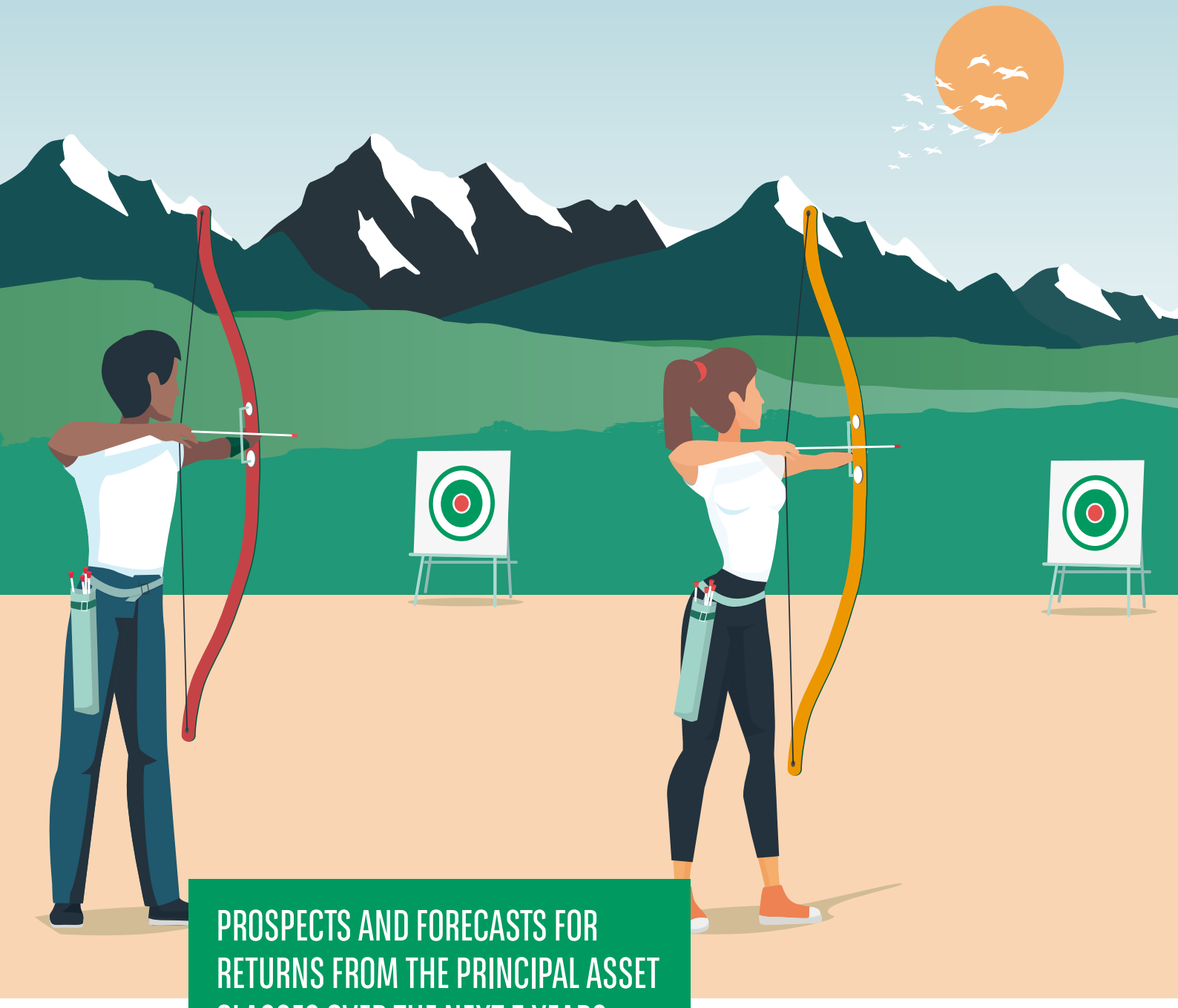
For professional investors - February 2023

LONG-TERM ASSET ALLOCATION
A DIFFERENT OUTLOOK



PROSPECTS AND FORECASTS FOR RETURNS FROM THE PRINCIPAL ASSET CLASSES OVER THE NEXT 5 YEARS

BNP PARIBAS
ASSET MANAGEMENT

The sustainable investor for a changing world

Koye Somefun

Head of Multi Asset & Solutions
Quantitative Research Group
koye.somefun@bnpparibas.com

Daniel Morris

Chief Market Strategist
daniel.m.morris@bnpparibas.com

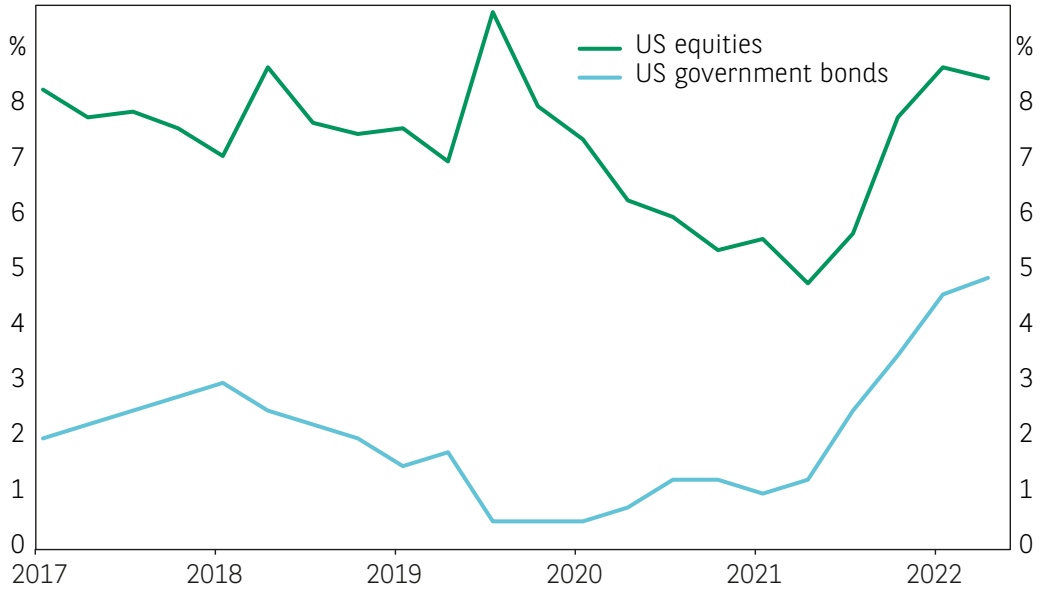
Mehdi-Vincent Hacini

Quantitative Analyst,
Quantitative Research Group
mehdivincent.hacini@bnpparibas.com

What a difference a year makes. In the US, the S&P 500 index was trading at 22x forward earnings at the beginning of 2022, 10-year Treasury yields were 1.5%, and the US Federal Reserve (Fed) funds rate was in the 0.0-0.25% range.

