WHITEPAPER

Capital Market Assumptions

Influence tomorrow

BARCLAYS | Private Bank

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For Accredited Investors in Singapore.

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Executive summary

At Barclays Private Bank, we help our clients achieve their long-term investment goals through a structured and disciplined investment process. This journey starts with understanding our clients, their investment needs and objectives – such as liquidity, lifestyle and aspirational goals – as well as their risk tolerance and capacity.

Strategic Asset Allocation (SAA) is the bedrock of our investment process, and it represents the optimal long-term positioning in a range of asset classes. The SAA design is guided by our investment philosophy, which revolves around the principles of long-term investing, wealth preservation, international multi-asset class diversification, and optimal risk-return trade-off. According to some academic studies, 80-90% of a portfolio performance can be attributed to the SAA.[1] Therefore, getting the long-term asset allocation policy right is important for successful investing.

Part of good asset allocation rests on reliable estimates of future return and risk. To this end, our Capital Market Assumptions (CMA) represent forward-looking estimates of expected returns, volatilities, and correlations over the next five years for a number of asset classes, i.e. fixed income, equities, commodities, real estate, hedge funds, foreign exchange, and private markets.

Our CMA framework provides a strategic investment compass that helps our clients navigate through shifting landscapes of reward and risk in financial markets. We avoid a naïve assumption that history will repeat itself exactly. The forward-looking nature of the CMA reflects our attempt to integrate the macro-financial information regarding the current stage of the economic cycle with our views regarding secular trends and possible structural changes. Our estimates are constructed using a building-block approach which provides a decomposition of expected returns into key drivers: income, growth, and valuation. The final results represent a robust blend of quantitative and fundamental expertise.

This whitepaper provides a non-technical overview of the CMA methodology at Barclays Private Bank. We hope that the reader will find it insightful and use it as a guidebook for understanding the key return drivers across a spectrum of investment opportunities, as well as to inform their views regarding the attractiveness of various asset classes going forward.

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[1] E.g. see Brinson, Hood and Beebower (1986), Brinson, Singer and Beebower (1991), and Ibbotson and Kaplan (2000).

Introduction

The Capital Market Assumptions (CMAs) represent forward-looking estimates of expected returns, volatilities, and correlations over the next five years for a range of (sub)asset classes in the investment universe, i.e. fixed income, equities, commodities, real estate, hedge funds, foreign exchange, and private markets.

For each asset class, the CMAs are produced in their respective local currencies. The exception to this rule are the indices that include geographically disperse securities (e.g. global or emerging market equities, global bonds, or commodities, among others). For such indices, the expected returns are produced in a hard currency (e.g. USD).

We build our expectations of long-term returns and risk parameters by leveraging both academic and industry research. Our methodology blends data-driven models and expert views for different asset classes with macroeconomic projections for the next five years. Therefore, the current stage of the economic cycle provides an important anchor to our CMAs.[2]

THE BUILDING-BLOCKS APPROACH FOR EXPECTED RETURNS

Our methodology for the estimation of expected returns is based on a simple framework – which has a strong foundation in financial economics and asset pricing theory – that breaks down the expected returns into three complementary building blocks, i.e. income, growth, and valuation.

This methodology can be applied to a wide range of asset classes: fixed income, equities, and commodities. The exceptions to this rule are hedge funds and private markets, for which data is not as readily accessible and transparent as is the case for public markets. However, alternative decomposition approaches and quantitative techniques are available for these asset classes.

THE BUILDING-BLOCKS APPROACH FOR EXPECTED RETURNS

ASSET CLASS	BUILDING BLOCKS OF TOTAL RETURNS					
	Income		Growth		Valuation	
Fixed income	Treasury yield	Credit spread	Roll return		Treasury yield curve adjustment	Credit spread adjustment
Equities and REITs	Dividend yield	Net buyback yield	Real earnings growth	Inflation	Multiple expansion	
Commodities	Collateral return		Roll return		Spot price adjustment	
Hedge funds	Quantitative approach					
Private markets	Public market benchmark			Illiquidity premium		

Source: Barclays Private Bank. REITs: Real Estate Investment Trusts.

[2] Forecasts are not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

THE REGIME ANALYSIS FOR EXPECTED VOLATILITIES AND CORRELATIONS

The most common approach when computing long-term volatilities and correlations is to rely on historical estimates because risk parameters are relatively stable over longer investment horizons. However, average historical risk parameters do not incorporate any forward-looking information. To address this issue, we have developed a methodology for the estimation of expected volatilities and correlations based on a two-step process.

In a first step, we conduct an analysis of historical risk regimes. This helps us to distinguish between risk-on and risk-off periods which are characterised by relatively low and high volatilities and correlations, respectively. Such analysis is particularly useful to understand the asset classes which might improve portfolio diversification during stressed periods in equity markets.

In a second step, based on the macroeconomic projections and other forward-looking inputs, the expected risk parameters for the next five years are estimated by appropriately mixing regime-specific risk inputs.

Therefore, this approach allows us to express and incorporate our views regarding the investment risks going forward.

CALIBRATING THE REARVIEW MIRROR

Although price indices can be used over shorter horizons, this does not hold for long-term investments because it is necessary to capture the transfer of value in the form of interim cash distributions, e.g. coupons or dividends. Therefore, total return indices are used in our analysis. We note that the CMAs do not account for taxes, transaction costs, management fees, and any other costs.

Given that our investment horizon is five years, intra-daily, daily and weekly market moves are not an ideal match for our analysis due to a large frequency gap. Using monthly or quarterly data for forecasting over one or multiple economic cycles is a standard approach in the financial industry.

To this end, we collect 20 years of monthly data. Our data set consists of index time series which provide the required inputs for the implementation of the building-blocks methodology (e.g. returns, yields, option-adjusted spreads, duration, dividends, buybacks, etc.). Most indices have sufficiently long histories. For five indices, which do not have sufficiently long data history, a backfilling algorithm is put in place. The backfilling process is further detailed in the last section of this paper. The particular time frame of 20 years is considered for several reasons.

First, our sample spans multiple business cycles and therefore reflects various macroeconomic conditions. Stressed market periods are captured (e.g. the Dot-com bubble, the Great Financial Crisis, and the COVID-19 pandemic).

Second, our data does not extend too far in the past. The sample selection is a balancing act between the statistical benefits of using longer time series in our analysis and the potential biases due to use of data that reflects market regimes which have low realisation likelihood over the next five years.

For example, there were several important changes around 2000 in the economic and financial landscape, such as the introduction of the Euro, inflation stabilisation, lower equity bond correlation, globalisation, demographic trends, growing importance of emerging markets, corporate payout policy changes, and many others.

Therefore, by design, our data set accounts for structural changes and secular trends on the basis of economic arguments. Nevertheless, it is long enough for correlation matrix estimation and risk regimes analysis.

THERE IS NO SUCH THING AS PERFECT FORESIGHT

It is important to stress that – despite all the efforts involved with the forecasting of long-term returns and risks – the CMAs are not a guarantee of future performance. We do not have perfect foresight, and it is challenging to accurately predict all political, social, economic, financial, and other shocks that will materialise over the investment horizon of five years.

Uncertainty is an inherent characteristic of our world. One can only speak of returns and risks that can be reasonably expected in the future. The main purpose of the CMAs is to provide details around the underlying assumptions that trigger our decision-making process for an optimal asset allocation.

Accordingly, our primary goal is to build an internally consistent CMA framework which provides the expected returns and risks which are likely to be supplied by the economy and financial markets over our investment horizon.

We stress that our CMAs are constructed at an asset-class level, with long-term investment horizon in view. We do not make any reference to specific products or investment vehicles. Moreover, it is important to note that the tactical asset allocation and instrument selection processes are completely separated from the CMAs, both in terms of the coverage (granularity) and the investment horizon (typically no longer than one year).

Therefore, the CMAs at Barclays Private Bank should be understood as a set of our baseline expectations regarding the likely macroeconomic path, and the returns and risk parameters for a broad spectrum of asset classes. Although our CMAs do not try to model short-term market gyrations, we acknowledge that uncertainty is a concern for the long run as well.

Macroeconomic backdrop

Each asset class in the investment universe has specific characteristics, risk-return profile, and serves a particular role in a portfolio context. However, all investments are ultimately exposed to the same underlying systematic risks, most notably the economic factors. Our CMA framework accounts for this by linking the expected returns and risk parameters to the projected paths for the key macroeconomic variables.

Economies around the globe are highly intertwined and jointly form a complex system. There are many aspects that one could consider when forming a macroeconomic view, e.g. economic activity, consumer prices, labour market, business conditions, monetary base and money supply, total public debt outstanding and government budget balance, trade balance, housing sector, etc.

In terms of long-term forecasting, a single methodology applied to all countries of interest is likely to fail, given that economic systems across the globe have vastly different sizes, population structures, natural resources, productivity, political stability, etc. Therefore, relying on a single model is not prudent in our view, and combining information from different sources can add significant value.

An effective way to build macroeconomic forecasts is to focus on key factors that encapsulate information about the current and expected state of the economy: short-term interest rates, inflation, and real GDP growth.

SHORT-TERM INTEREST RATES

Treasury bills are government debt obligations with maturities of up to one year. Interest rates on treasuries reflect a government's short-term cost of borrowing. Following the industry standard, we consider three-month treasuries as a proxy for short-term debt in the CMA framework.

Short-term interest rates are intricately linked to the central bank policy rates. Their relationship is remarkably stable across different monetary regimes due to central banks' control of the money supply via open market operations. For example, if the economy is struggling, central banks typically reduce interest rates and add liquidity to the market, i.e. buying treasury securities. Lower policy rates make loans more affordable, which ultimately boosts credit creation and economic activity. This is often referred to as expansionary monetary policy.

Therefore, monetary policy is the key determinant of future short-term interest rates. This has been particularly pronounced after the Global Financial Crisis (GFC). On the basis of their assessment of the economy and with their mandates in mind, central banks use forward guidance to communicate the likely future path of monetary policy, effectively anchoring the market's expectations.

Another important post-GFC effect is the practice of quantitative easing (QE), a rather unconventional tool of monetary policy which involves large-scale asset purchases during a defined period (e.g. long-term government bonds and/or corporate bonds). Due to historically low interest rates, quantitative easing was introduced in several countries and regions around the globe to increase money supply, anchor longer term rates and stimulate investments.

Given these facts, we base our forecasts on:
(a) The Bloomberg economic consensus data that aggregates information from almost 70 different global banks
(b) The official target ranges for central bank policy rates, and
(c) Historical policy rates in the port-GFC period. Our survey-based approach is motivated by extensive academic research, e.g. Chun (2011), Wright (2011), Kim and Orphanides (2012), and Bauer and Rudebusch (2020).

Our approach is motivated by the following considerations. First, the pandemic has hit hard the economy in 2020. As a response, central banks have cut interest rates to new record lows. To support the economic recovery, central banks are expected to keep the interest rates at low levels and provide additional liquidity through their QE programs. Second, the likely path of short-term interest rates is a function of the economic growth and inflation trajectories. Given our inflation and economic growth projections (discussed further in this section), our baseline scenario is a gradual increase in interest rates over time.

INFLATION

Inflation represents the rate of change in the Consumer Price Index (CPI), a statistical indicator which measures the overall level of prices in an economy. It is often used to assess changes in the cost of living and to gauge the purchasing power of a country's currency.

Naturally, inflation impacts all asset classes. However, some of them are more sensitive to changes in the inflation rate. For example, real assets like commodities and real estate are typically considered as good inflation hedges. Inflation-linked bonds are designed specifically to provide protection against unexpected inflation, which is otherwise not embedded in nominal bonds. Additionally, commodity-related stocks and commodity-producing countries exhibit higher correlation with inflation.

Our approach to inflation forecasting is motivated by two streams of academic research. First, we leverage the findings of Banerjee and Marcellino (2003) and Kapetanios, Labhard and Price (2008), who demonstrate that pooling different predictions is a powerful and robust tool for inflation forecasting. Second, in their influential paper, Ang, Bekaert and Wei (2007) have demonstrated that survey-based models exhibit superior performance.

We combine the ideas presented in these studies, and build our inflation forecasts using a pooled, survey-based approach:
(a) The Bloomberg economic consensus data for the next two years
(b) The International Monetary Fund (IMF) long-term inflation projections
(c) Central bank inflation targets
(d) Market-implied inflation breakeven rates, and
(e) Historical inflation rates.

