

Market Price Monitor

Local Equity Markets

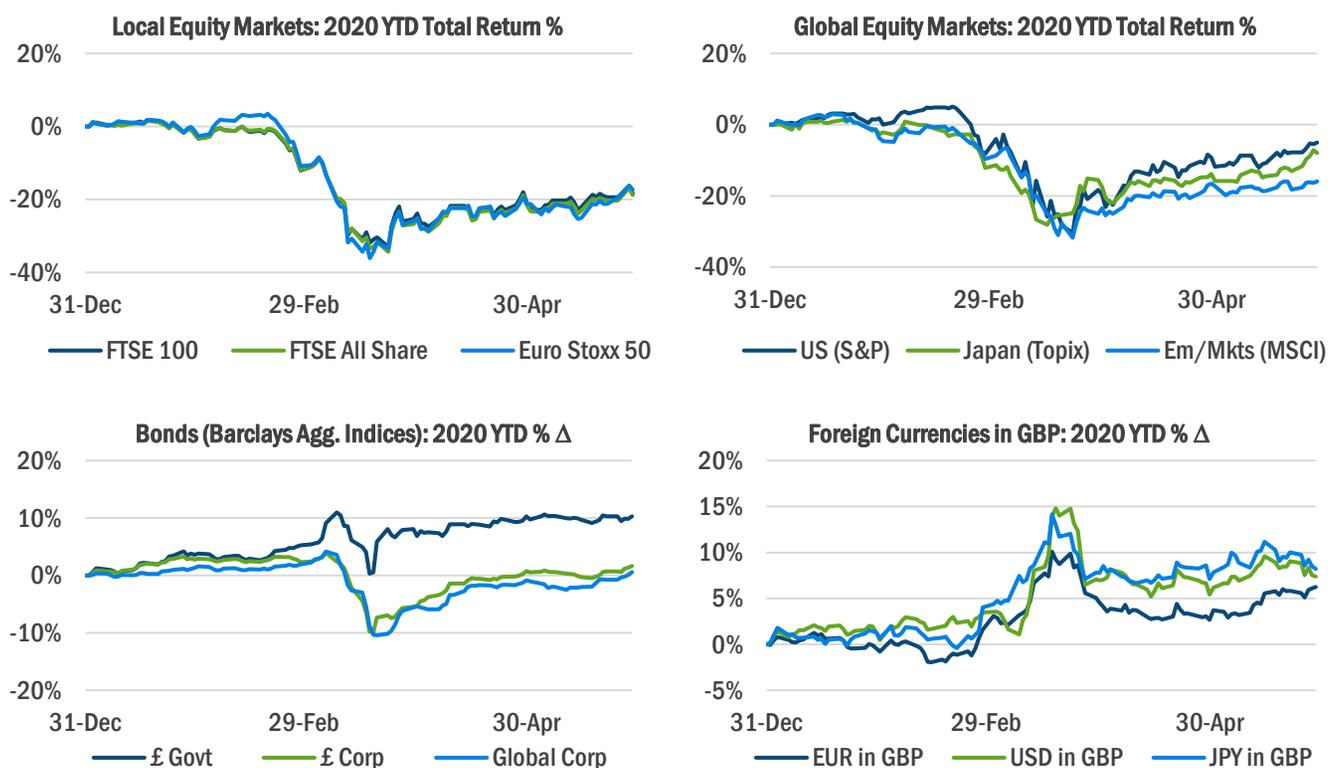
- Equity markets continued their positive run in May as they made gains for the second month in a row.
- Countries around the globe signalled a gradual re-opening of their economies and easing of lockdown restrictions, while governments and central banks continued to support economies by providing monetary and fiscal stimulus.
- The FTSE 100 index ended the month up 3.3%, but remains down 18.2% year-to-date.
- The Euro Stoxx 50 index gained 4.9% during the month.

Global Equity Markets

- The Japanese Topix was one of the best performing indices this month, returning 6.8%.
- Meanwhile the S&P 500 index gained 4.8%, by month-end. The main US equity benchmark is now only down 5% year-to-date.
- The MSCI Emerging Markets index ended the month up 0.8%.