With such elevated valuations, expected long-term returns for many assets classes were inevitably low: just 4.8% for US equities and 1.3% for Treasuries. Today (at the end of February 2023), the S&P 500 price-earnings (P/E) ratio has dropped to 18x, Treasury yields are 200 basis points (bp) higher, and the fed funds rate range is now 4.50-4.75%. As a result, expected returns have dramatically improved — to 8.5% for equities and 4.9% for bonds (see Exhibit 1).

Exhibit 1: Expected returns have improved significantly
Long-run expected returns



Data as at 31 December 2022 - Source: BNP Paribas Asset Management

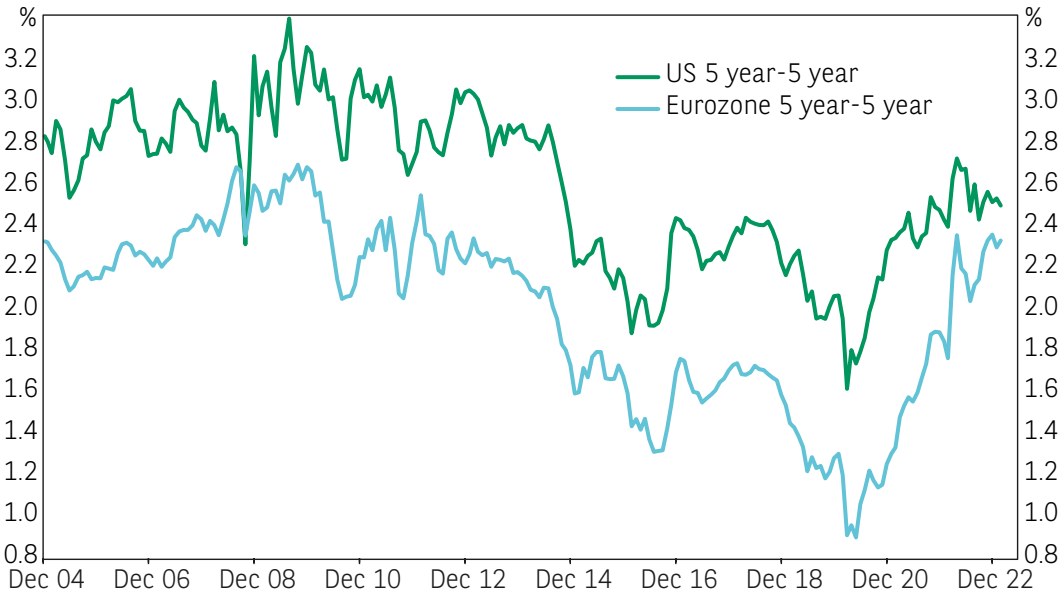
If the story in 2022 was all about valuations, the pivotal issue today is growth. High post-pandemic inflation is decelerating, but there is still a debate about whether recessions will ultimately be required to get inflation back to central bank targets, or whether this can happen painlessly via a 'soft landing'.

The answer depends on where one looks. The US yield curve (2-10 year) had been inverted since last summer and the German curve since last autumn. Consensus economic estimates are for a US recession this year. Many CEO and investor surveys show similar expectations.

Equity and high yield bond markets, however, seem to reflect the view that a recession will either be avoided, or if it occurs it will be mild. Currently low end-of-year inflation expectations could reflect the impact of a recession, or the scenario that inflation will ultimately prove largely transitory and will continue to rapidly decelerate (in which case, the recession signal from the inverted yield curve would have been a false alarm).

We believe tight labour markets mean that a recession in the US and sub-trend growth in the eurozone will be required to achieve central bank objectives. Regardless of the near-term outlook, the inflationary impulse of the pandemic has at least returned long-term expectations back to pre-Global Financial Crisis (GFC) levels (see Exhibit 2).

Exhibit 2: Inflation expectations
Five-year, five-year



Data as at 10 February 2023 - Source: Bloomberg, BNP Paribas Asset Management

LONG-TERM ECONOMIC ASSUMPTIONS: SECULAR STAGNATION, STAGFLATION OR SOFT LANDING?

Before the Covid pandemic, secular stagnation was a popular view among economists. The idea (originally proposed by Alvin Hansen in the 1930s but re-popularised by **Larry Summers**), is that there is a rising desire to save but a declining desire to invest. This combination leads to under consumption and investment, alongside lower growth, inflation and real interest rates.

The drivers for higher savings include income inequality and uncertainty about having sufficient income in retirement. Reduced investment is a function of stagnating labour forces, cheap capital goods (particularly since China has become integrated into the global economy), and the IT revolution, as tech companies tend to preserve capital.

Looking ahead, will secular stagnation continue to be the dominant economic trend? Labour market headwinds have been exacerbated by the pandemic as participation rates have fallen. Goods prices have risen due to supply chain bottlenecks, while plans to re-shore production should also lead to higher prices.

Additional factors could potentially be inflationary. Ageing populations may lead to less savings as the retired spend down their wealth. A smaller labour force should sustain wage gains. Goodhart and Pradanh have some **compelling arguments** as to why demographic trends may lead to high inflation.

While we believe the likelihood of higher inflation has increased, it is not our base case. We believe that persistent worries about having sufficient income in retirement, due to unsustainable pay-as-you-go systems and rising dependency ratios, will lead to increased savings.

Moreover, money saved for retirement is often concentrated among wealthy retirees who have a lower propensity to consume. At the same time, we believe technological developments reducing the need for large scale investments will continue.

Climate change is a much more salient issue than when Summers published his paper in 2016. Ensuring a rise in global temperature aligned with the Paris Agreement will require a massive economic transition – and massive investment.

If well managed, such investments would predominantly replace existing ones in fossil fuels. The current level of investment in fossil fuels needs to fall. The danger is that ongoing investments in fossil fuels could result in stranded assets as more stringent policies to limit global warming are implemented. **Mercure et al (2018)** estimated that stranded assets could lead to a discounted global wealth loss of USD 1-4 trillion – money that should have been spent on the transition to a Paris-aligned global economy.