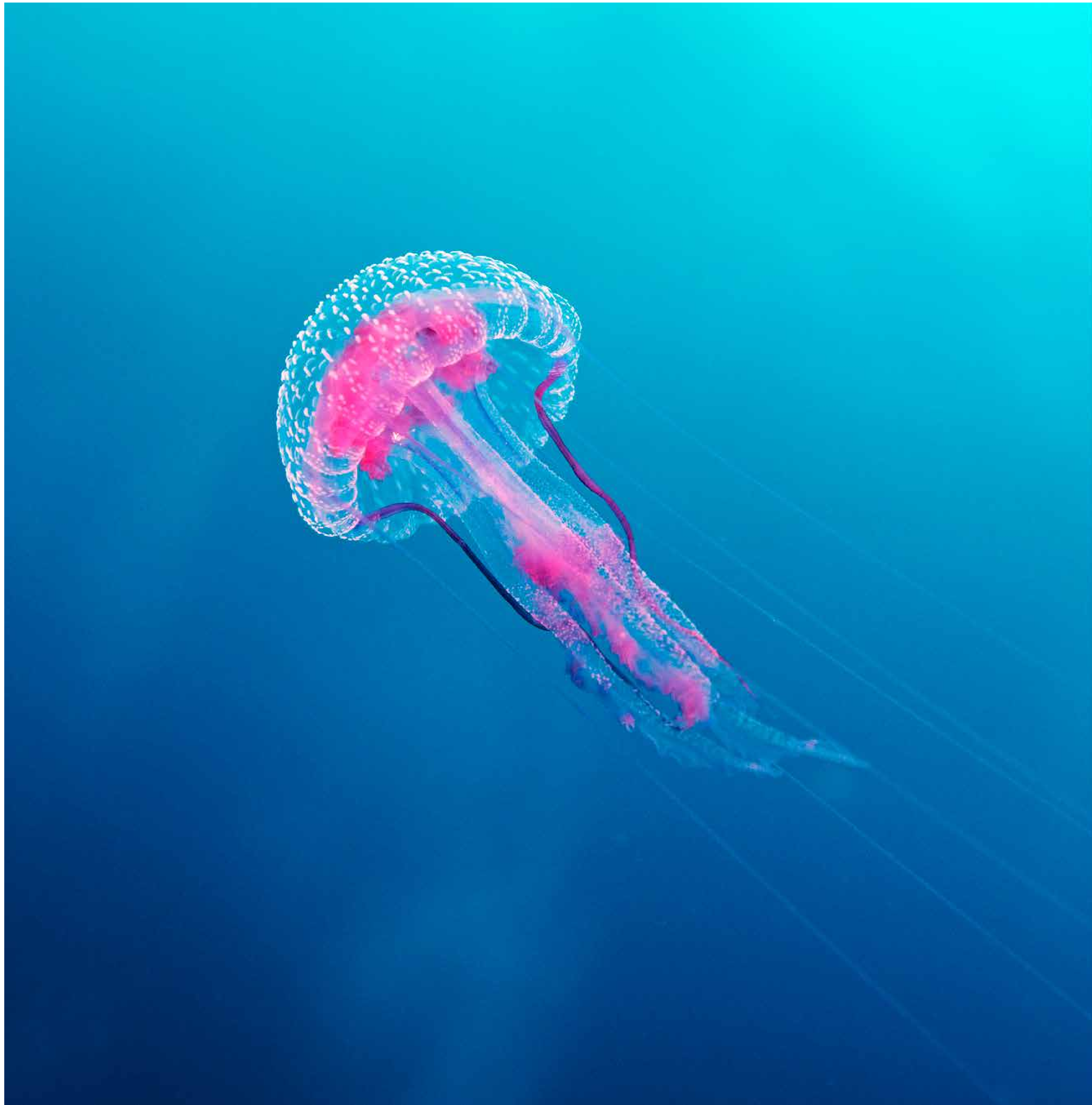
ECONOMIC GROWTH

Gross domestic product (GDP) measures the monetary value of all final goods and services produced in an economy over a pre-specified period (typically quarterly or annually). A GDP figure provides a snapshot of the aggregate domestic production. Therefore, it is often interpreted as an indicator of a country's economic health.

There are three distinct approaches to estimate the GDP, and theoretically they all should result in the same estimate: the expenditure, production, and income method. These methods correspond to the demand side of the economic output.

To build economic growth projections, we break down the nominal GDP growth into inflation and real GDP growth components. Since inflation projections are constructed separately in our CMA framework, we turn our attention to the real economic growth.

Our expectations for the real GDP growth are built on the same foundations as the inflation forecasting framework presented in the previous section. However, two differences should be highlighted. First, breakeven rates do not have any meaning in the context of economic growth. Second, central banks define explicit targets only for inflation. Therefore, by definition, these two components are absent from our real GDP forecasts.



Expected returns methodology

FIXED INCOME

A fixed income security represents a financial obligation of the debtor who promises to pay a specific amount of money on a pre-defined payment schedule to the creditor. The debtor borrows the money by issuing a bond, and repays the principal (i.e. the face value) at the maturity. The interest on the debt is typically paid in regular instalments (i.e. coupons) during the term of the bond.

THE LARGEST PIECE OF PIE

There are many different types of bond issuers, e.g. governments and other sovereign entities such as municipalities and agencies, corporations, and others. Investors in bonds benefit from a stable income stream and high likelihood of repayment of their initial investment. In a portfolio context, fixed income represents one of the core asset classes. In addition to their income-generating feature, bonds are attractive because they typically provide a portfolio protection when equity markets tank. This is particularly true for safer fixed income instruments, e.g. government bonds.

IT'S ALL ABOUT INTEREST RATES

If the bond is held to maturity, the investor is exposed to the reinvestment risk, i.e. the risk that they will have to reinvest coupons at the interest rate below the yield to maturity at the time of investment. If the bond is sold in the secondary market prior to the maturity, the investor is exposed to the interest rate risk, e.g. the risk that they will sell the bond at a price lower than the initial/purchase price due to interest rate movements and therefore realise a capital loss.

By construction, bonds are sensitive to changes in interest rates. If interest rates rise (fall) the bond prices decreases (increases). This fundamental result is merely a special case of the inverse relationship between the present value of a stream of cash flows and the discount rates. The degree of a bond's price exposure to the interest rate risk depends on several factors: maturity, coupon, yield, and embedded options.

BUILDING BLOCKS FOR GOVERNMENT BONDS

The three pillars of expected returns for government bonds are:

1. INCOME

The investor receives periodic coupon payments for each bond they hold in their portfolio. This is captured by the yield to maturity which represents the internal rate of return on a bond.

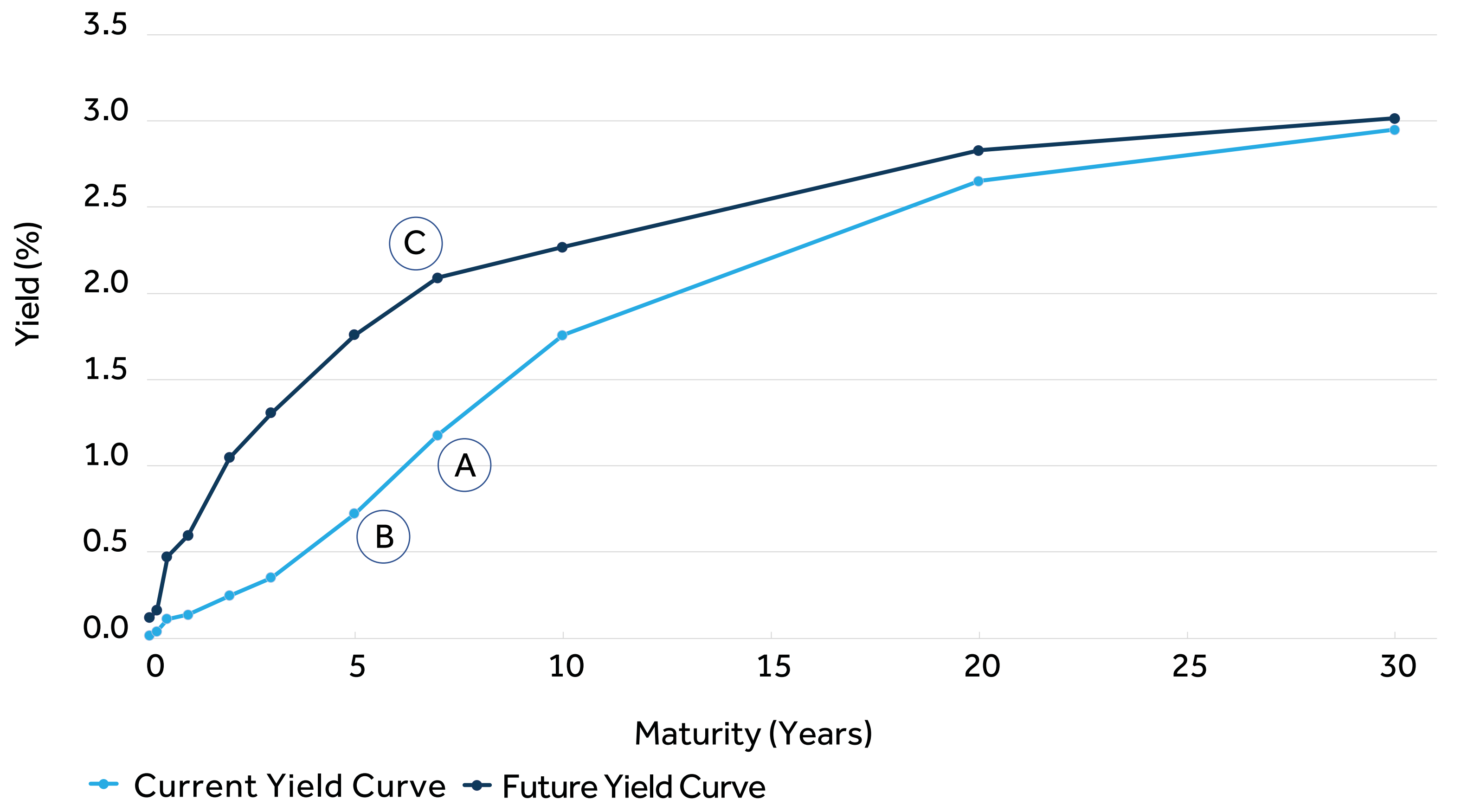
2. GROWTH

Assuming a fixed yield curve, if the spot yield curve is upward sloping – which is typically observed in fixed-income markets – bond prices increase as bonds approach maturity. This passage of time gives rise to the roll-down return, which captures mark-to-market changes in the yield.

3. VALUATION

Dynamics of the spot yield curve drives the repricing in the bond market.

AN ILLUSTRATION OF BUILDING BLOCKS FOR FIXED INCOME



A hypothetical example of a yield curve change and the contribution of different return drivers. For illustrative purposes only. The yield corresponding to point A represents the income. The difference between yields corresponding to points A and B (A and C), weighted by the duration, represents the growth (valuation) component.

Source: Barclays Private Bank.

YIELD AS THE ANCHOR OF NOMINAL RETURNS

Nominal total returns for fixed-income securities are strongly anchored by their current yields. This is particularly true for medium-to-long-term government bonds over longer investment horizons (see figure). Intuitively, by investing in a bond and holding it to maturity, an investor locks in the initial nominal yield. Over shorter investment horizons, valuation adjustments play a more prominent role because interest rates changes have an immediate effect on bond prices. However, a rise (fall) in interest rates renders higher (lower) yields which will at least partially offset the valuation impact over longer time horizons. Therefore, it is reasonable to expect that the valuation component should be somewhat muted over longer investment horizons.

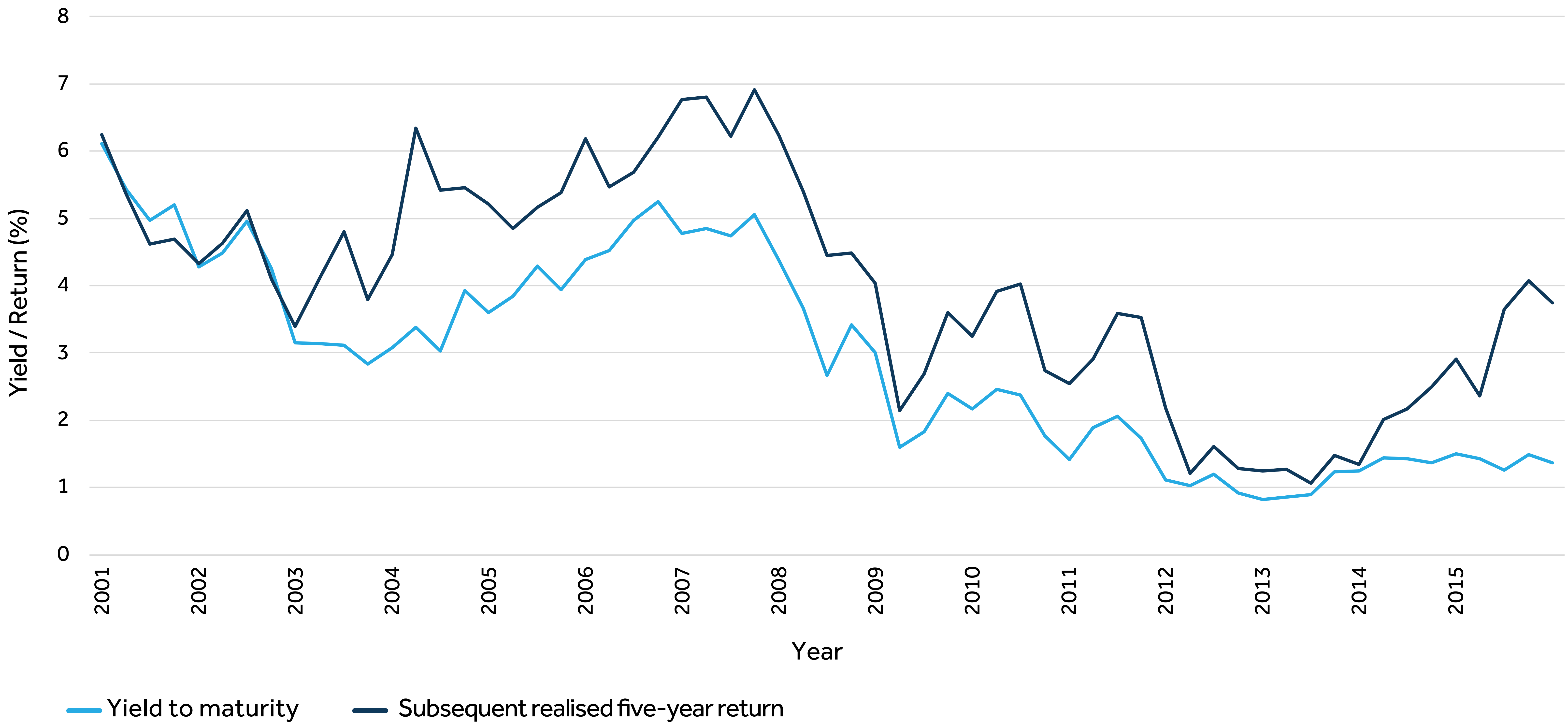
THE SANDS OF TIME AND ROLL-DOWN RETURN

As bonds age and roll down the yield curve, a capital gain is generated. The impact of the movement along the yield curve is a function of two factors: the steepness of the yield curve and the bond duration.

