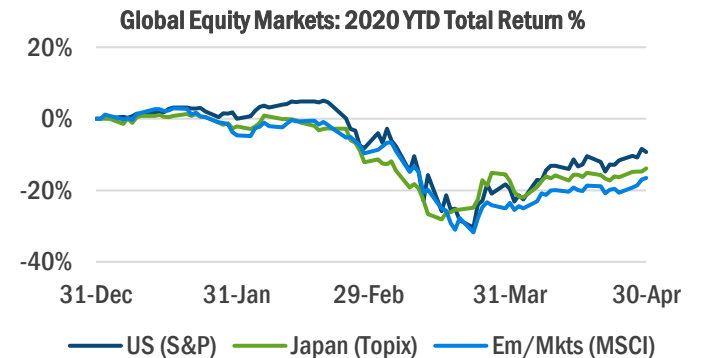
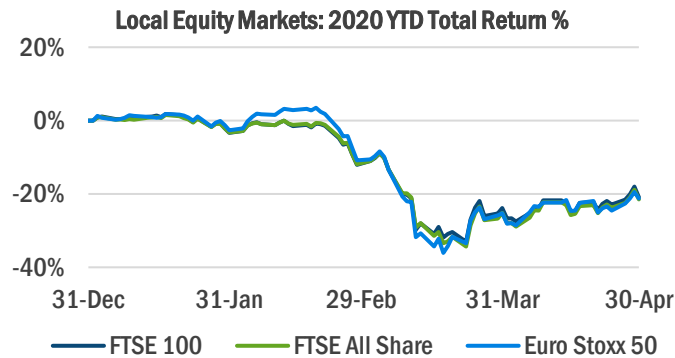
- After a turbulent March, equity markets had a strong performance in April.
- Countries around the globe continued their lockdown measures to fight the spread of COVID-19, meanwhile governments and central banks introduced significant stimulus packages to limit the damage caused to the economy.
- The FTSE 100 index gained 3.9% during the month, having lost 20.9% for the year-to-date.
- The Euro Stoxx 50 index ended the month up 5.4%.

Global Equity Markets

- The S&P 500 index was the best performer of the month, gaining 12.8%, while the Japanese equity market returned 4.3%, for the same period.
- The MSCI Emerging Markets index was up 9.2% at month-end.

Bond/FX Markets

- Both the British government and corporate bond indices made gains for the month. The former returning 3.2%, while the latter was up 6.4%.
- The British Pound had a positive performance in April as it gained 1.8% and 1.5% against the Euro and the US Dollar, respectively. The pound ended the month 0.7% stronger against the Japanese Yen.



	Total Returns as of April 30, 2020											
	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	3.9%	4.9%	5.4%	12.8%	4.3%	9.2%	3.2%	6.4%	4.8%	-1.8%	-1.5%	-0.7%
3 Month	-18.1%	-18.8%	-19.1%	-9.3%	-12.0%	-12.5%	6.2%	-2.1%	-2.4%	3.5%	5.0%	6.4%
1 Year	-17.1%	-16.7%	-14.0%	0.9%	-7.1%	-11.7%	16.1%	6.9%	5.7%	1.1%	3.7%	8.0%
YTD	-20.9%	-21.4%	-21.2%	-9.3%	-13.9%	-16.6%	10.3%	0.7%	-0.9%	2.7%	5.4%	7.1%