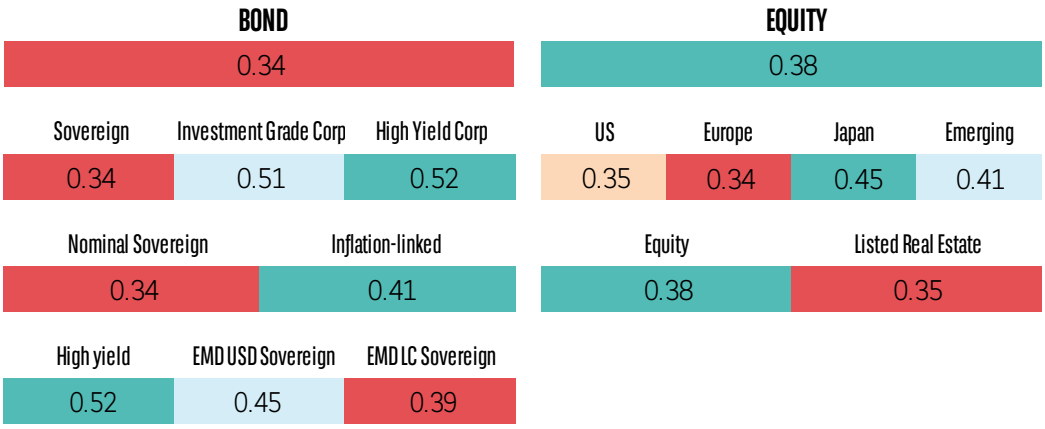
Meanwhile, the need to invest instead in clean energy may well push up inflation and bond yields. For now, our base case is that climate change will increase uncertainty around nominal yields and inflation, but it does not impact on our long-term inflation and yield expectations.

RECOMMENDATIONS

Our current expectations for risk-adjusted returns for a euro-based investor are modest. Few of the assets shown in Exhibit 3 have a Sharpe ratio greater than 0.5.

We see better risk-adjusted returns for equities in the decade ahead than for fixed income, even though expected returns on bonds improved substantially over the last year. The large hedging costs for US Treasuries reduce the expected return, whereas in relative terms hedging costs have less impact on the expected equity returns. Within core assets, we see credit outperforming government debt and equity, though there is little difference between investment grade and high yield credit. For government bonds, we are modestly more positive on inflation-linked bonds than nominal bonds. For riskier fixed income investments, we are comparatively positive on high yield versus emerging market credit. Regionally within equities, we see more potential in Japan and emerging market equities than in the US or Europe. Finally, choosing between equity and listed real estate, we prefer the former.

Exhibit 3: Asset allocation recommendations
Sharpe ratios for a 10-year investment horizon and euro-based investor*



Data as at 31 December 2022. *Hedging currency returns except for local currency emerging market debt and equity (in USD). Source: BNP Paribas Asset Management.

In the appendix you will find a table with expected returns and risk across a broad range of assets and different time horizons.

GOVERNMENT BONDS

For many of our clients, both assets and liabilities play a key role in their strategic asset allocation decisions. Liabilities are client-specific and therefore typically do not resemble the cash flow pattern of any standard bond index. To incorporate these liabilities into an asset allocation requires a view of the entire yield curve so that the present value and sensitivity to interest rates and inflation shocks of any liability pattern can be calculated.

We create a 'customised bond index' that closely mimics the interest rate sensitivities of a client's liabilities and corresponding matching assets. This approach has the additional benefit of easily dealing with the customised bond index of an asset-only client. Focusing on the term structure of interest rates provides flexibility in terms of customising our expected returns for fixed income assets.

More flexibility comes at the price of increased complexity, however. To keep the complexity to a minimum, we use a parsimonious yield curve model that only needs a limited number of input parameters to generate the yield curve. A key input for this approach is the 10-year government bond yield.

Exhibit 4 gives the expected equilibrium inflation, 10-year nominal and real yield for different currencies. At the moment, inflation is still high, albeit decelerating. Our base case scenario is that the economic environment will 'normalise' over the coming years and we will revert back to a situation of under-consumption and investing, pushing inflation back to central bank target levels (US and UK) or lower (Japan and eurozone). Demographic headwinds will again make meeting inflation targets an uphill battle for all central banks.

The target 10-year real yield is simply the difference between the 10-year nominal yield and inflation. The lower growth potential in Japan and the eurozone, partly due to ageing populations, in combination with expected under-investing and consumption due to excess savings, will result in equilibrium in small negative real yields for these two regions.

Exhibit 4: Equilibrium expected nominal and real 10-year yield plus equilibrium inflation assumptions
10-year real yield is obtained by subtracting inflation from the nominal yield

	USD	EUR Core	GBP	JPY
10Y Nominal	2.8%	1.3%	2.7%	0.9%
Inflation	2.3%	1.8%	2.0%	1.0%
10Y Real Yield	0.6%	-0.4%	0.7%	-0.1%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

Our framework requires a view on how 10-year nominal and real yields (for inflation-linked bonds) converge from current levels to equilibrium levels. We assume bigger adjustments in the first years (even overshooting), after which convergence slows. We then use BNP Paribas AM's proprietary Monte Carlo (MC) simulation framework to transform the expected convergence path of the (nominal and real) yields into expected return and risk figures.

Exhibit 5 gives the resulting expected returns for the various investment horizons. Our base case scenario is that the currently tight monetary policy will ease over the next two years, after which yield curves will converge back to lower equilibrium levels.

For government bonds and cash, this means that for all investment horizons, expected returns lie above equilibrium levels. The dislocation for cash is especially high as the current short end of the yield curves lies significantly above the equilibrium rate for all major regions.

Exhibit 5: Average expected total return for nominal government bonds and cash in local currency over various horizons

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
Bond EUR Sovereign Core	3.5%	3.1%	2.4%	1.7%
Bond EUR Sovereign	3.9%	3.8%	3.0%	2.1%
Bond USD Sovereign	4.9%	4.1%	3.5%	3.0%
Bond GBP Sovereign	5.3%	4.6%	4.0%	3.3%
Bond JPY Sovereign	1.1%	1.1%	1.3%	1.4%
Cash EUR	2.2%	1.6%	1.1%	0.6%
Cash USD	3.0%	2.6%	2.2%	1.9%
Cash GBP	3.1%	2.5%	2.2%	1.8%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

INFLATION-LINKED BONDS

Expected returns of inflation-linked government bonds (in local currency) are detailed in Exhibit 6. Equilibrium returns are slightly higher than for nominal bonds for the US and UK. In the UK, this is mainly caused by the significantly longer maturity of UK inflation-linked bonds. In the US, inflation-linked bonds are much more risky than nominal bonds.