Roll-down benefits investors in single-name bonds and fixed income indices alike. If a bond index is regularly (e.g. monthly) rebalanced to keep its maturity stable/constant, selling some of the securities held in the portfolio and buying other fixed income instruments with longer duration (to reset the bond portfolio duration to its initial value) will generate capital gains due to the roll-down of the liquidated bond positions.

YIELD TO MATURITY AS A PREDICTOR OF TOTAL RETURN PERFORMANCE

The yield to maturity and subsequent realised five-year return for the Bloomberg US Treasury Index from September 2000 to September 2015. The last data point used for five-year return calculation is September 2020. The data frequency is quarterly.



Source: Bloomberg, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

LOOKING AHEAD

The income and growth components of expected returns are determined by the current yield curve and the duration of the index. To estimate the valuation adjustment, it is necessary to forecast future changes in the yield curve.

To ensure internal consistency of our model, we incorporate our expected returns for short-term interest rates and build forecasts for term premia. A term premium measures the compensation for holding a longer-term bond instead of rolling shorter-dated bonds. It can be positive or negative. Our expectations are based on a parsimonious blended approach which combines market-implied information with mean-reversion assumptions derived from our projected economic path.

EXPECTATIONS HYPOTHESIS: MARKET KNOWS BEST

Market-implied expectations can be extracted from the yield curve using the expectations hypothesis which posits that long-term interest rates can be calculated from the current and future short-term interest rates (plus risk premium).

A fixed-income investor could commit their funds either by purchasing a zero-coupon bond with the time to maturity that is equal to the investment horizon (e.g. five years) or by rolling over one-year zero-coupon bonds. If the two strategies are equivalent in terms of the investment performance, then an upward-sloping (downward-sloping) spot yield curve indicates an expected increase (decrease) in the short interest rates.

A similar argument can be made about the forward yield curve. Therefore, according to the expectations hypothesis, forward rates should also reveal market-implied future interest rates.

Despite its intuitive appeal, the expectations hypothesis has been challenged on empirical grounds. Among other authors, Fama and Bliss (1987), Campbell and Shiller (1991), Ilmanen (1995), and Cochrane and Piazzesi (2005) showed that yield curve rather has some predictive power for future excess bond returns (the term premium).

THE ALLURE OF MEAN REVERSION

Interest rates are often assumed to be mean reverting. Indeed, historical data confirms that over multi-decade horizons this seems to be the case. Nevertheless, the global secular decline in interest rates since the 1980s has led to a bond bull market, and ultimately resulted in very low interest rates (close to the zero lower bound or even in the negative territory in some countries).

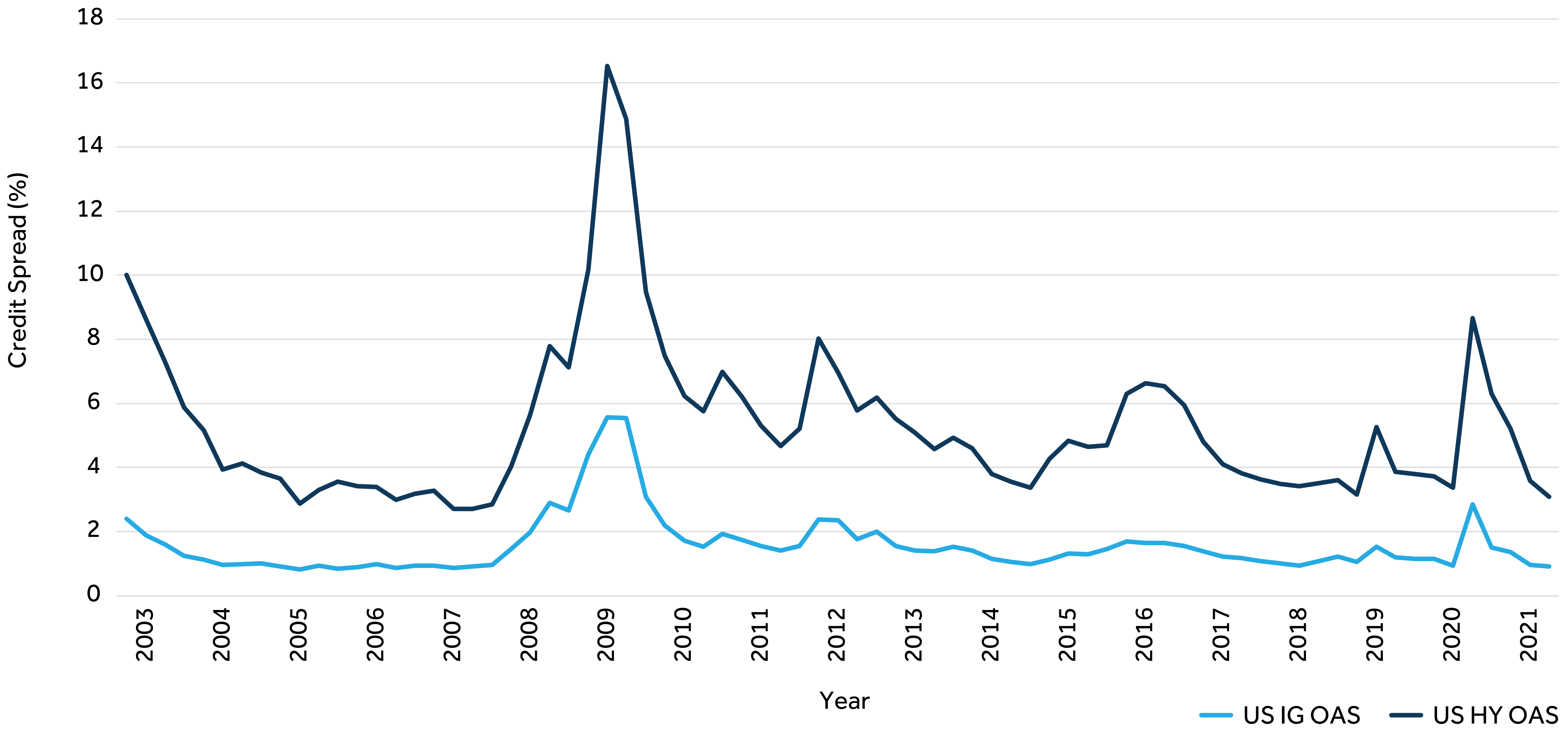
Although a full reversion to historical averages might be a too strong assumption, given the current macroeconomic environment and interest rates close or at the effective lower bound, Bloomberg economic consensus forecasts suggest that many financial experts find a rise in interest rates over the next five years to be likely. The extent of that move can be debated, however at least a partial mean reversion seems to be plausible as a baseline scenario.

We think that a full mean reversion to a long-term average interest rate level by the end of our forecast horizon is unlikely for a host of reasons, e.g. a significant slowdown of growth compared to the initial rebound, a gradual tapering of asset purchases programs, deleveraging pressures in the private sector, aging population, prolonged uncertainty-induced global savings and liquidity glut.

Overall, we expect that the post-pandemic world will be characterised by strong growth over one to two years. Somewhat elevated inflation rates are possible over medium-to-long term. Coupled with decreasing uncertainty during the macroeconomic expansion phase, a gradual interest rate normalisation might be on its way over the next five years.

CREDIT SPREAD FOR US INVESTMENT GRADE AND HIGH YIELD BONDS

The option-adjusted spread (OAS) for the Bloomberg US Corporate Investment Grade (IG) Bond Index and the Bloomberg US Corporate High Yield (HY) Index from September 2002 until March 2021. The data frequency is quarterly.



Source: Bloomberg, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

CREDIT RISK AND OPPORTUNITY

In addition to the interest rate risk, fixed income securities such as corporate, high yield, and emerging market bonds are exposed to the credit risk. The two main types of the credit risk are the downgrade and default risk.

Downgrade risk arises due to an unexpected credit rating downgrade of a bond issue or the issuer by rating agencies. Default risk represents the risk that the bond issuer might not be able to make timely interest and/or principal payments. Blanco, Brennan and Marsh (2005) classified default events into the following five categories: bankruptcy, failure to pay, obligation default or acceleration, repudiation or moratorium (for sovereign entities), and restructuring. Credit risk significantly increases the volatility of corporate, high yield, and emerging market bonds relative to government bonds.

Credit risk introduces a whole new world of investment opportunities. Equity betas of fixed income securities exposed to the credit risk is significantly higher than that of investment grade bonds. However, Sangvinatsos (2011) and Asvanunt and Richardson (2016) provided evidence that the credit risk premium represents an additional source of return which cannot be attributed to term or equity risk premium. To adequately compensate investors for bearing this risk, the total yield embeds a risk premium called credit spread. This component is often represented by the option-adjusted spread and modelled separately from government bond yields.

ADDING CREDIT SPREAD TO THE EQUATION

The expected returns for fixed income securities which are exposed to credit can be estimated using a two-level building-blocks approach. First, the total yield is broken down into two components – the yield on a duration-matching government bond and the credit spread. We note that duration matching is important for the model consistency – it ensures that our expectations regarding the short-term interest rates and term premium are correctly accounted for.

Therefore, to estimate the expected return for riskier bonds and fixed income indices, we leverage our results for government bonds and add the expected credit premium, modeled using the building-blocks approach.

Like government bond yields, credit spreads change over time (see figure). They are driven by company fundamentals and macroeconomic forces and they tend to move in the opposite direction of treasury interest rates. In times of stress, accommodative monetary policy stance and sentiment-driven flight to safety, credit spreads tend to widen whereas yields are typically falling. During risk-on periods which are characterised by stable growth and bullish equity markets, credit spreads significantly tighten. Therefore, credit spreads exhibit pro-cyclical and mean-reverting behaviour.

In our framework, the income component is represented by the current credit spread, whereas the valuation adjustment is estimated based on the assumed evolution of credit spread over the next five years. We assume a mean reversion of credit spreads over the next five years towards their averages over the past ten years.

Roll-down return due to credit spread changes is neglected. The reasoning behind this is that the quality of data for the corporate bond indices is generally lower compared to the government bonds, which makes it difficult to construct a reliable and robust estimator for this term. However, the impact of this assumption is relatively low because the roll-down return is typically small.

BEWARE OF CREDIT LOSSES

Modeling credit spreads is a necessary but not sufficient condition to estimate credit premium. Credit spreads do not map directly to excess credit returns because of potential credit losses. While the default risk is the main source of credit loss for high yield bonds, the main concern for investment grade bonds is the downgrade risk.

The probability of default represents the likelihood that a borrower will fail to repay their debt. The recovery rate is defined as the portion of the capital invested in the risky bond that is expected to be recovered by the investor in the case of a default. Therefore, the expected credit loss can be computed as the product of the probability of default and the loss given default (which equals one minus the recovery rate). The first component varies substantially over time, whereas the second component is relatively stable.

Giescke et al. (2011) estimated that credit spreads are approximately twice as large as default losses that over the long term. Moreover, they find that credit spreads do not adjust to realised default rates. These results indicate that credit spreads and haircuts can be forecasted separately. Therefore, we capture the combined effect of credit migration, default probabilities and recovery rates by introducing a haircut for credit spreads. The haircut represents a multiplier, which is assumed to be 40% in our model based on the standard industry approach.

ADDITIONAL CONSIDERATIONS FOR EMERGING MARKET BONDS

Emerging market bonds are investments in debt issued by or in emerging market countries. Over the last three decades, emerging market economies have had a stellar growth which boosted investment returns.

In our CMA framework, we consider two types of emerging market bonds. Emerging market nominal hard currency (EM HC) bonds represent the USD-denominated debt issued by sovereign governments (or issued by emerging markets corporations but fully held or guaranteed by the government). Emerging market nominal local currency (EM LC) bonds represent the debt issued in local currency by sovereign governments.

Although issued by governments, EM HC and EM LC bonds are not free from the default risk. Historical data shows that sovereign defaults and debt restructuring happened many times in the past (e.g. see Eichengreen and Lindert 1992 and Reinhart and Rogoff 2009). Some recent examples include Argentina, Ecuador, Venezuela, Lebanon, and Greece.

There are many reasons why a sovereign government could default (partially or fully) on its obligations, e.g. macroeconomic, political, structural, and regulatory. External risks are important drivers of the EM bonds performance.

First, the Fed's monetary policy is one of the key drivers. Higher interest rates in the US typically give support to the greenback, which has a negative effect on the EM LC debt due to increased refinancing or new issuance costs. Second, emerging markets are generally exposed to geopolitical risks, and they are particularly reliant on trade with China. Third, emerging market countries are heavily exposed to the commodity risks. Most of them are commodity producers. Therefore, the impact of stronger USD filters through this channel as well. Fourth, emerging markets are less liquid than developed markets, which is a major concern in times of market stress. Finally, high dispersion of returns due to broad geographic coverage, lack of familiarity and various other behavioural biases add to the list of risks faced by investors in emerging markets.

However, over the past two decades, emerging market countries have undergone major economic and financial reforms. Many improved their public spending policies, reduced public debt, and increased their foreign currency reserves. These changes are paving the way for many investors to put emerging markets on their radars.