Milliman Financial Risk Management

London Market Monitor – 30 April 2020

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

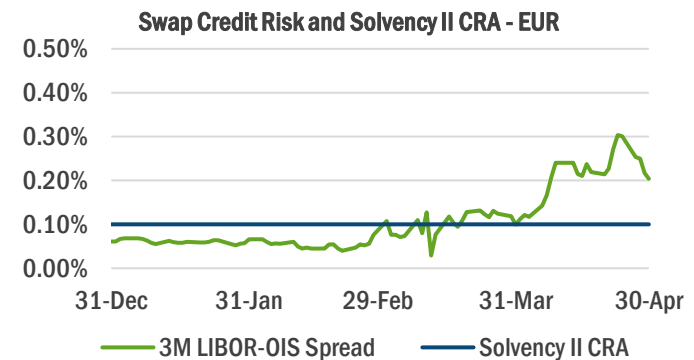
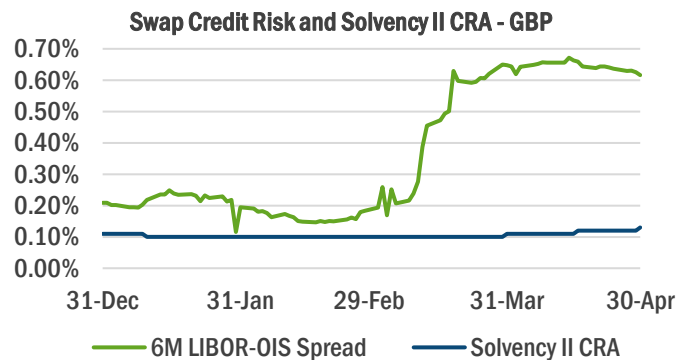
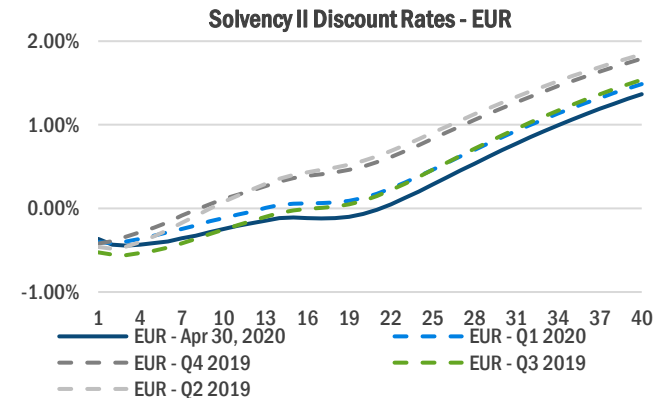
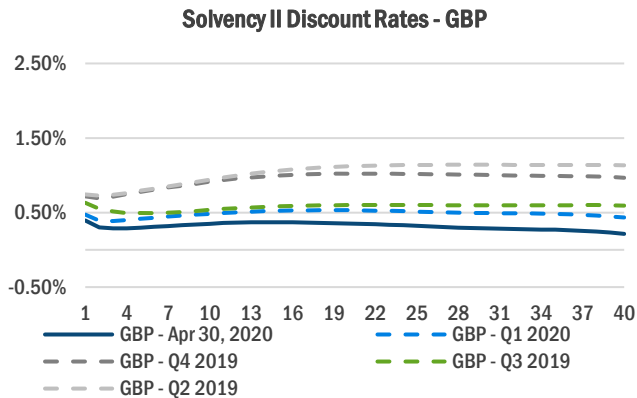
Solvency II Monitor - Rates

Risk Free Rates

- GBP Solvency II risk-free rates decreased at all terms for the fourth straight month, with medium to longer-term rates seeing the biggest decline.
- The 30-year GBP risk-free rate decreased by 21 basis points, meanwhile the 20 and 10-year rates fell by 18 and 13 basis points, respectively.
- EUR Solvency II risk-free rates decreased at all terms in April, with the exception of the 1-year rate, which saw an increase of 4 basis points.
- The 10 and 20-year rates decreased by 13 and 19 basis points, respectively.
- Most notably, the German government bond curve ended the month below zero at all terms.

Credit Risk Adjustment

- The GBP CRA increased by 2 basis points to reach 13 basis points at the end of April.
- The EUR CRA remained unchanged at the floor of 10 basis points.



	Change in GBP Discount and CRA (bps)					
	1Y	Y5	Y10	Y20	Y30	CRA
Since Q1 2020	-8	-12	-13	-18	-21	1
Since Q4 2019	-32	-48	-56	-67	-72	1
Since Q3 2019	-24	-20	-19	-25	-31	1
Since Q2 2019	-35	-50	-59	-77	-86	1

	Change in EUR Discount and CRA (bps)					
	1Y	Y5	Y10	Y20	Y30	CRA
Since Q1 2020	4	-9	-13	-19	-16	0
Since Q4 2019	6	-19	-36	-57	-50	0
Since Q3 2019	16	9	1	-16	-18	0
Since Q2 2019	10	-8	-32	-64	-57	0

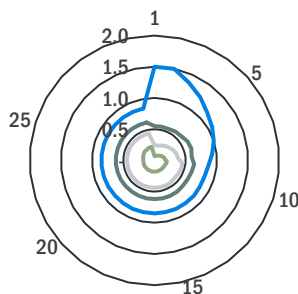
Solvency II Monitor - Spreads

Fundamental Spreads

- There were no material changes since the last report.