This consequently pushes up the arithmetic mean in the MC simulation framework we use to transform the expected convergence paths of the nominal and real yields into expected return and risk figures.

It is the Sharpe ratio which determines the allocation and — in equilibrium — it is marginally lower for inflation bonds than for comparable nominal bonds. One would expect this given that inflation-linked bonds neutralize part of the inflation risk.

For the eurozone and the US, the expected returns for the different investment horizons are higher than the equilibrium returns. This is caused by high current inflation and a real yield curve that is expected to decrease from its current levels, having a positive effect on the price of the current bond portfolio (positive duration effect).

For UK inflation-linked bonds, the opposite applies: The expected returns for the five to 20-year investment horizon are lower than the equilibrium return. Current inflation is also high in the UK but this is more than compensated for by a real yield curve that is expected to rise. UK inflation-linked bonds have long maturities (average duration of around 16 years), so the reduction in real yields has an outsized effect on returns.

Exhibit 6: Equilibrium expected nominal and real 10-year yield plus equilibrium inflation assumptions

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
Bond EUR Inflation-linked	4.5%	3.7%	2.7%	1.7%
Bond USD Inflation-linked	5.7%	4.6%	4.0%	3.4%
Bond GBP Inflation-linked	2.4%	3.3%	3.5%	3.6%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

INVESTMENT-GRADE CREDIT AND HIGH YIELD

The modelling approach taken for credit distinguishes between duration and credit risk components. The return coming from the duration component simply mirrors the corresponding government bond return. The cash flow pattern of the credit index, combined with the corresponding government bond term structure, is used to calculate the expected return and risk coming from the duration exposure.

Separately, the credit model determines the expected spread return (and risk). Total expected return is simply the sum of the expected return on exposure to duration and credit risk. This is a slight simplification as these components are not exactly linearly separable. However, it typically provides a good approximation and leads to a more intuitive understanding of the build-up of credit returns.

To determine the spread return, current spreads, equilibrium spreads and the probabilities of rating migrations play key roles. For corporate bonds, we believe a focus on default probabilities is too narrow. For investment-grade corporate bonds in particular, a rating downgrade is a bigger risk. Investors often refer to this as the risk of an issuer becoming a 'fallen angel'. To take this into account, we include Moody's long-term and forecast rating migration matrices in our approach.

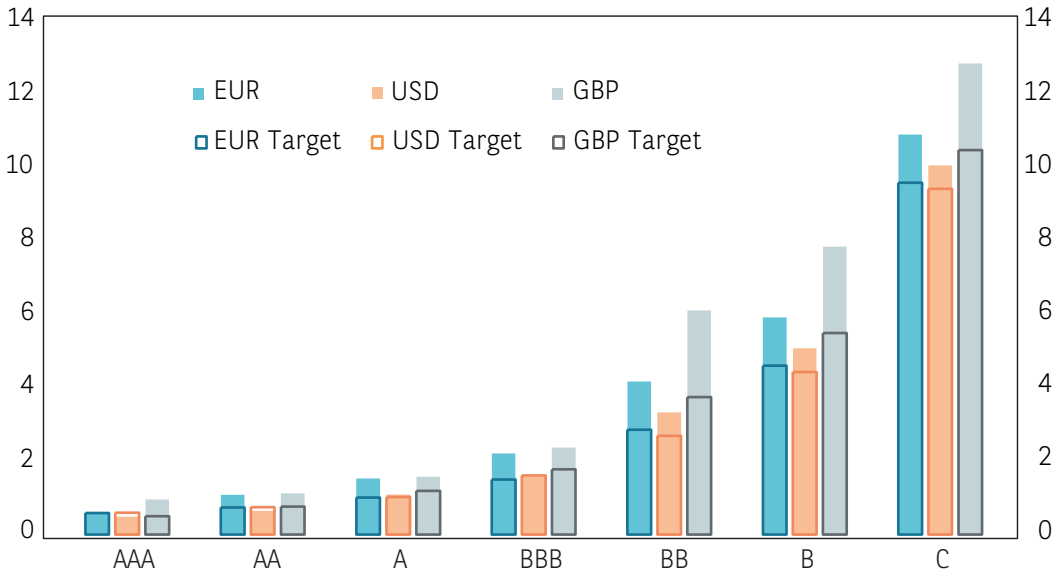
Exhibit 7 below shows the average transition matrix for a global corporate bond portfolio from 1920-2020. The rows represent the rating at which a particular corporate issue starts the year; the columns represent the rating at which the issue ends the year. The numbers in the table represent the probability of transitioning from the 'row' state' to the 'column state'. For example, the matrix tells us there is a 7.9% probability of any given Aaa bond being downgraded to Aa within a year. Consequently, the expected return in any given month on a 10-year Aaa bond (for example) is given by combining the yield (or roll-down) effect and the risk of ratings transition or default.

Exhibit 7: Average one-year ahead rating migration rates 1920-2020

	Aaa	Aa	A	Baa	Ba	B	C	Def
Aaa	91.0%	7.9%	0.8%	0.2%	0.0%	0.0%	0.0%	0.0%
Aa	1.1%	89.8%	8.1%	0.7%	0.2%	0.0%	0.0%	0.1%
A	0.1%	2.8%	90.7%	5.6%	0.6%	0.1%	0.0%	0.1%
Baa	0.0%	0.2%	4.2%	89.9%	4.5%	0.7%	0.1%	0.2%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

Exhibit 8: Current and long-term target spreads



Data as at 31 December 2022. Source: Bloomberg, BNP Paribas Asset Management.

A complicating factor is the rating migration, for example a AA-rated bond today will not necessarily be a AA-rated bond tomorrow due to a default, downgrade or upgrade. Therefore, we use Moody's current one-year-ahead migration matrix and long-run migration matrix to assess the impact of defaults and rating migrations.

In year one, we start with the current one-year-ahead migration matrix and converge, in a linear fashion, in 10 years to the long-run migration matrix, using from the tenth year onwards the long-run migration matrix.

Exhibits 9 and 10 show the total return in local currency and excess return over local cash of credit, over various investment horizons, for the standard Bloomberg Barclays Aggregate corporate indices.

For all regions, expectations lie above the equilibrium numbers. This is because of higher expectations for the underlying government bonds and the expected spread contraction for most ratings to the target levels. The absolute return for US and UK is significantly higher than for the eurozone counterparts.