AUGMENTED BUILDING BLOCKS FOR EM LC BONDS

We estimate the expected returns for emerging market bonds using the building-block approach for developed government and corporate bonds introduced above. The total expected return is broken down into the expected return for duration-equivalent US government bonds, and the credit premium. To estimate the latter component, we follow the same procedure as for the investment grade and high yield bonds.

Two additional components should be considered for the debt issued in local currency.

First, it is necessary to account for inflation differentials. For example, if duration-matched US government bonds are used as the risk-free benchmark, the inflation adjustment would be equal to the difference between the inflation rate in emerging markets and the inflation rate in the United States. This adjustment is based on our five-year inflation projections.

Second, an additional adjustment that reflects a view regarding the appreciation/depreciation of emerging market currencies relative to the USD. Our baseline model for emerging market local currency bonds does not include any currency adjustments – this question can be efficiently addressed on tactical investment horizons.

EQUITIES

Our methodology for the expected long-term returns on equities is based on the classical dividend discount model of Gordon (1962). At the heart of our building-block approach lies the premise that the productivity in the real economy ultimately generates the supply of capital market returns. Therefore, our approach belongs to the family of supply-side model studied in Grinold, Kroner and Sigel (2011) and Ferreira and Santa-Clara (2011).

BUILDING BLOCKS FOR EQUITIES

We decompose the expected returns into three components:

1. INCOME

The total expected pay-out yield which is equal to the sum of the expected dividend and net buyback yield,

2. GROWTH

The expected nominal earnings growth, i.e. the sum of the projected real earnings growth and inflation,

3. VALUATION

The expected change in the cyclically adjusted price-to-earnings (CAPE) ratio.

To set the stage for our theoretical, building-blocks model, we define the key terms and briefly discuss each of the factors listed above. Our assumptions regarding each of the components are informed by the current economic and financial environment, among other things.

VALUE TRANSFER VIA DIVIDENDS AND BUYBACKS

For much of the 20th century, dividends were the dominant channel for cash redistribution to shareholders. Dividends are the cash distributions of corporate profits to the shareholders. They are sometimes used as an instrument to mitigate potential conflicts between the company's management and its shareholders. In the past, cash dividends have been relatively stable, both in terms of the amount paid out (relative to the stock price) and the distribution schedule during the year.

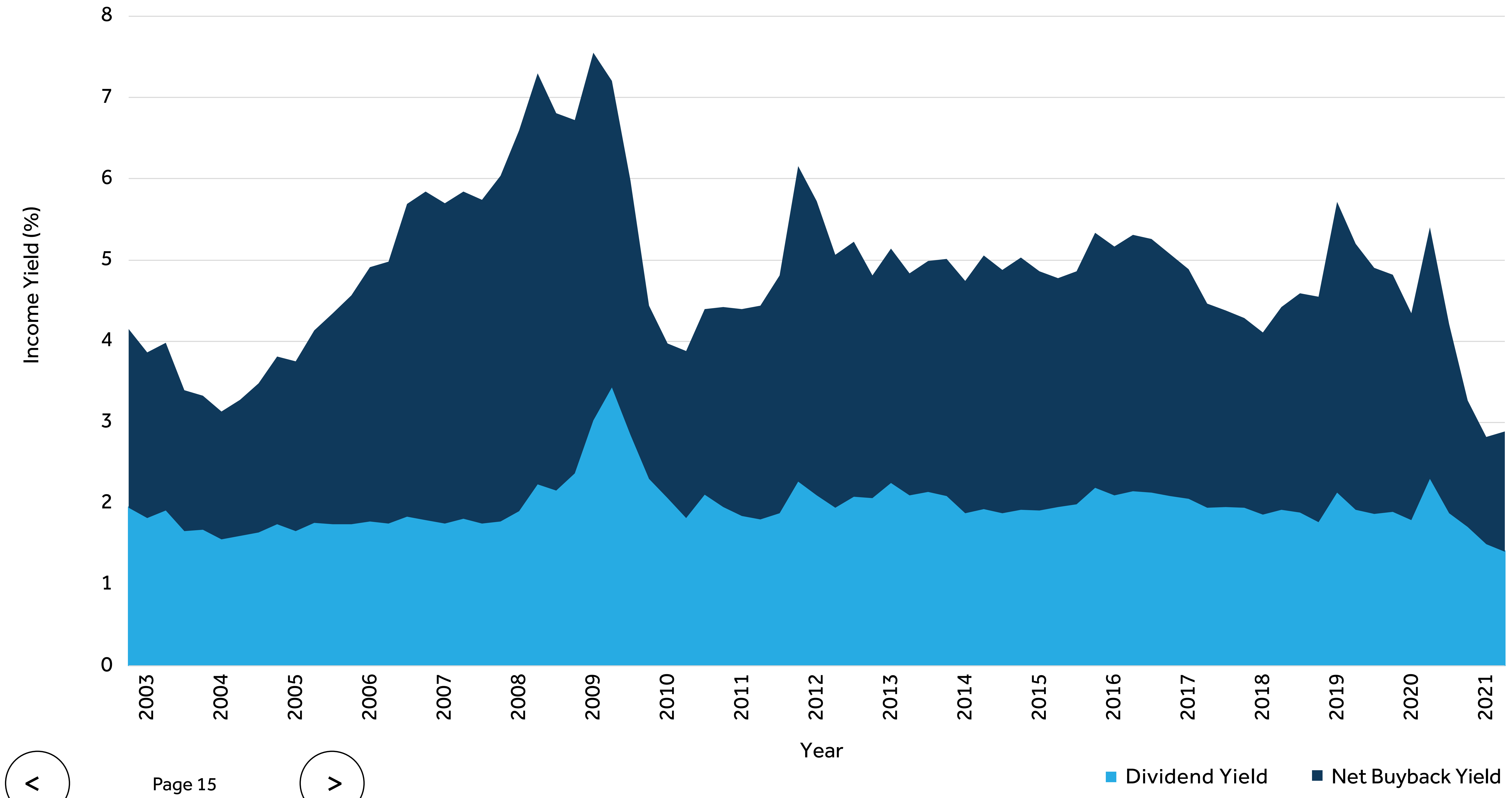
Following regulatory and tax changes in the US during 1980s, companies' propensity to repurchase shares increased significantly. In turn, the average dividend yield decreased over time. Although associated with the US initially, the substitution of dividends with share buybacks has gained traction in much of the world. We note that buybacks should be considered net of new share issuances to account for the dilution of ownership.

Both components are cyclical, however they exhibit the lowest variation over time among all equity building blocks. Regulatory and tax changes are often the main drivers of secular trends in dividend payments, buybacks, and share issuances. However, such events are extremely difficult to predict. Currently, the total income return is about 2-4% in developed markets.

Dividends and buybacks represent the main channels of value transfer to the shareholders, rather than a source of value creation. Although closely linked, dividend and net buyback yield represent two distinct aspects of the corporate payout policy. Some academics and practitioners even classify buybacks as a growth component. This is because buybacks reduce the number of shares outstanding, which in turn boosts financial ratios on the per-share basis. For example, share repurchases increase the EPS – the same aggregate earnings are distributed over a smaller number of shares.

INCOME FOR US EQUITIES

The dividend and net buyback yield for the MSCI USA Net Total Return Index from September 2002 until March 2021. The data frequency is quarterly.



Source: Bloomberg, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

RELIABILITY AND ROBUSTNESS OF EQUITY INCOME

To build our long-term forecasts for dividend yield and net buyback yield we briefly revisit two approaches which are commonly applied the industry.

Ferreira and Santa-Clara (2011) estimate dividend yield by the current dividend-price ratio, which is consistent with the random walk hypothesis. Their framework does not include buybacks. In the spirit of their model, one could use the current net buyback yield as the estimator for the second component of the income pillar. This approach is often used in the industry. However, cyclical fluctuations in the dividend payments, buybacks, and share issuances could create excess variability in the estimates. Given that our investment horizon is five years, we think that the income yield – as the most stable component of the expected equity returns – should be estimated in a more robust way.

Grinold, Kroner and Siegel (2011) use the longest available sample to estimate the historical averages of dividend yield and net buyback yield. By construction, the advantage of this approach is that the two components are likely very stable over time. However, the structural shifts in the corporate payout policy are neglected in their framework (unless the available sample coincides, by chance, with the period of interest).

Based on these insights, we estimate the two components of the income pillar by assuming a linear convergence of the dividend and net buyback yield from the current levels to their respective ten-year averages over the next five years. Therefore, our estimates are driven by the sample that spans a full business cycle.

We add a dynamic component to the model by accounting for the current levels and recognising the fact that policy changes take time. Overall, our estimator smooths out the effects of macroeconomic regimes within a cycle. Additionally, it prevents use of older observations which implicitly accounts for the structural changes in the corporate payout policy.

EQUITIES AS GROWTH DRIVERS

Equities offer one of the greatest growth prospects among all asset classes. Generally, corporate growth is generated by investing retained earnings or new capital into profitable business projects.

In the long run, the aggregate earnings growth is inextricably linked with the economic growth. During economic booms and busts, investors' behavioural biases and irrational exuberance often lead to strong market overreactions. However, diverging trends between the economic and corporate earnings growth tends to have a finite life.

Bernstein and Arnott (2003), Cornell (2010), and Grinold, Kroner and Siegel (2011) argue that if corporate earnings grow faster (slower) than the overall economy over a long period of time, returns on capital (labour) will increasingly dominate returns on labour (capital). Such trends cannot continue indefinitely since they would either result in depletion of rewards for labour, government, and other non-corporate entities or drive business profits to zero. Therefore, the corporate earnings growth and the economic growth must be co-integrated in the long run. In economic terms, this means that the marginal product of capital and labour are decreasing functions. Moreover, the long-term aggregate earnings and economic growth are ultimately bounded by the rate of technological progress and the growth of input factors.

GETTING REAL ABOUT EARNINGS GROWTH

To build our expectations for the growth pillar of expected equity returns, we decompose the nominal earning growth into the real earnings growth and inflation. Our rationale for this approach is twofold. First, Van Binsbergen and Koijen (2010) find that nominal earnings growth has a predictable low-frequency component. However, their research shows that this is likely due to the predictability of inflation rate. Second, we recognise the fact that earnings growth rates for different time periods are directly comparable only when normalized by the average level of prices in the economy.

The real earnings growth is notoriously difficult to forecast (see, e.g. Fama and French 2002, Chan, Karceski and Lakonishok 2003, and Cochrane 2008). Some authors argue that the real earnings growth should be bounded from above by the real GDP growth. A substantial part of the economic growth is generated by private companies, which are arguably the main drivers of the growth.

Across geographies, the corporate sector typically accounts for up to 50 percent of GDP (with a tendency of further decrease). This means that a large share of the growth is generated outside of the corporations whose shares are publicly traded on stock exchanges. Moreover, in most countries, the composition of equity market indices does not mimic that of GDP. Another detrimental factor is the share issuance, which is a drag on stock returns due to the dilution effect. This is particularly pronounced in fast-growing emerging economies.

However, due to globalisation, many companies have become multinational. Outsourcing of production was spurred by lower costs in emerging markets and improving trade conditions. Therefore, the revenues of global companies are generated internationally, and this creates an exposure to a range of macro-financial factors across different geographies. Additionally, large-cap equity indices are relatively frequently rebalanced, which creates an upward bias for the aggregate earnings growth estimates. On the other hand, the economic growth is not subject to a such bias. These factors have the potential to boost the earnings growth beyond the domestic GDP growth cap.

By taking stock of these arguments, we follow the common approach in the industry and consider the forecast of the real earnings growth based on the expected real GDP growth. This is augmented by a forecast which is based on the expected real revenue growth and profit margin.

Our five-year forecast is constructed using a blended approach which combines these two methods. In this way, we obtain a robust, macro-consistent, forward-looking supply-side estimate of the growth component of the expected equity returns.

VALUATION IN THE SPOTLIGHT

The valuation pillar of equity returns captures the changes in the price/earnings (P/E) ratio, which represents the price that investors are willing to pay per unit of a company's earnings. Due to its tendency to mean revert (see, e.g. Campbell and Shiller 1998), many market practitioners use P/E ratios as an indicator of future returns.