Fundamental Spreads %

GBP - Financial

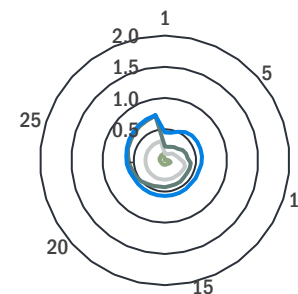


— AAA — AA — A — BBB

GBP Financial Fundamental Spread %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.07	0.11	0.19	0.18	0.22
AA	0.24	0.31	0.45	0.44	0.44
A	0.55	0.58	0.62	0.62	0.62
BBB	1.50	1.14	0.84	0.85	0.85

GBP Financial 'Before Floor' %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.00	0.04	0.08	0.16	0.22
AA	0.04	0.06	0.11	0.19	0.26
A	0.06	0.13	0.20	0.33	0.45
BBB	0.16	0.25	0.35	0.50	0.61

GBP - Non-Financial



— AAA — AA — A — BBB

GBP Non-Financial Fundamental Spread %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.00	0.01	0.10	0.07	0.10
AA	0.11	0.16	0.34	0.31	0.31
A	0.22	0.28	0.42	0.50	0.73
BBB	0.45	0.59	0.57	0.57	0.74

GBP Non-Financial 'Before Floor' %					
	1Y	Y5	Y10	Y20	Y30
AAA	0.00	0.01	0.04	0.07	0.10
AA	0.00	0.04	0.08	0.16	0.24
A	0.04	0.14	0.26	0.50	0.73
BBB	0.11	0.22	0.34	0.56	0.74

The **Solvency II risk-free discount rates** are based on applying the Smith-Wilson Extrapolation to LIBOR swap rates sourced from Refinitiv and applying the Credit Risk Adjustment as defined in the Technical Specs. The data is provided by EIOPA and as of 30/04/20.

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 30/04/20. **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 – 30 April 2020

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

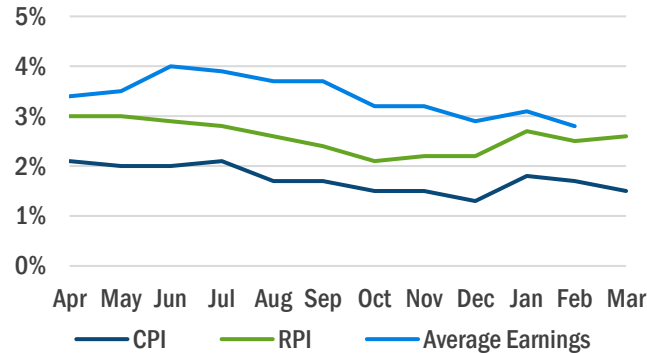
UK Inflation Monitor

- UK's CPI inflation fell by 20 basis points to 1.5% in March.
- In contrast, UK's RPI inflation increased by 10 basis points in March, posting a reading of 2.6%.
- According to the ONS: "Falls in the price of motor fuels and clothing resulted in the largest downward contributions. Rises in air fares produced the largest, partially offsetting, upward contribution to change."
- Average earnings decreased by 30 basis points in February, with the headline figure at 2.8%.
- The projected RPI curve was marginally higher than the previous month. Relative to the year-end projected curve that saw future inflation stay above 2.5%, we see the projected long-term inflation beyond 2040 remain below 2.5%.
- There were no updates to the GDP growth figure this month.

House of Lords' Report

- The consultation period that was scheduled to run until 22 April 2020, was extended to 21 August 2020.

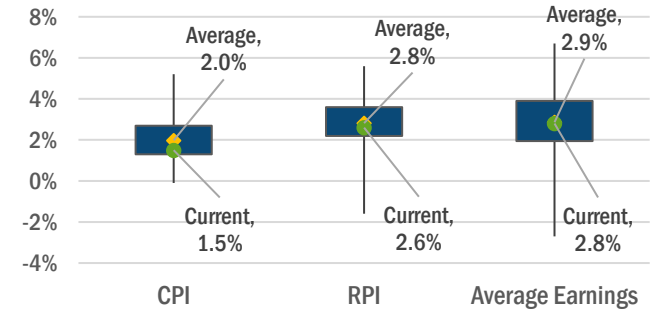
UK Inflation Rate: Experience over Past Year



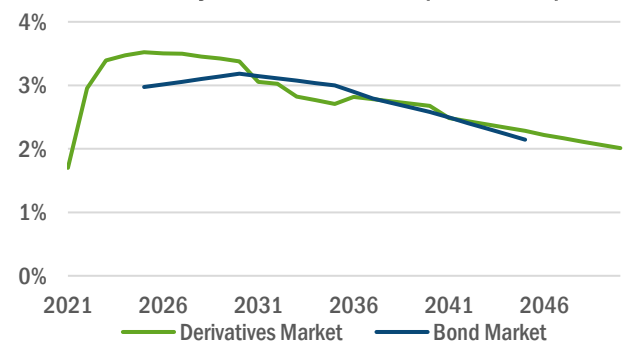
Historical UK GDP Growth (Year-on-Year)



Max, Min and 50% Range: Since BoE Independence



Projected UK RPI Inflation (Year-on-Year)