These differences are partly driven by the underlying local cash rates (as can be seen from the numbers in excess over local cash in Exhibit 10). In excess return (and for hedged return) terms, we have a regional preference for UK credit due to higher absolute spread levels for the UK as shown in Exhibit 8 (leading to a larger spread contraction) and higher expectations for the underlying government bonds (over local cash).

Exhibit 9: Expected total return in local currency of developed credit over various horizons

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
Bond GBP Investment Grade	7.4%	6.2%	5.3%	4.2%
Bond GBP High Yield	10.3%	8.5%	7.2%	6.0%
Bond EUR Investment Grade	5.5%	4.5%	3.5%	2.5%
Bond EUR High Yield	7.2%	5.9%	4.8%	3.8%
Bond USD Investment Grade	6.7%	5.7%	5.1%	4.3%
Bond USD High Yield	8.0%	6.8%	6.1%	5.1%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

Exhibit 10: Expected excess return in local currency of developed credit over various horizons

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
Bond GBP Investment Grade	4.2%	3.5%	3.0%	2.3%
Bond GBP High Yield	7.0%	5.8%	4.9%	4.1%
Bond EUR Investment Grade	3.2%	2.9%	2.4%	1.9%
Bond EUR High Yield	4.9%	4.3%	3.7%	3.2%
Bond USD Investment Grade	3.6%	3.1%	2.8%	2.3%
Bond USD High Yield	4.8%	4.2%	3.8%	3.1%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

EMERGING MARKET DEBT

For emerging market bonds, we distinguish between emerging market debt (EMD), hard currency (HC) and local currency (LC) sovereign global. Both EMD HC and LC comprise sovereign (and supranational) bonds. For EMD HC, these bonds are denominated in foreign currencies, predominantly the US dollar (USD), with denomination in euros (EUR) being more common for Eastern European countries.

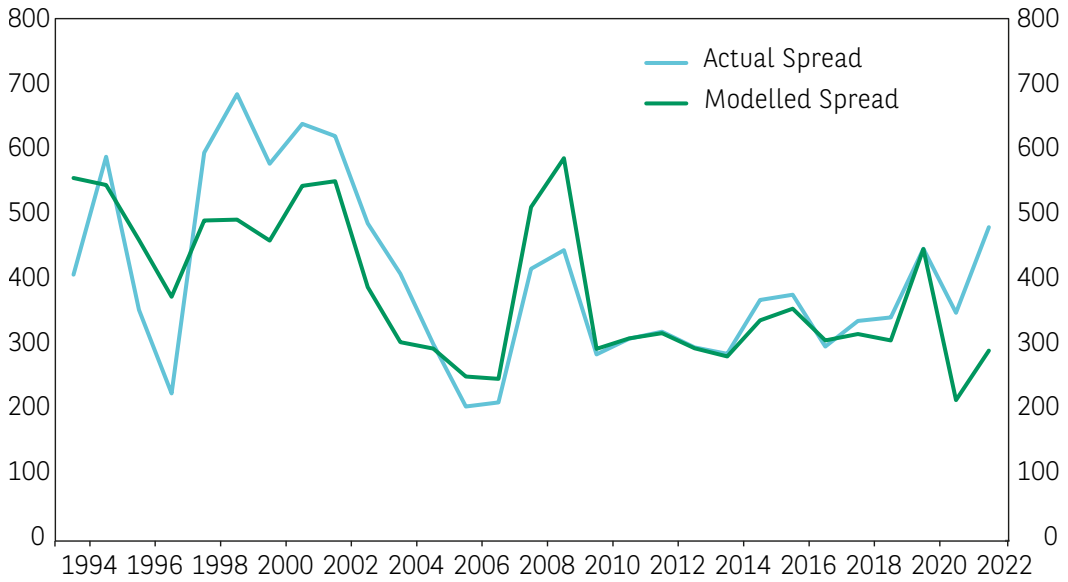
Typically, a country can default on its hard currency debt whereas for local currencies a credit event is generally channelled through a strong deprecation/devaluation of the currency (as a country can typically print more money to pay for its debts in local currencies).

Emerging market debt hard currency

As with credit, the expected return for EMD HC consists of a US Treasury or underlying yield and a spread component. Partly due to the limited availability of data, we opt for a more stylised approach than the curve approach used for credit by estimating the historical relationship between the spread over US treasuries for EMD HC. Key explanatory variables are (expected) GDP growth, the average rating for the EM Debt HC index, and the weighted average US corporate debt spread.

Exhibit 11 illustrates the historical fit of this relationship. The actual and modelled spreads show a close relationship between 2010 and 2020. As emerging markets have become more mature and intertwined with the global economy, we believe recent history is more representative (this view assumes the impact of the current deglobalisation trend will be limited). The simple spread model, derived from this relationship, allows for the calculation of target spreads conditional on the expected value of the three explanatory variables.

Exhibit 11: Actual and modelled hard currency emerging market debt



Data as at 31 December 2022. Source: Bloomberg, Moody's, BNP Paribas Asset Management.

This target spread changes during the first 10 years as the three explanatory variables change. After 10 years, the spread represents the equilibrium spread and does not change further as the explanatory variables are static.

The current actual spread typically differs from this target spread. We assume that this difference between target spread and actual spread disappears in a linear fashion over a 10-year horizon. Combining this target spread and the difference gives the actual (predicted) spread in the next 10 years. This spread is translated into a spread return by simply using the spread duration: i.e.,

$$R_t = s_{t-1} + Duration_{t-1} \cdot (s_t - s_{t-1}) - default\ impact_t \quad (1)$$

where R_t and Duration_t denote the spread return and duration, while s_t denotes the index spread.

As with developed credit, we assess the impact of defaults and rating migrations using Moody's long-run sovereign migration matrix. We combine the spread return with the US Treasury returns. Exhibit 12 gives the expected average spread return, US Treasury return and total return at different investment horizons.

Exhibit 12: Expected returns: Emerging market debt hard currency

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
Spread Return	2.4%	2.4%	2.2%	2.1%
US Treasury Return	4.9%	4.1%	3.5%	3.0%
Total Return	7.3%	6.5%	5.8%	5.2%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

For the shorter investment horizon, the expected total return for EMD HC is considerably higher than the equilibrium level: i.e., EMD HC looks 'undervalued'. Spreads are slightly higher than anticipated by our spread model, leading to a marginal contribution to this undervaluation. The biggest contribution comes from the underlying US Treasuries.