Bond/FX Markets

- The British government bond index was flat for May.
- Both the British and global corporate bond indices made gains during the month. The former returning 0.9% and the latter 1.5%.
- The Pound had a weak performance in May as it lost 3.5% and 1.8% against the Euro and the US Dollar, respectively. The Japanese Yen was 1% stronger against the British Pound at month-end.



| | Total Returns as of May 29, 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 | 3.3% | 3.4% | 4.9% | 4.8% | 6.8% | 0.8% | 0.0% | 0.9% | 1.5% | 3.5% | 1.8% | 1.0% |
| 3 Month | -7.0% | -7.8% | -7.3% | 3.6% | 4.8% | -6.9% | 4.8% | -0.7% | -1.3% | 4.6% | 3.8% | 4.0% |
| 1 Year | -11.8% | -11.2% | -4.9% | 12.8% | 6.2% | -4.0% | 12.8% | 7.0% | 6.5% | 1.7% | 2.3% | 2.7% |
| YTD | -18.2% | -18.8% | -17.3% | -5.0% | -8.0% | -15.9% | 10.3% | 1.6% | 0.6% | 6.2% | 7.4% | 8.2% |

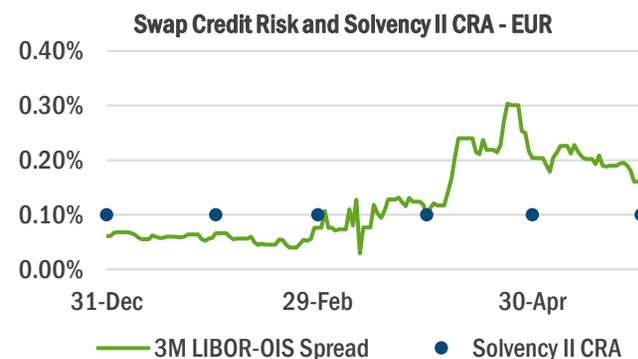
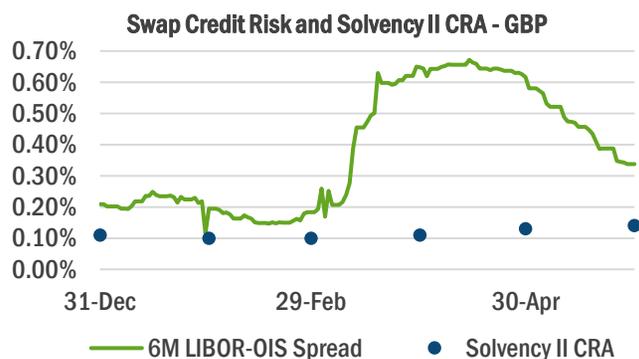
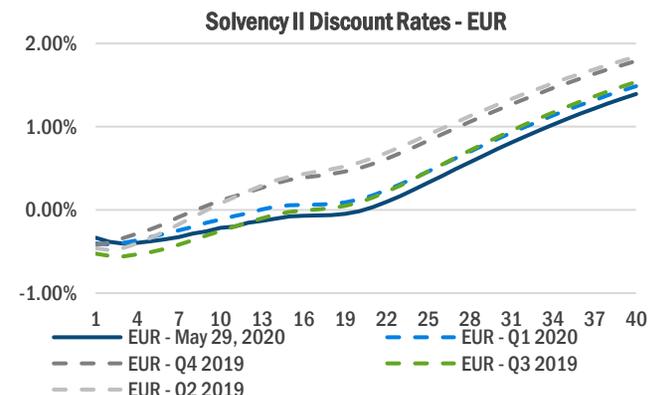
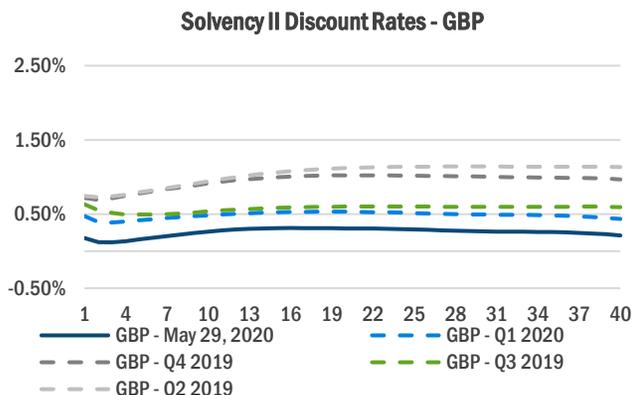
Solvency II Monitor - Rates

Risk Free Rates

- GBP Solvency II risk-free rates decreased at all terms for the fifth straight month, with shorter-term rates seeing the biggest fall.
- The 1-year GBP risk-free rate declined by 22 basis points, meanwhile the 5-year rate fell by 14 basis points.
- The GBP Solvency II curve is now materially below the levels observed at the end of Q1 2020.
- In contrast, EUR Solvency II risk-free rates increased at all terms in May.
- The 20-year EUR Solvency II risk-free rate saw the largest increase, climbing by 5 basis points.