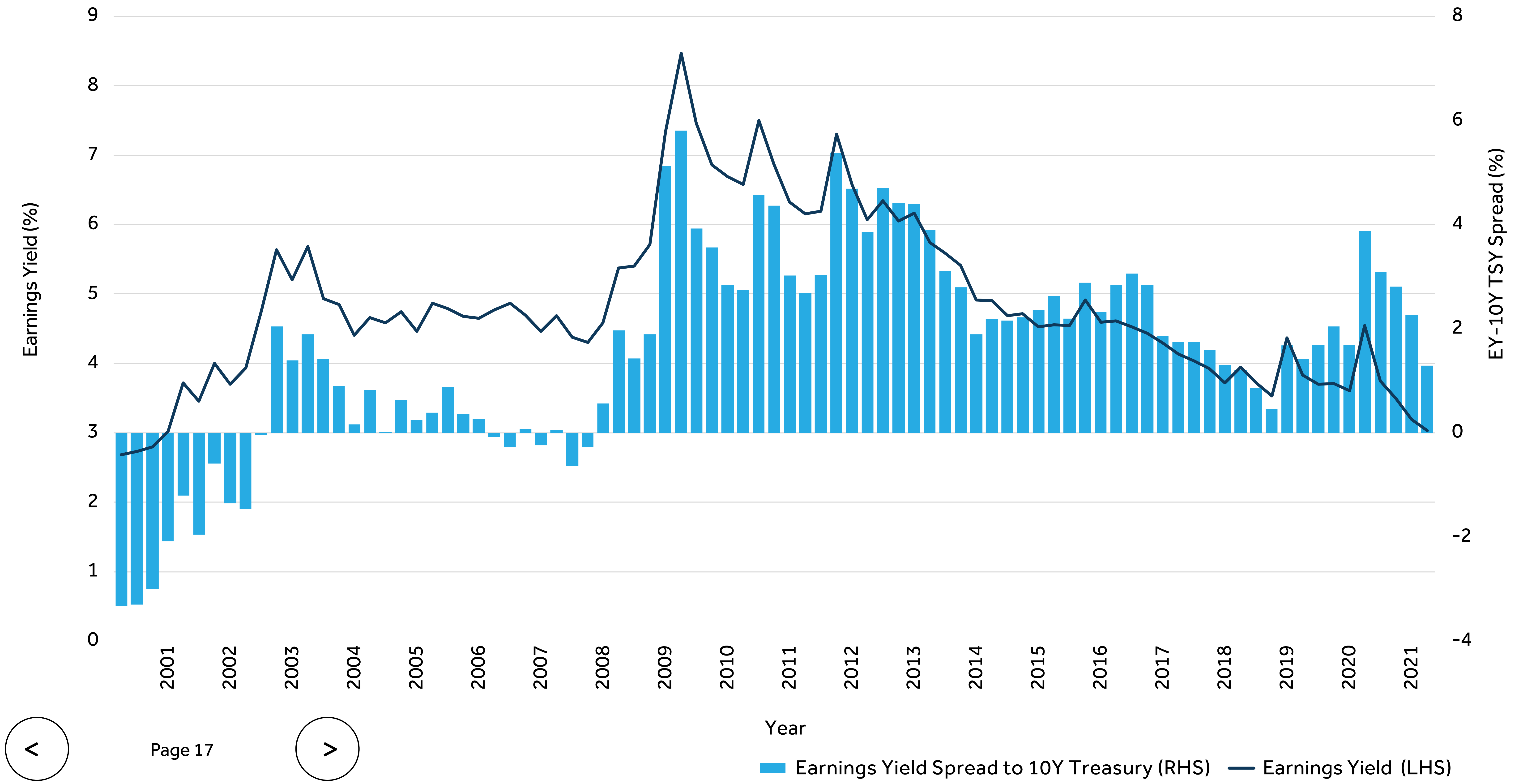
Historically low (high) values of a P/E ratio are typically interpreted as a sign of high (low) future returns. There are many definitions of the P/E ratio. The cyclically adjusted price-earnings (CAPE) ratio, which smooths out the cyclical swings in corporate earnings and accounts for the impact of inflation, is one that is commonly used. It can provide better forecasts of stock returns over longer investment horizons to other valuation methods.

In the short term, changes in P/E ratios are primarily driven by investor sentiment. Like earnings growth, the P/E ratio fluctuates substantially, and is extremely difficult to predict.

The predictability improves to some extent over longer investment horizons. Lee, Myers and Swaminathan (1999), Carlson, Pelz and Wohar (2002), Philips and Ural (2016) and Davis et al. (2018) show that the key long-term factors are the risk-free rate and the 10-year bond yield (or alternatively the term premium), inflation and its volatility as well as changes in the dividend payout policy. For broad equity indices, the sectoral composition can substantially change. Such shifts may create significant structural bias.

EARNINGS YIELD FOR US EQUITIES

The earnings yield – the inverse of the cyclically adjusted price/earnings (CAPE) ratio – and its spread to the 10-year government bond yield for the MSCI USA Net Total Return Index from March 2001 until March 2021. The data frequency is quarterly.



Source: Bloomberg, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

MEAN REVERSION STORY WITH A TWIST

Evaluating the repricing effect from the historical perspective is particularly important for investment horizons of five to ten years (i.e. over the span of one business cycle). Following the industry standard, our model is predicated on the premise that P/E ratios are mean reverting.

To estimate the multiple expansion/contraction over the next five years, we consider the potential impact of the key economic factors. According to our projection, interest rates will rise over time, but at moderate pace. Lower discount rates are generally positive for valuations. Second, since we expect quantitative easing to be rolled back only gradually, it should remain supportive of asset prices. Third, if the inflation remains under control over the next five years – which is our baseline scenario – then we do not anticipate strong headwinds for equities. Finally, we expect higher-than-average economic growth in the next one to two years, and this should be supportive of rich valuations.

Overall, we expect that repricing will be relatively contained over the next five years. In terms of the expected convergence level and speed of mean reversion, we expect that the P/E ratio will reach its ten-year average over the next ten years.

COMMODITIES

Commodities are physical assets, which are mostly used as production inputs for other goods and services. As pro-cyclical assets, commodity prices are driven by economic growth, inflation, and industrial production. The aggregate supply and demand, as well as the storage and transportation, represent other important factors which influence commodity prices. Additionally, most commodities are denominated in the USD. On average, broad commodities are expected to be negatively correlated with the greenback.

Commodities are considered to be an inflation hedge (see, e.g., Bodie 1983). They can offer certain return opportunities and diversification benefits (see, Erb and Harvey 2006, Blitz and De Groot 2014, and Levine et al. 2018).

There are many different types of commodities, which, according to Geman (2005), can be broadly classified into the following categories: agriculturals (grains, softs, citrus and orange juice, and livestock), metals (industrial and precious metals) and energy (oil, natural gas, coal, and electricity).

COMMODITY FUTURES TAKE THE CENTRE STAGE

Trading spot commodities involves buying, shipping, storing, and selling the product, and therefore it incurs substantial operational complexity and costs. For a vast majority of investors an immediate delivery of commodities is not feasible. An alternative is to use futures contracts. Some of the prerequisites of the commodity futures trading are the opening of a margin account and posting of a collateral. Moreover, to avoid physical delivery of the product, investors must liquidate the contract (roll over into the next contract) before the maturity if they want to close the position (stay invested).

CONTANGO OR BACKWARDATION?

There are two standard shapes of the commodity futures curve, which reflect market expectation regarding the future prices. Normal backwardation refers to the situation in which the curve is downward sloping, i.e. the prices of futures contracts are lower than the spot price, and they are a decreasing function of the maturity. Contango is the commonly used term to describe an upward sloping futures curve, i.e. the prices of futures contracts are higher than the spot price, and they increase with the maturity. In the former (latter) case, the futures contracts roll up (roll down) to the spot price as they approach the maturity date. This means that an investor who has a position in commodity futures will lock in a gain (loss) whenever the contract is rolled over in a backwardated (contangoed) market.

Commodity futures curves are typically in a contango. A later delivery date implies higher uncertainty and costs associated with the storage, transportation, and insurance. A rational explanation is that, on average, futures markets reflect the commodity risk premium. However, supply-demand mismatches can be caused by myriad factors, e.g. seasonality, severe weather conditions and natural disasters, transportation disruptions, major regional and global political events, etc. Under such circumstances, an inversion (i.e. backwardation) of the futures curve could happen.

It is important to stress that certain commodity markets tend to be in contango or backwardation for structural reasons which are related to hedging pressures (De Roon, Nijman and Veld 2000, Gorton, Hayashi and Rouwenhorst 2013, and Arnott et al. 2014). Commodity producers (consumers) are naturally long (short) the underlying commodity and they often choose to hedge their positions entering short (long) positions in futures markets, which ultimately contributes to a backwardation (contango).

Yet another, related, reason for a particular commodity market to be contangoed or backwardated is the storability of the commodity. If it is relatively easy and cheap to store the commodity, then producers might simply stack up their inventories if the market price falls. Copper, for example is such a commodity; it is therefore typically in contango because producers are not compelled to discount future inventory as it can be stored if prices are not satisfactory. Oil, on the other hand, is more difficult and expensive to store; it may therefore be more frequently backwardated as producers hedge their commodity exposure to consumers (and speculators) who are willing to assume the price risk in exchange for the expected roll yield premium.

CHOOSING THE RIGHT BENCHMARK

Erb and Harvey (2006) remark that there is no consensus among index providers regarding the composition of a commodity basket (as opposed to the equity and bond markets where indices are constructed using market capitalisation weighting). Tang and Xiong (2012) find that financialisation of commodity markets led to an increase in the volatility of non-energy commodity complex. Moreover, their correlations with the oil market shifted higher. From the economic point of view, this means that supply and demand forces prevalent in individual markets are not the only factors which impact commodity prices. The aggregate risk appetite of investors in broad commodity indices represents an increasingly important factor.

In the CMA framework, commodities are considered on a broad basis. We follow the industry standard and use the Bloomberg Commodity Index as a proxy for the whole asset class (Bloomberg 2018). This index blends different types of underlying exposures in a basket comprising individual front-month commodity futures contracts (which roll over approximately every second month). This index has several characteristics:

- The Bloomberg Commodity Index is well diversified, and it provides a broad exposure to commodity markets.
- The index is constructed using futures contracts exclusively, which are liquid, standardised, exchange traded, and cost-efficient investment vehicles. Moreover, this implies that the index represents an investable benchmark.
- The index assumes a full cash collateral.

The individual commodities weights are determined using liquidity and USD weighted production data. To reduce concentration risk, certain exposure limits are introduced. The index is rebalanced on annual basis.

BUILDING BLOCKS OF COMMODITY RETURNS

We estimate the expected returns for commodities using the building-blocks approach. Like fixed income and equities, commodities returns can be decomposed into: income, growth, and valuation.

BUILDING BLOCKS FOR COMMODITIES

1. INCOME

The interest on the collateral.

2. GROWTH

Roll returns or the cost or benefit of staying invested in the futures contract as time passes.

3. VALUATION

The difference between current and expected future nominal spot price.

COLLATERAL RETURN

Assuming that commodity futures are fully cash-collateralised, our proxy for this component is the collateral return, which is estimated as the expected return on a three-month US Treasury bill. Our estimation of the income component is based on our macroeconomic forecasts which include ultra-short fixed income.

ROLL RETURN

Erb and Harvey (2016) define the commodity roll return as the cost or benefit of staying invested in the futures contract over time. Since the roll return describes the convergence of the futures contract price to the sport price, it is a function of the shape of the futures curve.

To isolate the effect of the roll yield, we extract the historical time series of the cumulative roll return from the difference between the Bloomberg Commodity Index and the Bloomberg Spot Index. Macroeconomic and financial conditions have substantial changed over the last 30 years, and particularly since the Global Financial Crisis (GFC).

For these reasons, we do not rely on the simple long-run historical average to forecast the roll return. In our view, a better approach would be to anchor our estimate to the post-GFC period. To this end, we only consider the last 10 years of commodities roll index data. Finally, in the spirit of mean reversion, we assume that the roll return will linearly converge to this level over the next five years.

SPOT RETURN

To estimate commodity spot returns, we first decompose the nominal spot return into the real return and inflation rate. This step ensures that projected inflation is embedded in our five-year expected return for commodities. Moreover, this approach ensures that we account for the fact that, on average, inflationary pressures push commodity prices higher.

Second, given a strong negative correlation between roll yield and real spot return, we estimate a regression model and use our roll yield forecasts to obtain real spot return projections.

HEDGE FUNDS

Hedge funds generate returns by leveraging exposures to equities and fixed income, often by the means of long-short strategies and derivatives. They follow dynamic trading strategies in the attempt to generate significant alpha while sheltering portfolios in some of the worst down markets. Although these traits make them attractive to investors, it is important to make a distinction between single-manager and diversified hedge fund strategies.

THE PROMISE OF HIGH RETURN IS NOT WITHOUT RISK

Single-manager hedge fund strategies often involve both long and short positions in highly volatile and tail-risk-exposed securities such as small-caps, high yield bonds, options, etc. Moreover, the lack of transparency, complexity, and high fees and expenses makes them admissible only for certain investors.

The decision regarding an investment in hedge funds is a balancing act between the attractiveness of the promise of alpha and diversification benefits versus a number of risks which are specific to individual hedge funds.

SELECTION IS KEY...

The hedge fund universe is tremendously diverse. HFR (2020) classifies single-manager hedge funds into four primary categories: equity hedge, event-driven, macro, and relative value. Adding hedge fund manager-specific (idiosyncratic) risk, it is not surprising that hedge funds performance is characterised by high dispersion. As such, the selection of hedge funds is extremely important for portfolio construction.

... BUT DIVERSIFIED STRATEGIES INFORM THE ASSET ALLOCATION POLICY

Hedge fund indices are constructed as portfolios of hedge fund managers. In the context of the optimal long-term asset allocation policy, we consider hedge funds on index level. Therefore, our CMA framework for hedge funds revolves around well-diversified strategies.

Defining the most representative benchmark index for hedge funds is not a trivial task. It is important to distinguish between liquid and illiquid strategies which are reported on daily and monthly frequency, respectively.

Our selected proxies are based on the industry standard. For liquid hedge funds, we use the HFRX Global Hedge Funds Index. The illiquid benchmark in our CMA framework is the HFRI Fund Weighted Composite Index.

HEDGE FUND INDICES ARE NOT FREE OF BIASES

Although diversified strategies reduce idiosyncratic risks to a certain extent, hedge fund indices are also subject to certain biases. Fung and Hsieh (2000) highlight three challenges that typically result in an overstated performance of hedge funds indices.

First, survivorship bias is a result of the removal of certain index members, which typically happens if a fund is closed because of poor performance. As a consequence, index returns are representative of successful funds only and tend to be upward biased. However, survivorship bias is not an issue for hedge funds only – it is well documented for all asset classes (see Rohleder, Scholz and Wilkens 2011).

Second, selection bias is a consequence of the fact that hedge fund managers have the freedom of choosing whether they want to report fund returns or not to third-party databases. Moreover, if the decide to share that information, they can also choose which performance metric to report. This means that hedge fund managers can as well choose to report returns only for well performing hedge funds (see Fung and Hsieh 1997).