Emerging market debt local currency

The return of EMD local currency (LC) can be decomposed into three components:
(a) **Yield** — the income return corresponding to the yield-to-maturity of the index
(b) **Duration** — the valuation return corresponding to changes in the yield
(c) **Foreign exchange (FX)** — the return coming from the evolution of EM FX vs. USD.

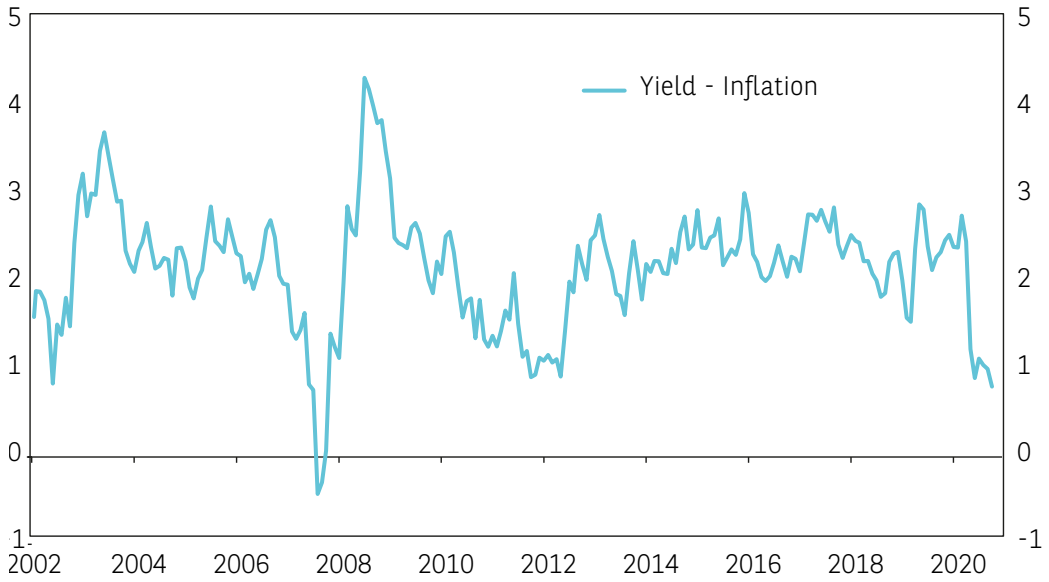
By adding these separate components together, we can closely match the actual total return of the index. This can be seen in Exhibit 13, which shows monthly actual and re-constructed total returns of the JPM GBI EM Global Diversified Composite since 2003.

Exhibit 13: Decomposing EMD LC in Yield, Duration and Fx closely tracks the realised annual return of JPM GBI EM Global Diversified Composite

Data as July 2022. Source: JP Morgan, BNP Paribas Asset Management.

As can be seen in Exhibit 14, the difference between the yield of EMD LC and the inflation rate of the corresponding EM basket has been relatively stable over the past 20 years, hovering at around 2.2%. We assume that, in equilibrium, yields will adhere to this relationship; that is, yield is equal to the average inflation expectation of EM plus a spread. Starting from the current yield level, the yield converges in 10 years to 6.2% (an equilibrium inflation expectation of 4% plus a 2.2% spread).

Exhibit 14: Difference between the yield of the JPM GBI EM Global Diversified Composite index and inflation of the EM basket



Data as July 2022. Source: JP Morgan, BNP Paribas Asset Management.

Exhibit 15 gives the expected return, at different investment horizons, for the total yield. Additionally, it shows average values for different horizons for the duration effect and foreign currencies.

The duration effect is calculated using equation (1), while the impact of foreign currency exposure on EMD LC is assessed using purchasing power parity (adjusted for differences in productivity). In equilibrium we assume a zero-currency effect.

Exhibit 15: Expected return for EMD LC at different investment horizons for the total yield components (inflation + spread), duration effect and currency effect

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
Total Yield	6.7%	6.5%	6.4%	6.2%
Duration Effect	0.5%	0.3%	0.2%	0.0%
FX Effect	0.2%	0.4%	0.2%	0.0%
Total Return	7.4%	7.2%	6.7%	6.2%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

EQUITIES

To model equity returns, we decompose them into various components — inflation, total yield/income and real total payout growth — that contribute to the expected return. This approach is often referred to as a total payout model (see Streahl and Ibbotson 2017 for more details)[1].

With the growing importance of buybacks, we prefer this approach over the dividend discount model. Additionally, a total payout method has the advantage over an earnings-driven approach in that, unlike earnings, payout is not sensitive to changes in accounting standards.

The total payout model decomposes equilibrium returns into inflation, total yield and real total payout growth. For inflation, we use the same equilibrium assumption as for fixed income. Consequently, the total payout model for real equity returns becomes the real equilibrium return plus a valuation adjustment:

Real Return = Total Yield + Real Total Payout Growth (adj B.) + Valuation Adjustments (2)

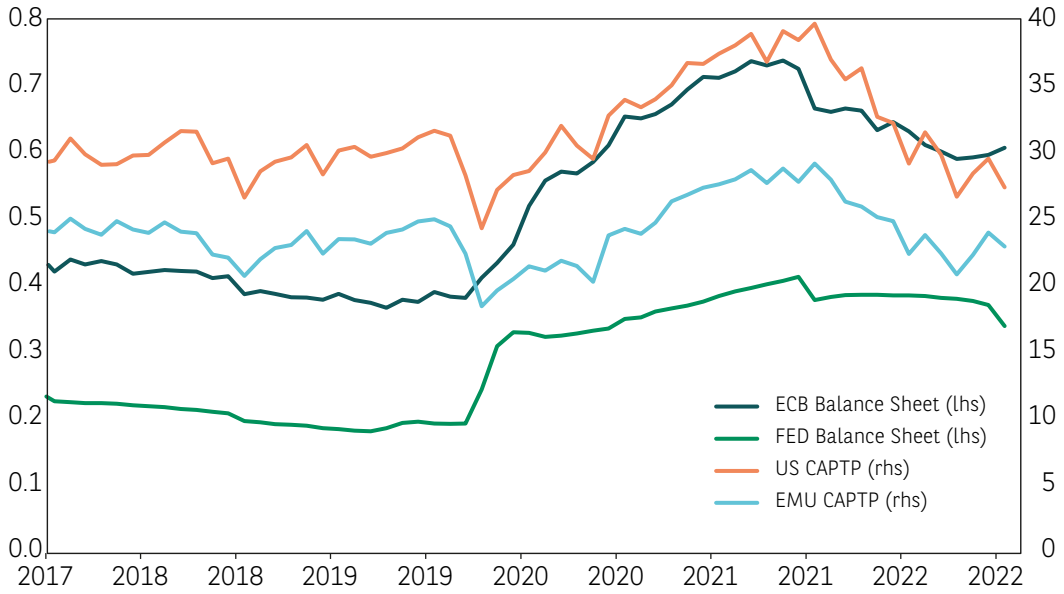
To gauge the valuation component, we look at the variation in the price to total payout (of an index). The starting point is the Cyclically Adjusted Price to Total Payout (CAPTP) ratio, calculated by taking the 10-year median real total payout divided by the current price. The idea is that the current CAPTP will converge to its equilibrium level in 10 years.