Credit Risk Adjustment

- The GBP CRA was 14 basis points at month-end, an increase of 1 basis point from the previous month.
- 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 | -30 | -26 | -22 | -23 | -23 | 3 |
| Since Q4 2019 | -54 | -62 | -65 | -72 | -74 | 3 |
| Since Q3 2019 | -46 | -34 | -27 | -30 | -33 | 3 |
| Since Q2 2019 | -57 | -64 | -68 | -82 | -88 | 3 |

| | Change in EUR Discount and CRA (bps) | | | | | |
|---------------|--------------------------------------|-----|-----|-----|-----|-----|
| | 1Y | Y5 | Y10 | Y20 | Y30 | CRA |
| Since Q1 2020 | 7 | -5 | -10 | -14 | -12 | 0 |
| Since Q4 2019 | 9 | -15 | -33 | -52 | -47 | 0 |
| Since Q3 2019 | 19 | 13 | 4 | -11 | -14 | 0 |
| Since Q2 2019 | 13 | -4 | -29 | -58 | -53 | 0 |

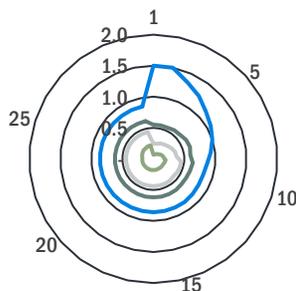
Solvency II Monitor - Spreads

Fundamental Spreads

- There were no material changes since the last report.

Fundamental Spreads %

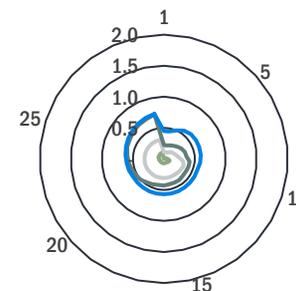
GBP - Financial



— 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 | 0.25 | 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 | 0.86 | 0.86 |
| 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 | 0.15 | 0.25 | 0.35 | 0.49 | 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 | 0.29 | 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 | 0.55 | 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 31/05/20.

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 31/05/20. **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.

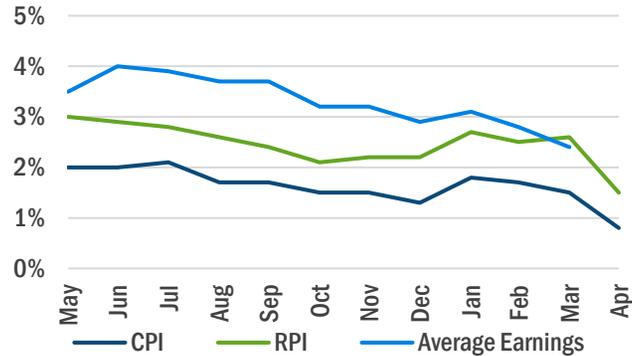
UK Inflation Monitor

- UK's CPI inflation fell by 70 basis points to 0.8% in April.
- The RPI inflation reading was 110 basis points lower than the previous month, with the headline figure now at 1.5%.
- According to the ONS: "Falling energy and fuel pump prices resulted in the largest downward contributions. Rising prices for recreational goods resulted in a partially offsetting upward contribution."
- The projected RPI curve was marginally higher than the previous month. But it still indicates a downward trajectory in long-term inflation, relative to higher short-term inflation.
- UK's Q1 2020 GDP growth was -1.6%, as the British economy contracted for the first time since Q4 2009, reflecting the impact of lockdowns imposed across the country during the second half of the quarter.

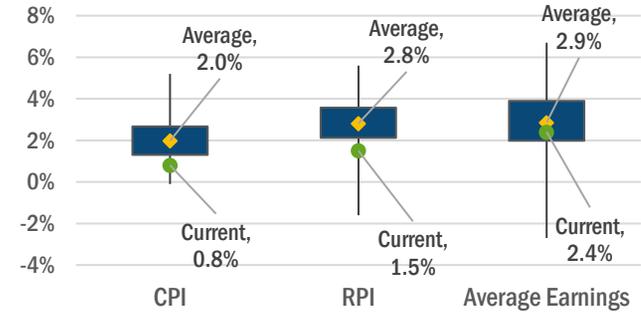
House of Lords' Report

- There were no further updates this month.

UK Inflation Rate: Experience over Past Year



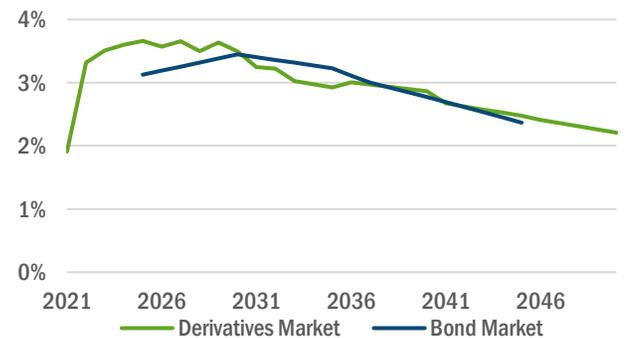
Max, Min and 50% Range: Since BoE Independence