Last but not least, backfilling bias can also artificially inflate performance metrics. When a new fund is added to the database, historical returns are backfilled. Fund managers are incentivised to provide instant histories if they have a good track record. Therefore, backfilling refers to an instantaneous inclusion of a fund's performance during the early, incubation period when it is admitted to a database (see Capocci, Corhay and Hübner 2005 and Jorion and Schwarz 2019).

THINKING OUTSIDE OF THE (BUILDING-BLOCKS) BOX

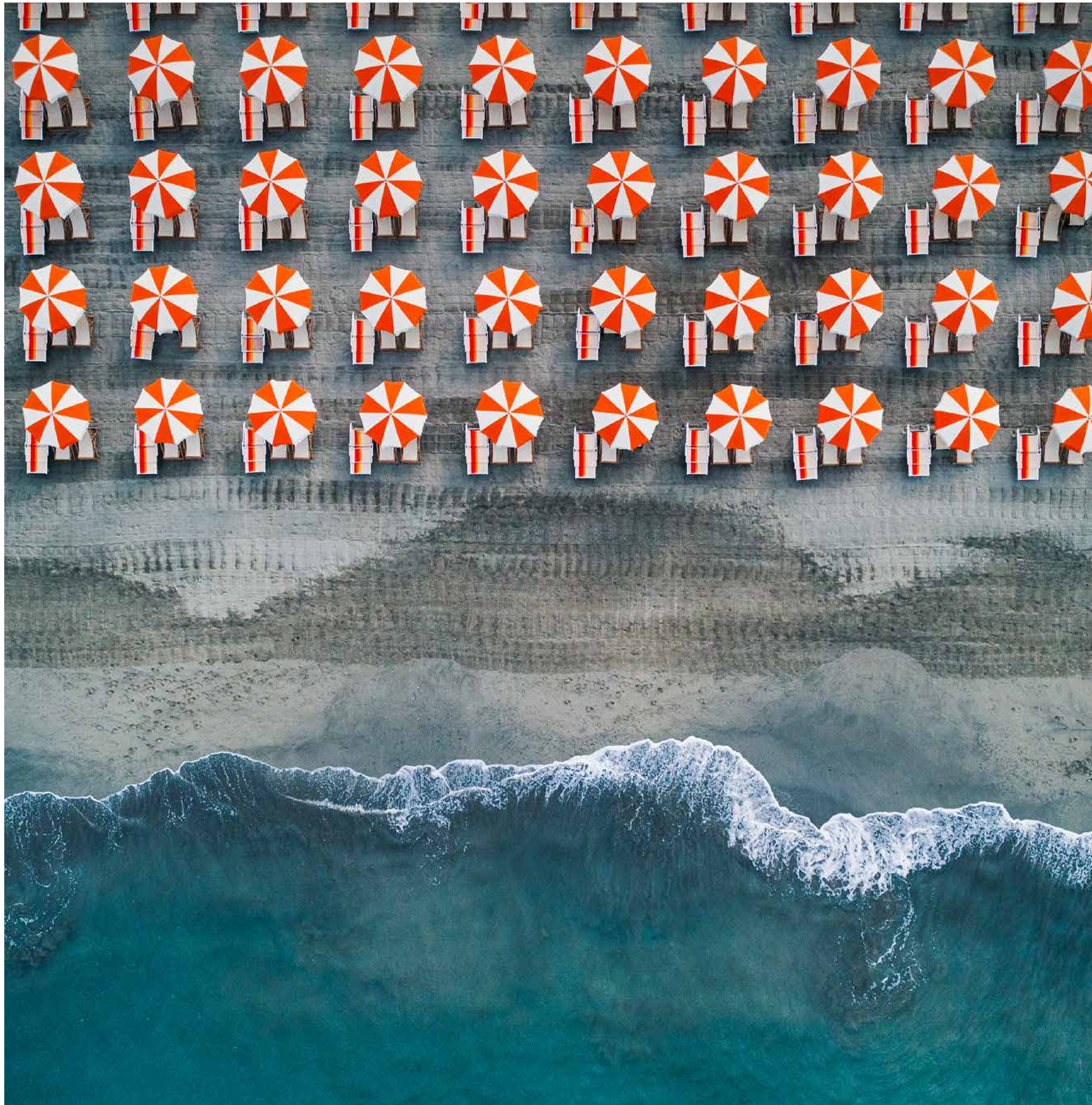
Due to the lack and opacity of data for hedge funds, an application of the building-blocks methodology in the case of hedge funds is not possible. Complexity and sophistication of the underlying strategies exacerbates the problem. Therefore, we have to think outside of the box and build a different methodology for the estimation of expected returns for hedge funds.

One viable option is to design a blended approach which relates hedge funds to the core asset classes (i.e. equities and bonds) and possibly some alternative investments (e.g. commodities). Fung and Hsieh (1997), Liang (1999), Hasanhodzic and Lo (2007), and Bali, Brown and Caglayan (2011) consider linear multifactor models for hedge fund returns replication.

Given the dynamic nature of hedge fund strategies and the fact that they often trade non-linear derivative contracts, one could rightfully raise a question whether linear models are a good modelling choice for the replication of hedge fund returns. In their empirical study, Amenc et al. (2010) find that non-linear models do not necessarily improve upon the linear benchmark.

Ibbotson, Chen and Zhu (2010) argue that non-traditional betas are neither well explained nor readily available to investors. For this reason, they suggest using only traditional betas when replicating hedge fund returns. In this setting, non-traditional betas are naturally incorporated in the alpha, which represents the added value of hedge fund investments.

Therefore, our model is based on a multivariate regression technique, which is the standard approach applied in the industry.



THE MAIN DRIVERS OF HEDGE FUND RETURNS

To ensure internal consistency of our framework, the candidate factors are sourced from the CMA universe. In particular, we use four factors to estimate the expected returns for hedge funds: government bonds, high yield bonds, equities, and commodities. Each of these factors encapsulates a specific form of market risk.

Government and high yield bonds embed term and credit premium. Equity returns are driven by the equity risk premium with is closely related to the economic growth. Finally, commodities reflect the key factors of real asset returns, and are closely related to the economic growth and inflation.

We tackle this problem from a risk premium angle, and regress hedge fund returns in excess of cash onto excess returns of the four factors. The rationale for this approach is threefold. First, it offers an intuitive economic interpretation. Second, this is advantageous from the statistical point of view because risk premia are less correlated than asset returns. Finally, the performance of hedge funds is in practice often quoted on a reference-rate-plus-spread basis. The excess return representation seamlessly fits into this narrative.

PRIVATE MARKETS

Private markets have experienced a tremendous growth over the last four decades. Today, they already constitute a significant part of institutional portfolios, and are expected to keep an important role in the future. Historical data supports the notion that private markets can diversify portfolios, enhance the risk-return profile and give investors exposure to niche companies.

In this section, we review the main characteristics of private markets. We discuss the key risks and opportunities, and provide a brief summary of private credit, equity, and real estate markets. Lastly, we present our approach for estimation of expected returns for these three sub-asset classes.

ILLIQUIDITY AND COMPLEXITY RISKS AS KEY CHALLENGES

Private assets are not traded on market exchanges. Transactions are infrequent and require more time for finalisation, and trade details are only partially available. Valuations are based on professional appraisals, and historical data exhibit persistent and slowly oscillating autocorrelation structure. Moreover, by design, investments in private equity represent long-term commitments of capital.

Private market investors are inevitably exposed to the illiquidity risk. The impact of illiquidity risk can be mitigated to some extent with time diversification, i.e. investments spread over time instead of quick entry into the market. However, private equity markets – like many other markets – go through boom-and-bust cycles, and too slow capital deployment can be detrimental for returns. Finding the right pace of investment calls is one of the key components for successful investments.

In addition to the illiquidity risk, the lack of transparency, asymmetric information, and numerous intricacies in private equity transactions give rise to a complexity risk. Whether investors get compensation for such risks or not ultimately depends on the private equity firm, i.e. the depth and quality of their due diligence processes and selection skills. Private markets are indeed characterised by large dispersion of fund returns (see Kaplan and Schoar 2005).

PRIVATE CREDIT

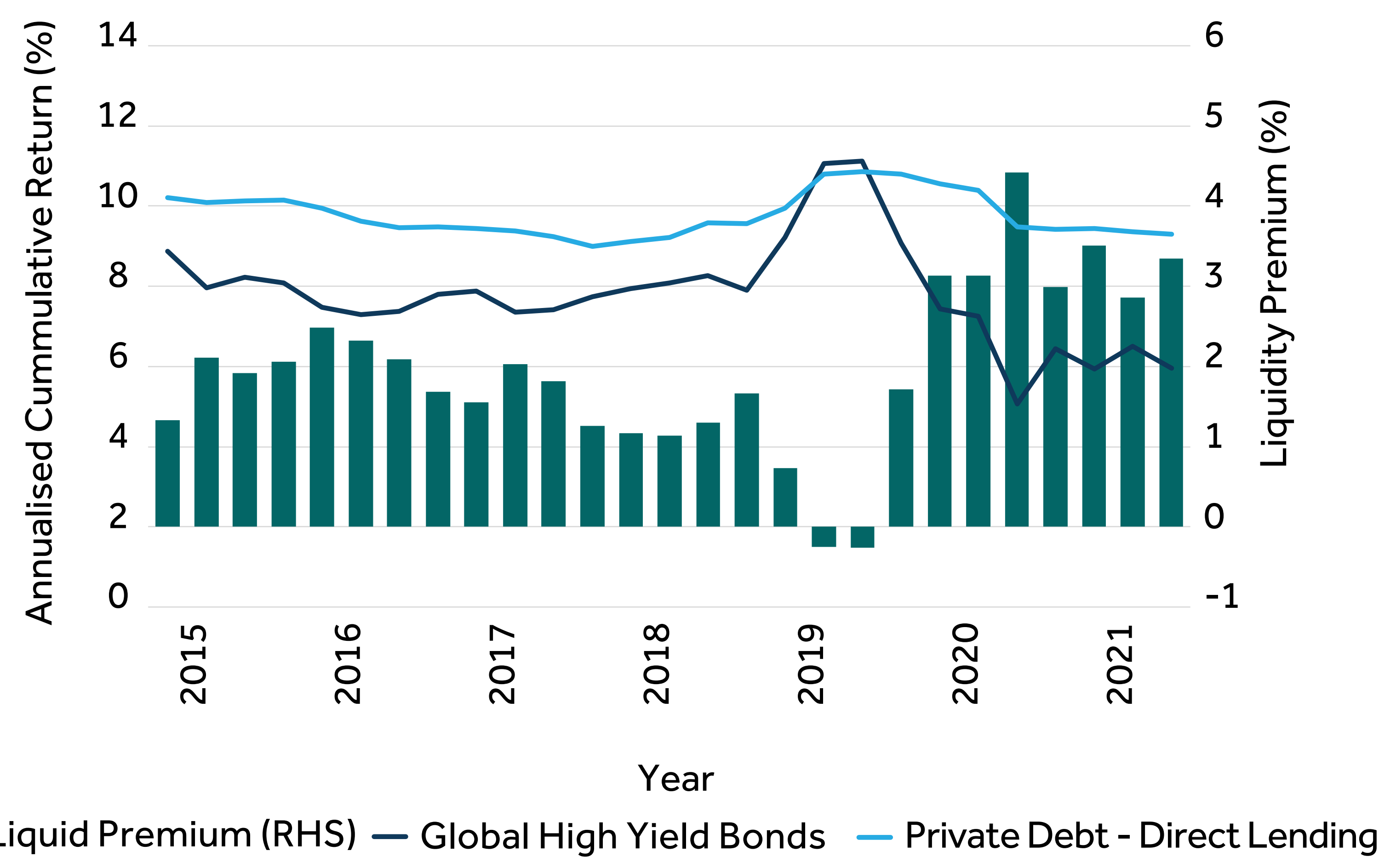
Private credit refers to the debt which is held or extended to private companies. Private credit investment universe is very broad. Cambridge Associates (2017) classify private credit strategies into three categories: capital preservation, return maximisation, and opportunistic and niche strategies.

In the CMA framework, direct loans – which represent illiquid loans to middle-market companies in the US – are used as a proxy for private credit. Nesbitt (2019) defines middle-market companies as businesses whose earnings before interest, taxes, depreciation, and amortisation (EBITDA) range from USD 10 million to USD 100 million, which is equivalent to medium and small stocks in Russell 2000 Index. This middle-market segment includes around 200,000 businesses and corresponds to about one-third of private sector GDP.

Traditionally, direct loans have been one of the core businesses of commercial banks. In the wake of the Global Financial Crisis, changes in the banking sector regulation resulted in more rigid restrictions – in particular regarding the types of loans and the leverage – and increased capital requirements. The advantage that banks had over non-bank lenders quickly melted away because of substantially higher costs of middle-market lending businesses.

PRIVATE DEBT

Private credit (direct lending) vis-à-vis listed (global high yield) bonds. A comparison of 10-year moving average performance from September 2014 until March 2021. The difference in performance is attributed to the illiquidity premium. The data frequency is quarterly.



Source: Bloomberg, Preqin, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

PRIVATE EQUITY

Private equity refers to equity investments in privately held companies by professional investors. Broadly, private equity investments can be classified into three categories, depending on the stage in which the private companies are: venture capital, growth capital, and buyouts.