However, since 2009, we have seen a spectacular increase in the balance sheets of developed economy central banks, which has supported an expansion of valuation measures such as the CAPTP.

1 Philip U Straehl and Roger G. Ibbotson, "The Long-Run Drivers of Stock Returns: Total Payouts and the Real Economy" Financial Analysts Journal, Third Quarter 2017.

Exhibit 16 depicts this balance sheet growth versus CAPTP. Regression analyses confirm a relatively significant statistical relationship between central bank balance sheet expansion and CAPTP. These regressions are in-sample, so they do not necessarily confirm the predictive power of balance sheet expansion vis-à-vis equilibrium CAPTP.

Exhibit 16: Balance sheet as % of GDP of FED vs. US MSCI CAPTP & ECB vs. MSCI EMU CAPTP



Data as July 2022. Source: JP Morgan, BNP Paribas Asset Management.

With central banks poised to reduce their balance sheets, however, we try to proxy the effect this may have on CAPTP and consequently on the valuation adjustment. We assume current CAPTP will converge to a long-term CAPTP adjusted for the central bank's balance sheet.

Combining the valuation adjustments with the equilibrium equity expectations over inflation gives real equity return expectations for the first 10 years. Adding the inflation equilibrium assumptions used within the fixed income model gives the total return expectations depicted in Exhibit 17.

Exhibit 17: Expected returns for equity for different investment horizons

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
USA	8.5%	8.5%	8.4%	8.4%
USA SC	11.3%	10.9%	9.9%	8.9%
EMU	6.6%	6.8%	7.2%	7.7%
EMU SC	9.7%	9.4%	8.5%	7.7%
UK	8.2%	8.1%	7.8%	7.5%
Japan	7.8%	7.5%	6.9%	6.3%
Emerging	11.0%	10.8%	10.5%	10.1%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

For the developed regions, these numbers assume a 30% reduction of central bank balance sheets over the next 10 years, which will depress the valuation component. After last year's sell off (partly reversed this year), equities generally still look fairly priced or even cheap. EMU equities are the notable exception.

REAL ESTATE

We decompose real estate returns into inflation, income, growth and valuation components. To proxy the income and growth components, we rely on dividends and earnings. The model for real returns is:

Real Return = Dividend Yield + Real Earnings Growth + Valuation Adjustments (3)

There are two main reasons for choosing the dividend model instead of a total payout approach as we do for equities. Firstly, buybacks are less relevant. A large part of real estate indices consist of real estate investment trusts (REITs), which require payments in dividend for most of their taxable income. Secondly, the data on buybacks is more limited for real estate indices.

Exhibit 18 shows the expected return for real estate over different investment horizons. After the market correction we saw in 2022, real estate again looks slightly undervalued.

Exhibit 18: Expected returns for real estate over different investment horizons

	First 5 Years	First 10 Years	First 20 Years	Equilibrium
Real Est. US	8.4%	8.3%	8.1%	7.9%
Real Est. Europe	7.8%	7.7%	7.3%	6.9%
Real Est. Asia-Pacific	8.4%	8.3%	8.2%	8.1%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

CURRENCY AND VALUATION: TO HEDGE OR NOT?

All risk and return numbers are presented in local terms, avoiding the issue of what an asset's expected return will be from a particular investor's currency perspective. As a rule of thumb, we believe that an investor should hedge the currency risk of their fixed-income investments as it could otherwise dominate the volatility of their fixed-income exposure.

As a proxy for the hedging cost, we take the difference between USD and euro cash returns, resulting in a hedging cost of 0.8%. The expected 4.1% local currency total return for US Treasuries becomes a 3.3% euro-hedged return, which is lower than the 3.8% expected return on euro sovereign government bonds.

Another factor in determining whether one should hedge foreign currency exposure is the return we can expect on the currency. To address this, we turn to the relative version of the purchasing power parity (PPP) theory of currency determination.

In a world of free trade, the price of identical tradable goods across countries should be normalised by cross-border arbitrage. In other words, nominal exchange rates should move to offset relative changes in price levels. PPP seems to provide a good anchor for foreign exchange forecasts.

The assumption is that if prices in country A rise relative to those in country B, we would expect to see a depreciation of country A's nominal exchange rate (i.e., a rise in the number of units of currency A necessary to buy one unit of currency B).

A recent ECB study comparing equilibrium exchange rate models confirms that in terms of predictability, PPP outperforms two other fair value models.[2]

Exhibit 19 gives the expected currency return from a euro investor's point of view. In terms of relative purchasing power parity, the USD and Swiss franc (CHF) are overvalued versus the euro and the Japanese yen (JPY) is undervalued.

Exhibit 19: Average annual expected currency returns for a euro-based investor over different investment horizons

Total Return	First 5 Years	First 10 Years	First 20 Years	Equilibrium
USDEUR	-2.0%	-1.7%	-0.8%	0.0%
GBPEUR	0.0%	0.0%	0.0%	0.0%
JPYEUR	5.0%	4.2%	2.1%	0.0%
CHFEUR	-0.7%	-0.6%	-0.3%	0.0%

Data as at 31 December 2022. Source: BNP Paribas Asset Management

Taking into account valuation, hedging cost, but also the extent to which hedging can reduce portfolio risk, we would at the moment typically advise investors to hedge the currency exposure of CHF and to a lesser extent the USD (as hedging costs have come down substantially). For the JPY we would be willing to take quite a bit of currency risk, while we are neutral on the pound sterling (GBP).