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

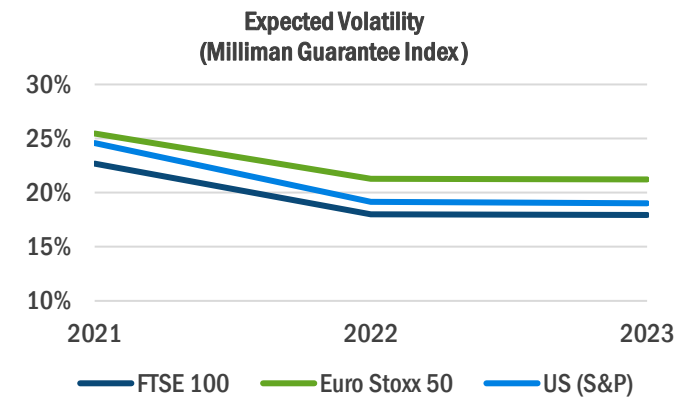
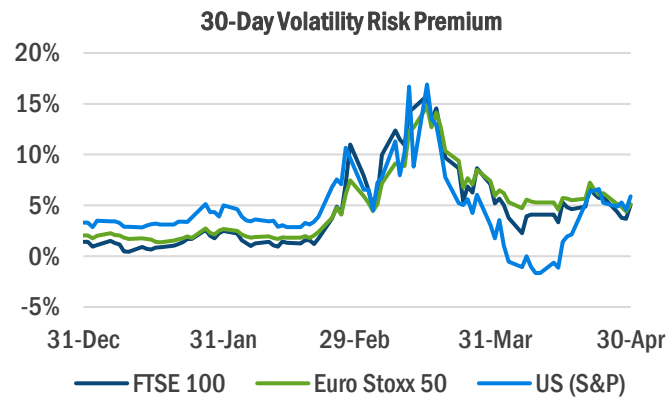
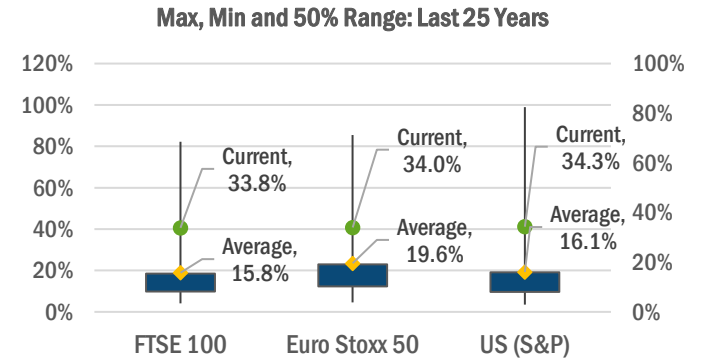
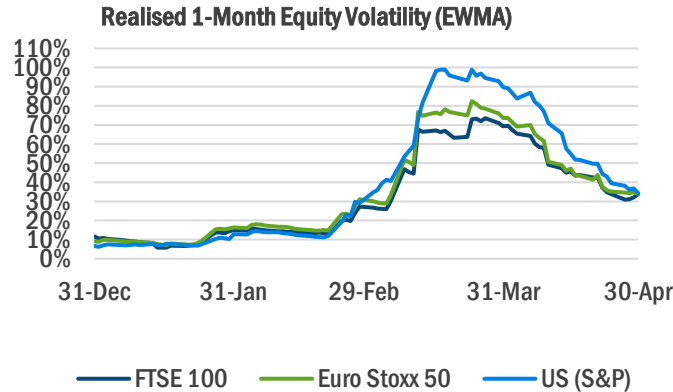
- **Consumer Price Index (CPI)** – measuring the monthly price of a basket of consumer goods and services
- **Retail Price Index (RPI)** – similar to CPI, but the main difference due the addition of mortgage payments, council tax and other housing costs
- **Average Earnings** – measuring the average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

Volatility and Hedging Cost Monitor

- Realised volatilities declined in April, however remained above their historical averages with all major indices ending the month with realised volatilities of above 30%.
- The FTSE 100 and the Euro Stoxx 50 indices had realised volatilities of 33.8% and 34% at month-end, respectively. Meanwhile the S&P 500 ended the month with a realised volatility of 34.3%
- Volatility risk premiums for the Euro Stoxx 50 and the FTSE 100 indices were broadly unchanged during the month, as they both ended the month at 5.1%.
- In contrast, the S&P 500 saw its volatility risk premium decline into negative territory, as quickly softening demand for protection lead to its implied volatility falling more sharply than its realised volatility at the start of the month, before turning positive and ending the month at 5.9%.



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.



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