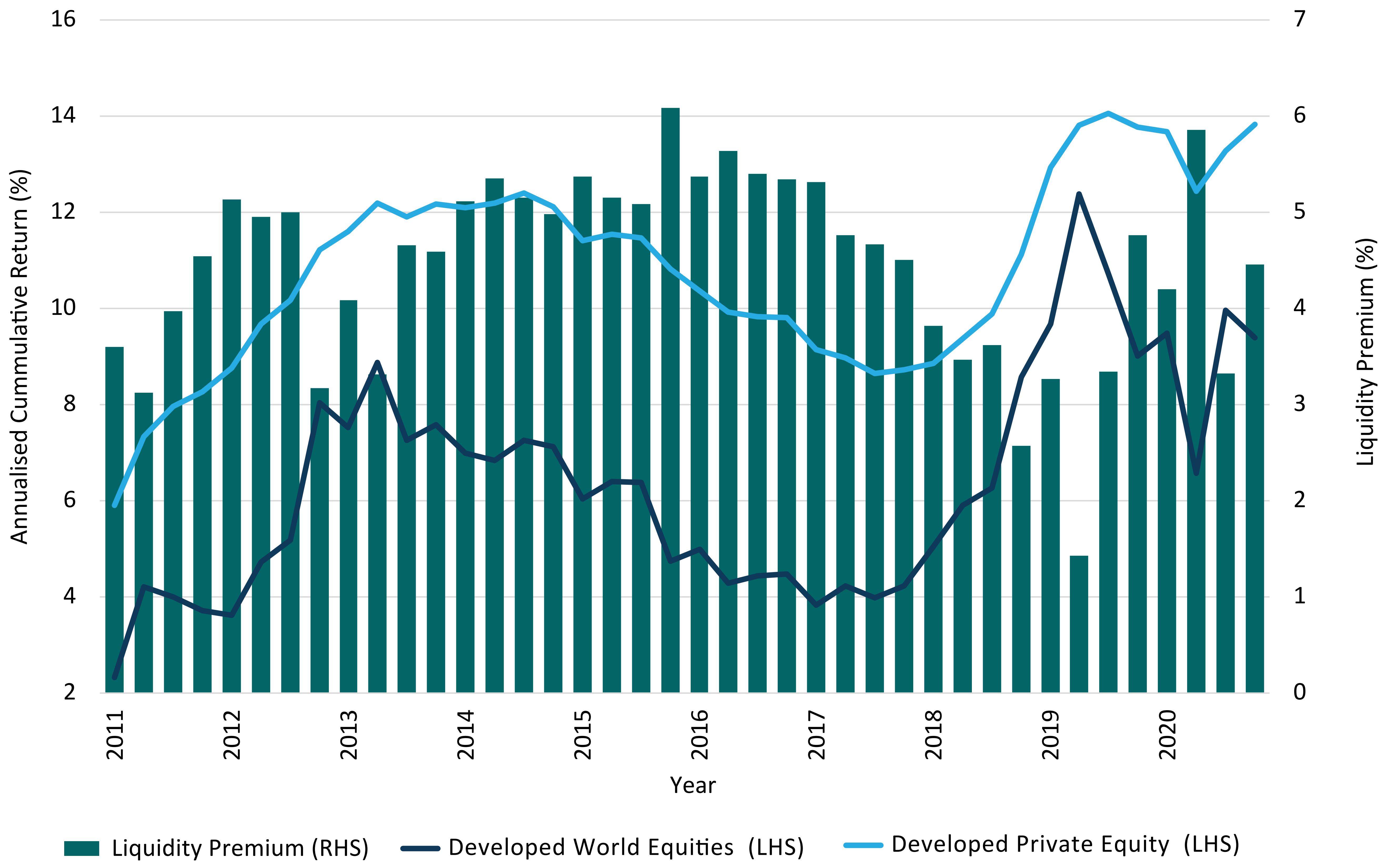
Private equity has become an important element of the financial ecosystem starting from the 1980s. Investors in private equity typically take an active role with investee companies for two reasons, and they enjoy the unlimited upside potential of innovative businesses.

First, early-stage companies require guidance with various business aspects. Most entrepreneurs are highly specialised and do not have knowledge of strategic, financial, and commercial aspects. Therefore, they greatly benefit from the investors' consulting and networking capabilities. Companies which are at the growth capital stage require an upgrade in their management style as well as rethinking of their long-term strategy (e.g. they might have to acquire some of their competitors). Mature established companies often suffer from stagnation. Investors can help with a change of ownership, building a stronger relationship with creditors, and ultimately increasing earnings power.

Second, and perhaps a more obvious reason is that investors want to protect their capital. The key to any financial transaction is information. Investor activism greatly mitigates the risks of adverse selection and moral hazard. This is one of the most important elements in private equity investments.

DEVELOPED PRIVATE EQUITY

Developed private equity vis-à-vis listed (developed world) equity. A comparison of 10-year moving average performance from March 2010 until September 2020. The difference in performance is attributed to the illiquidity premium. The data frequency is quarterly.



Source: Bloomberg, Preqin, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

PRIVATE REAL ESTATE

Real estate belongs to the class of real assets. Real assets represent (or are closely related to) tangible, physical assets such as infrastructure, natural resources, or properties. An exposure to real estate is particularly attractive to investors because it offers storage of value and inflation protection.

Private real estate investments can be securitised and non-securitised. Securitised private real estate is also known as the unlisted real estate, and it is measured at the fund level. Non-securitised private real estate refers to a direct ownership of residential apartments, complexes or housing developments, office buildings, warehouses, industrial properties, land, and retail real estate. Direct real estate is measured at the asset level.

To estimate the expected returns for private real estate, we first need to define our benchmark index. Following the industry standard, we consider the National Council of Real Estate Investment Fiduciaries (NCREIF) National Property Index. The index is composed of operating commercial properties (i.e. apartment, hotel, industrial, office, and retail properties) which are held for investment purposes only, and it is market value weighted. The composite total returns are reported on an unleveraged basis. Therefore, our benchmark is representative of the direct real estate segment.

EXPECTED RETURNS FOR PRIVATE MARKETS

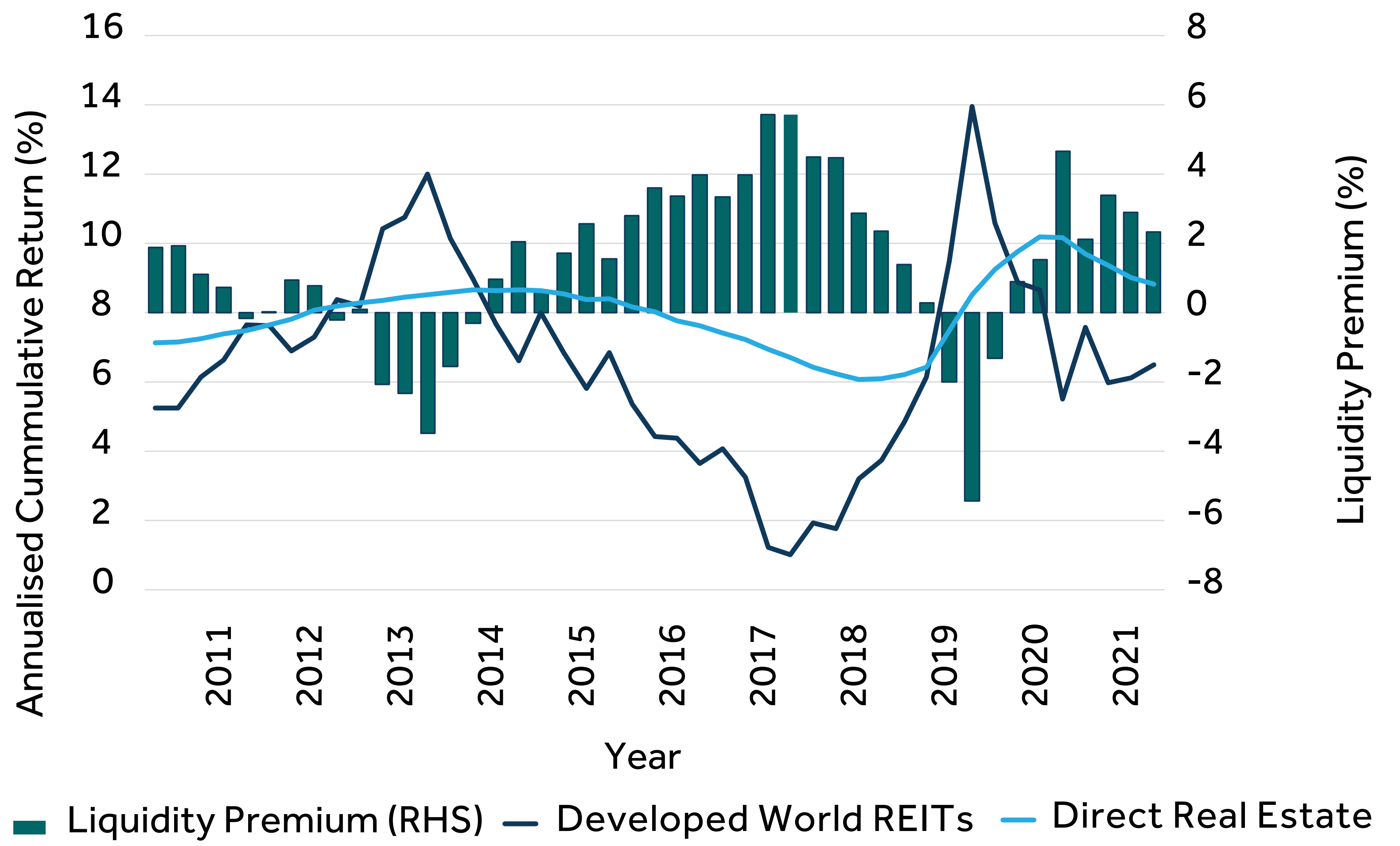
Investors who are interested in private markets have to be willing and able to accept the illiquidity risk, for which they are compensated by an illiquidity risk premium. This is also reflected in the fact that historical data is available quarterly, as opposed to public markets which are characterised by daily liquidity.

To estimate five-year expected returns, we start with the expected returns for a comparable public market index and add an illiquidity premium. The illiquidity premium is estimated as a ten-year average of the performance spread between the private market index and the selected public equities index. Our approach is in line with standard models for private equities used in the financial industry.

For the three sub-asset classes discussed above, we apply the following approach. First, for private credit, we consider direct lending and compare its performance to US high yield bonds. Second, we compare the performance of a broad private equity index with developed global large-cap equities. Third, the public market benchmark for direct real estate is based on developed global real estate investment trusts (REITs). REITs are modelled as equities because real estate is classified as one of the equity sectors according to the Global Industry Classification Standard (GICS).

DIRECT REAL ESTATE

Direct real estate vis-à-vis developed world REITs. A comparison of 10-year moving average performance from December 2010 until March 2021. The difference in performance is attributed to the illiquidity premium. The data frequency is quarterly.



Source: Bloomberg, Preqin, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

FOREIGN EXCHANGE

International asset allocation brings many benefits to investors. An expansion of the investment universe beyond home markets creates return-enhancing and diversification opportunities for investors. However, it exposes them to new risks as well.

FOREIGN EXCHANGE RISK

One of the key challenges is the currency risk. A foreign exchange (FX) rate is defined as the rate at which one currency can be converted to another, i.e. the price of the unit of a foreign currency expressed denominated in the home currency.

FX risk typically amplifies the total risk of investments in foreign assets. This effect is particularly pronounced for low-volatility assets such as cash and fixed income. On the other hand, the results are rather mixed for equities – the optimal hedging policy depends on the nature of the home currency, e.g. commodity-driven versus safe-haven currencies (see Campbell, Serfaty-De Medeiros and Viceira 2010).

Dumas and Solnik (1995) find that the FX risk premium is a significant component of asset returns in international financial markets. However, many investors are reluctant to keep a significant foreign currency exposure in their portfolios. One possible explanation is that FX rates are rather volatile, yet they do not offer attractive returns.

THE FOREIGN EXCHANGE FACTOR ZOO

Any foreign exchange rate combines a long position in one currency with a short position in another.

Currencies are driven by many factors, acting over different time horizons, and ranging from financial and macroeconomic to political ones, e.g. interest rate differentials, cross-currency basis, inflation, monetary aggregates, total output levels and output gaps, productivity, net foreign assets, and commodity prices.

In the short-term, high volatility makes predicting foreign exchange movements very difficult. For example, in their highly influential paper, Meese and Rogoff (1983) find that the random walk hypothesis outperforms economic models. Recently, Rossi (2013) and Cheung et al. (2019) provided a critical review of the literature on exchange rate forecasting and concluded that there is no easy answer to the question. Their conclusion is that the exchange rate predictability depends on the investment horizon, sample period, and forecast evaluation method.

The lack of consensus and unifying theoretical or empirical framework after half a century of modern finance research poses serious challenges for currency modelling. Cenedese and Stolper (2012) stress that the variety of models and their failure to consistently provide reliable forecasts has nudged many practitioners to use model averaging to produce their FX forecasts.

FOCUSING ON THE KEY LONG-TERM DRIVERS

Our baseline approach focuses on the fundamentals. In particular, we apply the relative purchasing power parity (PPP) in combination with a mean reversion assumption for real exchange rates as our baseline approach for spot foreign exchange rate forecasting.

The relative PPP is an intuitive concept that has deep roots in the economic theory – it is based on the law of one price. It is often used as an anchor for the long-run real exchange rates (Rogoff 1996). Although transaction costs and other market frictions have the potential to dilute the relationship between the price levels and exchange rates, it is reasonable to assume that the PPP should at least approximately hold in the long run to prevent international trade arbitrage (Taylor and Taylor 2004).