2 Ca' Zorzi, Michele and Cap, Adam and Mijakovic, Andrej and Rubaszek Michał, The Predictive Power of Equilibrium Exchange Rate Models, January 2020 Available at SSRN: https://ssrn.com/abstract=3516749

APPENDIX

The approach

The long-term expected return views can be broken down into equilibrium returns and valuation adjustments. The idea is that financial assets typically go through economic cycles. Equilibrium returns represent the return expectations for financial assets over multiple economic cycles. Economic and financial conditions more specific to the current cycle are captured in the valuations-adjustment component.

For five to 10-year investment horizons, the valuations component is quite important, whereas for 20+ year investment horizons, return expectations are dominated by the equilibrium return. Explicitly separating out the valuation component has the benefit of transparency as it shows how the valuation assumption contributes to the period return.

We have generated these expected return and risk views to facilitate the asset allocations of our clients. Some of our clients have very long-term liabilities to allow for. For example, the decommissioning of a nuclear power plant could easily lead to liabilities of 50-plus years, and a pension fund with a large number of young participants would also have a multi-decade liability horizon. Having forecasts of long-term returns and risk facilitates the design of a strategic asset allocation to finance these very long-term liabilities.

Risk and return figures across different investment horizons - Local currency terms*

Total Return Q4 2022	First 5 Years	First 10 Years	First 20 Years	Equilibrium
CASH				
Cash GBP	3.1%	2.5%	2.2%	1.8%
Cash EUR	2.2%	1.6%	1.1%	0.6%
Cash USD	3.0%	2.6%	2.2%	1.9%
FIXED INCOME				
Bond EUR Sovereign	3.9%	3.8%	3.0%	2.1%
Bond EUR Sovereign Core	3.5%	3.1%	2.4%	1.7%
Bond GBP Sovereign	5.3%	4.6%	4.0%	3.3%
Bond USD Sovereign	4.9%	4.1%	3.5%	3.0%
Bond EUR Inflation Linked	4.5%	3.7%	2.7%	1.7%
Bond USD Inflation Linked	5.7%	4.6%	4.0%	3.4%
Bond GBP Investment Grade	7.4%	6.2%	5.3%	4.2%
Bond GBP High Yield	10.3%	8.5%	7.2%	6.0%
Bond EUR Investment Grade	5.5%	4.5%	3.5%	2.5%
Bond EUR High Yield	7.2%	5.9%	4.8%	3.8%
Bond EUR Leveraged Loans	6.4%	5.1%	4.1%	3.2%
Bond USD Investment Grade	6.7%	5.7%	5.1%	4.3%
Bond USD High Yield	8.0%	6.8%	6.1%	5.1%
Bond USD Leveraged Loans	6.6%	5.7%	5.1%	4.3%
Bond EMD HC Sov Global	7.3%	6.5%	5.8%	5.2%
Bond EMD LC Sov Global	7.4%	7.2%	6.7%	6.2%
EQUITY				
Equity North America USA	8.5%	8.5%	8.4%	8.4%
Equity North America USA SC	11.3%	10.9%	9.9%	8.9%
Equity Europe Pan-Europe	6.4%	6.5%	6.7%	6.9%
Equity Europe EMU	6.6%	6.8%	7.2%	7.7%
Equity Pacific Japan	7.8%	7.5%	6.9%	6.3%
Equity Emerging Global	11.0%	10.8%	10.5%	10.1%
Equity Global Developed Countries	8.0%	8.0%	8.0%	7.9%
ALTERNATIVES				
Alternative Real Estate Pan-Europe	7.8%	7.7%	7.3%	6.9%
Alternative Real Estate USA	8.4%	8.3%	8.1%	7.9%
Alternative Real Estate Asia-Pacific	8.4%	8.3%	8.2%	8.1%
Alternative Convertible Global	7.1%	6.9%	6.5%	6.2%
Alternative Commodity Global	8.7%	8.3%	7.2%	6.1%

Volatility Q4 2022	First 5 Years	First 10 Years	First 20 Years	Equilibrium
CASH				
Cash GBP	0.6%	0.6%	0.7%	0.9%
Cash EUR	0.5%	0.5%	0.5%	0.7%
Cash USD	0.5%	0.5%	0.5%	0.6%
FIXED INCOME				
Bond EUR Sovereign	5.3%	5.6%	5.8%	5.9%
Bond EUR Sovereign Core	4.8%	5.0%	5.1%	5.2%
Bond GBP Sovereign	6.6%	6.9%	7.0%	7.2%
Bond USD Sovereign	5.2%	5.3%	5.3%	5.3%
Bond EUR Inflation Linked	4.8%	4.9%	4.9%	4.8%
Bond USD Inflation Linked	8.2%	8.2%	8.3%	7.7%
Bond GBP Investment Grade	6.5%	6.6%	6.7%	6.8%
Bond GBP High Yield	9.0%	9.0%	9.2%	9.5%
Bond EUR Investment Grade	4.8%	5.0%	5.1%	5.2%
Bond EUR High Yield	8.1%	8.1%	8.6%	9.1%
Bond EUR Leveraged Loans	7.5%	7.6%	7.5%	7.4%
Bond USD Investment Grade	6.7%	6.7%	6.6%	6.4%
Bond USD High Yield	8.4%	8.4%	8.5%	8.6%
Bond USD Leveraged Loans	6.0%	6.0%	6.0%	6.1%
Bond EMD HC Sov Global	8.4%	8.4%	8.6%	8.8%
Bond EMD LC Sov Global	11.8%	11.8%	11.7%	11.7%
EQUITY				
Equity North America USA	16.5%	16.5%	15.8%	15.0%
Equity North America USA SC	20.8%	20.8%	20.3%	19.7%
Equity Europe Pan-Europe	14.3%	14.3%	14.5%	14.6%
Equity Europe EMU	17.6%	17.6%	17.5%	17.4%
Equity Pacific Japan	16.5%	16.5%	17.0%	17.6%
Equity Emerging Global	19.6%	19.6%	20.2%	20.7%
Equity Global Developed Countries	14.8%	14.8%	14.4%	13.9%
ALTERNATIVES				
Alternative Real Estate Pan-Europe	19.4%	19.4%	17.8%	15.7%
Alternative Real Estate USA	19.1%	19.1%	18.2%	17.2%
Alternative Real Estate Asia-Pacific	16.3%	16.3%	15.8%	15.3%
Alternative Convertible Global	11.7%	11.7%	11.6%	11.4%
Alternative Commodity Global	19.8%	19.8%	19.6%	19.4%

Data as at 31 December 2022. *Except for local currency emerging market debt equity (in USD). Source: BNP Paribas Asset Management.

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The following views represent our judgment as at the date of this presentation and may subject to change without notice.

VIEWPOINT

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