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:

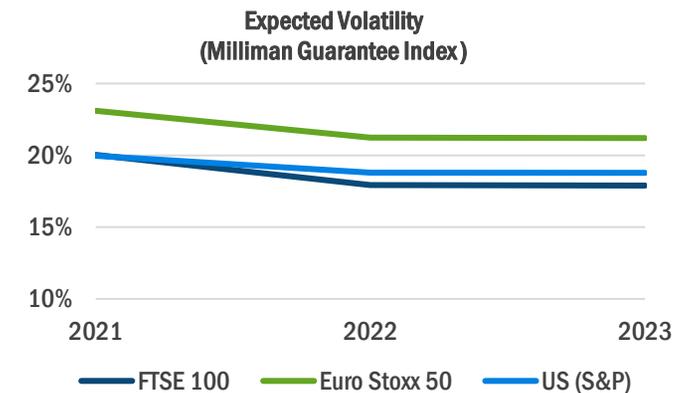
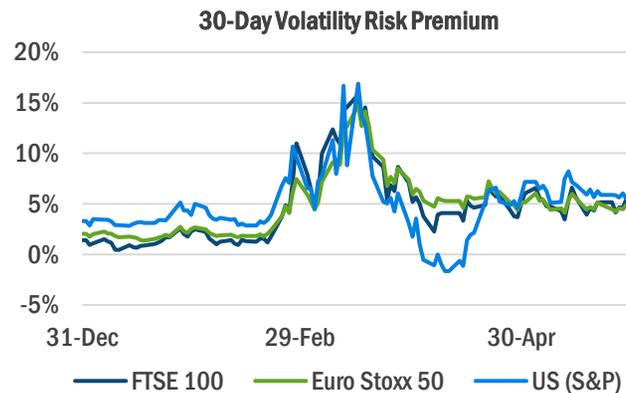
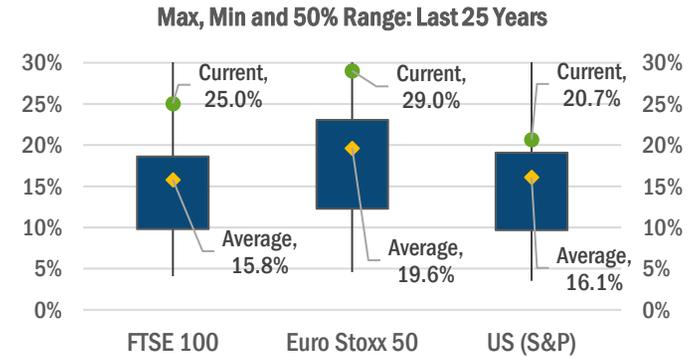
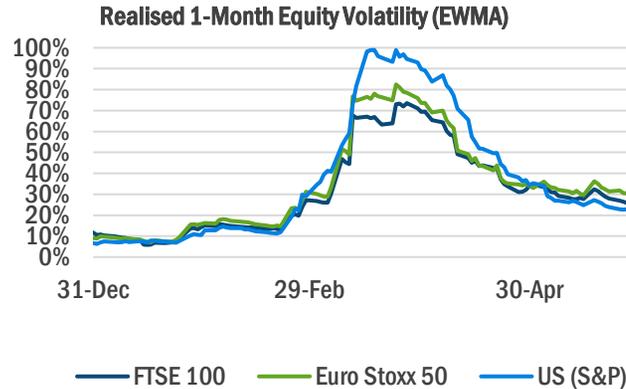
- **Consumer Price Index (CPI)** – measuring the monthly price of a basket of consumer goods and services
- **Retail Price Index (RPI)** – similar to CPI, but the main difference due the addition of mortgage payments, council tax and other housing costs
- **Average Earnings** – measuring the average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

Volatility and Hedging Cost Monitor

- Realised volatilities continued to decline in May, as all major indices ended the month with their realised volatilities back below 30%.
- Despite this decline, realised volatilities remain above historical averages for all major indices. The FTSE 100 and the Euro Stoxx 50 realised volatilities stood at 25% and 29% at month-end, respectively. While the S&P 500 ended the month with a realised volatility reading of 20.7%.
- Volatility risk premiums remained broadly unchanged as implied volatilities fell with realised volatilities. However risk premium levels are still elevated compared to those seen prior to the Covid-19 pandemic crisis.
- The FTSE 100 and the S&P 500 had volatility risk premiums of 5.5% at month-end, while the Euro Stoxx 50 posted a volatility risk premium of 4.9%.



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.

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 approximately \$136.4 billion in global assets (as of March 31, 2020).

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

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