To estimate the expected foreign exchange rate, we first calculate the real exchange rate (RER). Although persistent trends are occasionally observed, foreign exchange rates generally exhibit mean-reverting behaviour over longer horizons. We assume a convergence of the RER towards a level which is estimated by combining mean-reverting signals over the past five and ten years. Furthermore, we assume that the full convergence will take place over the next five years. Our choice of this parameter is motivated by the results presented in Lothian and Taylor (2000) who estimate the convergence rate towards the fair value and find that 50% of the distance to the fair value is typically closed in 2.5 years. Assuming linear convergence, we end up with full convergence after five years.

The inflation differentials are computed from our macroeconomic projections. The final estimates for nominal FX rates are obtained by adding the two components together. Our long-term expectations are constructed for the three currency pairs that are most important in the context of our strategic asset allocation: GBP/USD, EUR/USD, and CHF/USD.

Expected risk methodology

Investors expect to be rewarded for the systematic risks they take. Asset allocation and portfolio construction decisions critically rely on diversification and risk-return trade-off. For this reason, it is necessary to estimate also the key risk parameters – volatilities and correlations – for all asset classes in our CMA universe.

Volatility gauges the dispersion of asset returns, and it is calculated as the standard deviation of the return distribution. Correlation coefficient measures the degree of linear association between two variables, and it is bounded between -1 and +1. Assets with significantly positive (negative) correlation are on average moving in the same (opposite) direction. If the correlation is close to zero, then the assets are uncorrelated.

In this section, we first explain our methodology for estimation of volatilities and correlations over longer investment horizons. We then provide some additional information regarding some important quantitative aspects of our framework.

THE NUTS AND BOLTS OF OUR LONG-TERM RISK METHODOLOGY

The most common approach when computing long-term volatilities and correlations is to use the classical sample estimators. Arguably, this is sufficient in many applications because risk parameters are rather stable over longer investment horizons.

However, a question that often arises in practice is how to incorporate forward-looking information (e.g. investment views) into the risk methodology. Motivated by the work of Chow et al. (1999), Kritzman and Li (2010) and Bisias et al. (2012), we have developed a parsimonious model that offers a solution to this problem.

In a nutshell, we have constructed a multi-asset class risk-on-risk-off (MAC RoRo) indicator that provides a measure of risk which aggregates and compresses information from all asset classes in our CMA universe. Mathematically, our indicator is based on the Mahalanobis distance, which represents a contemporaneous measure of outlierness in a multivariate setting.

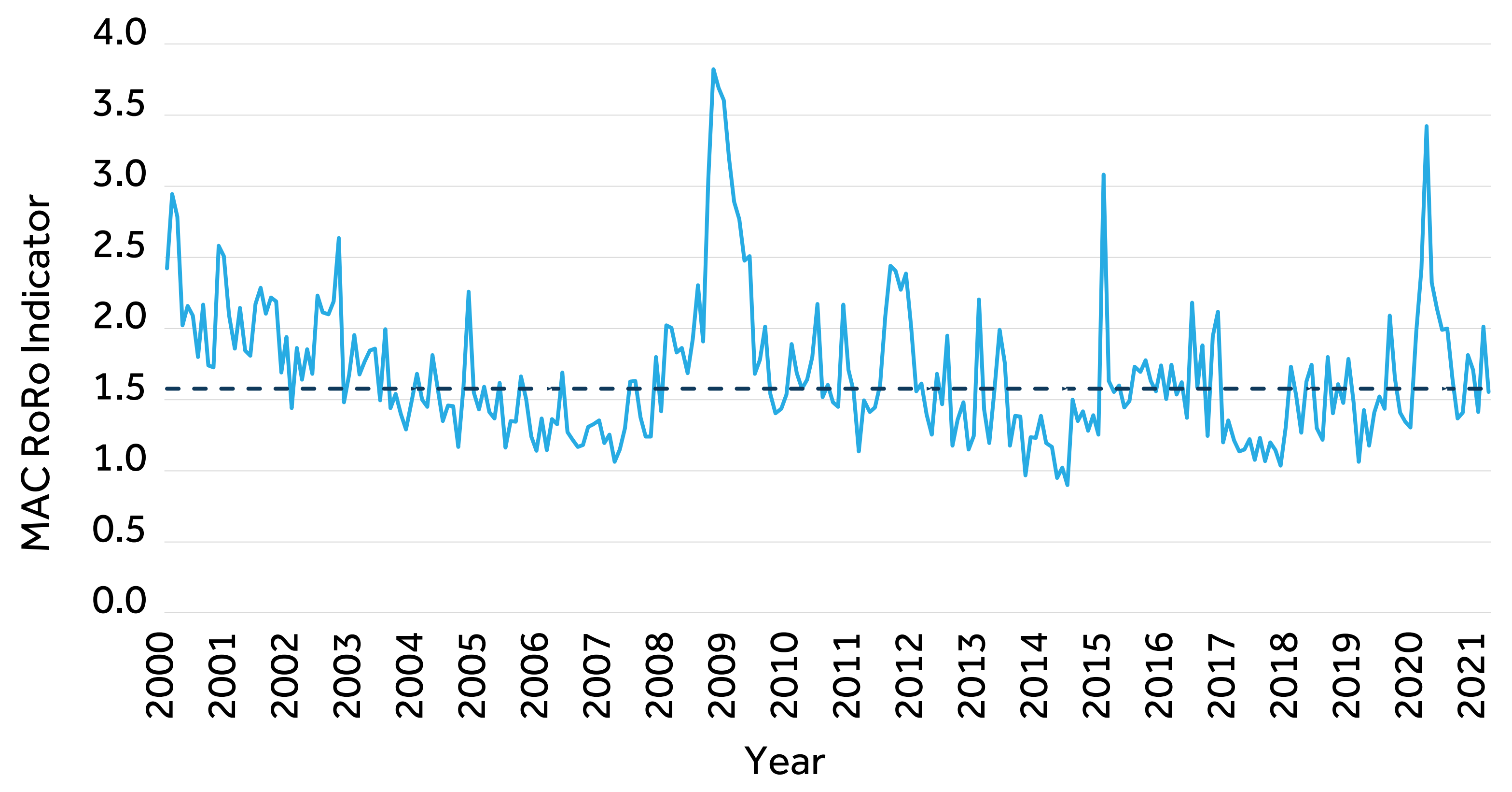
The name of the indicator is motivated by its application – we use it to split the full history of asset returns into two subsamples which correspond to risk-on and risk-off regimes. These regimes are typically characterised by relatively low and high volatility, respectively.

We note that our sample is split into two equally sized subsamples. First, this ensures that the risk parameters indeed demonstrate distinct behaviour in the two subsamples. Second, any other threshold value would favour one subsample over the other, and could create certain statistical issues.

We estimate the covariance matrix separately for the two regimes. The mixing weights applied to the regime-specific covariances determines whether the final matrix will be in line with neutral, historical estimates (equal weights) or biased towards a risk-on or risk-off regime (unequal weights). This approach provides effective mitigating controls for our long-term estimates of the risk parameters.

MULTI-ASSET CLASS RISK INDICATOR

The multi-asset class risk-on-risk-off (MAC RoRo) indicator is a proxy for "outlierness" of financial markets (solid light blue line). Higher (lower) values indicate periods of elevated (muted) volatility and correspond to risk-off (risk-on) regimes. The two regimes are delineated by the dashed dark blue line. Calculations are based on the historical covariance matrix from January 2000 until March 2021. The data frequency is monthly.



Source: Bloomberg, Preqin, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

THE SCIENCE AND ART OF SAMPLE SELECTION

Our data set comprises monthly historical returns over the last 20 years, hence capturing a wide variety of market conditions. Both risk-on (bull) and risk-off (bear) market environments are represented as well as a range of conditions specific to different phase of a macroeconomic cycle (i.e. recession, recovery, expansion, and slowdown). The selected period reflects the balance between:

- The requirement to use as long time series as possible to improve the quality of the statistical analysis,
- Data availability and its consolidation potential for a large set of asset classes,
- Representativeness of historical returns during periods characterised by significantly different economic and financial market conditions.

TECHNICALLY SPEAKING

Unlike asset returns which can exhibit substantial variation over time, risk parameters are typically stable and relatively predictable over longer investment horizons.

However, a panel of monthly returns for a broad range of asset classes exhibits several features which can adversely affect estimation results (see Peterson and Grier 2006). This presents certain technical challenges such as: smoothed returns for private markets, unbalanced histories of different asset classes, and estimation risk.

To address these issues, it is necessary to implement adequate data treatment procedures.

FIGHTING ILLIQUIDITY

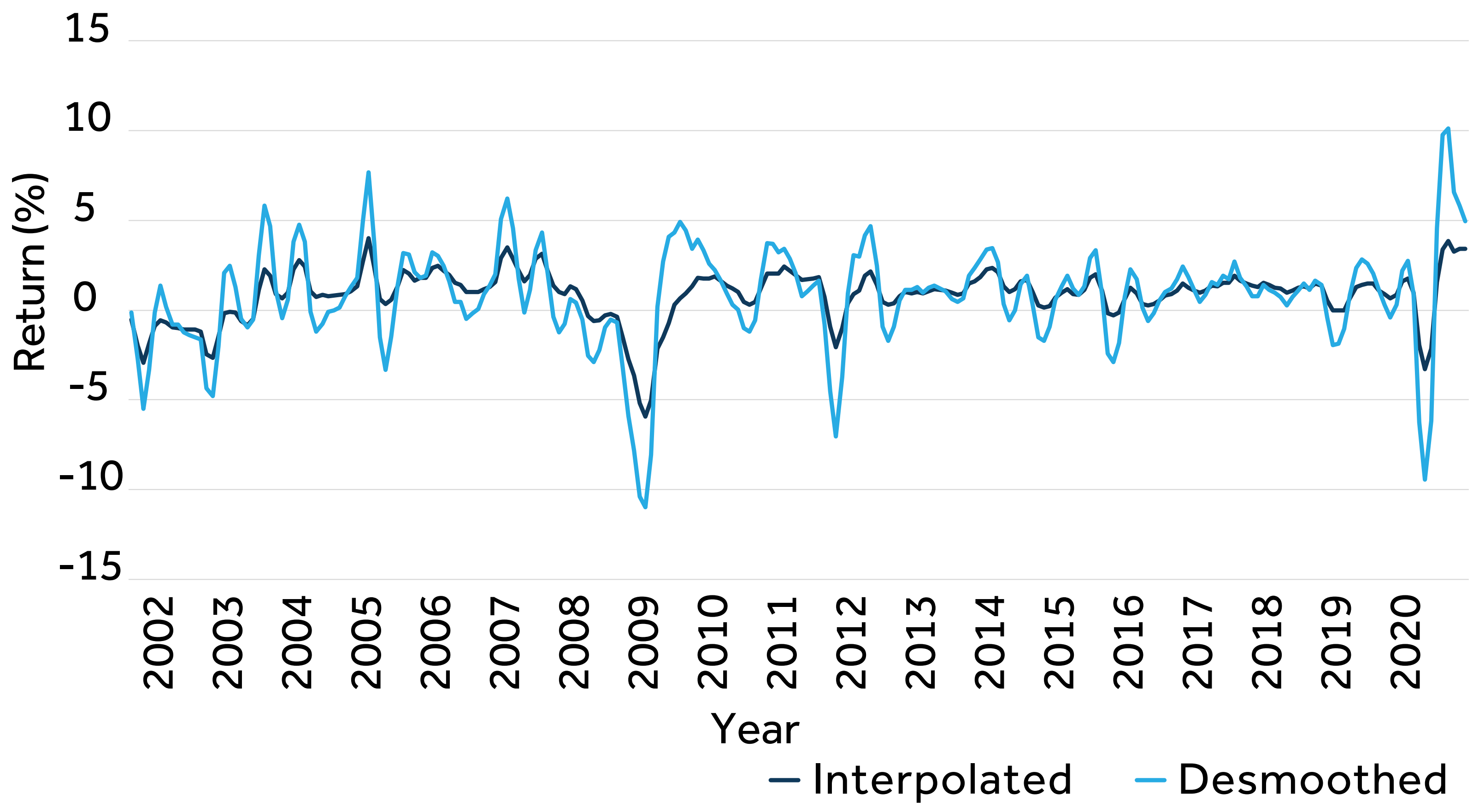
Performance of private assets is often provided on quarterly frequency only. The reported levels do not represent marked-to-market quotes. They are rather based on some subjective valuations and appraisals, which typically result in averaged or smoothed estimates of the true returns.

As a consequence, classical sample estimators of risk metrics for private markets are typically biased. This means that illiquid assets may appear substantially more attractive because of artificially high Sharpe ratios and downward-biased correlations with publicly traded assets. Ultimately, the smoothing-induced distortion of the risk profile of private markets can have an adverse effect on the asset allocation process. We address this problem in two steps.

First, we implement a de-smoothing model which combines econometric procedures proposed in Fisher, Geltner and Webb (1994) and Cho, Kawaguchi and Shilling (2003). In a nutshell, the model generates additional volatility in asset returns based on the assumption that the true, de-smoothed process is hidden behind the appraised returns though a weighted averaging process.

AN EXAMPLE OF THE DE-SMOOTHING ALGORITHM

The output of the de-smoothing algorithm for developed private equity (PrEQin Private Equity Benchmark Index). Dark (light) blue line represents the original (de-smoothed) returns from June 2001 until September 2020. The data frequency is monthy (interpolated from original, quartely, frequency).



Source: Preqin, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

Second, we adjust volatilities for private markets based on their positive autocorrelations. The popular square-root-of-time scaling rule for volatility is theoretically correct only under the assumption that returns are independently and identically distributed. Although this is approximately satisfied in many public markets, private markets tend to not meet this condition. Working along the lines of Lo (2002), we adjust volatilities for private credit, private equity, and direct real estate.

INFORMATION IS EVERYTHING, DON'T DISCARD IT

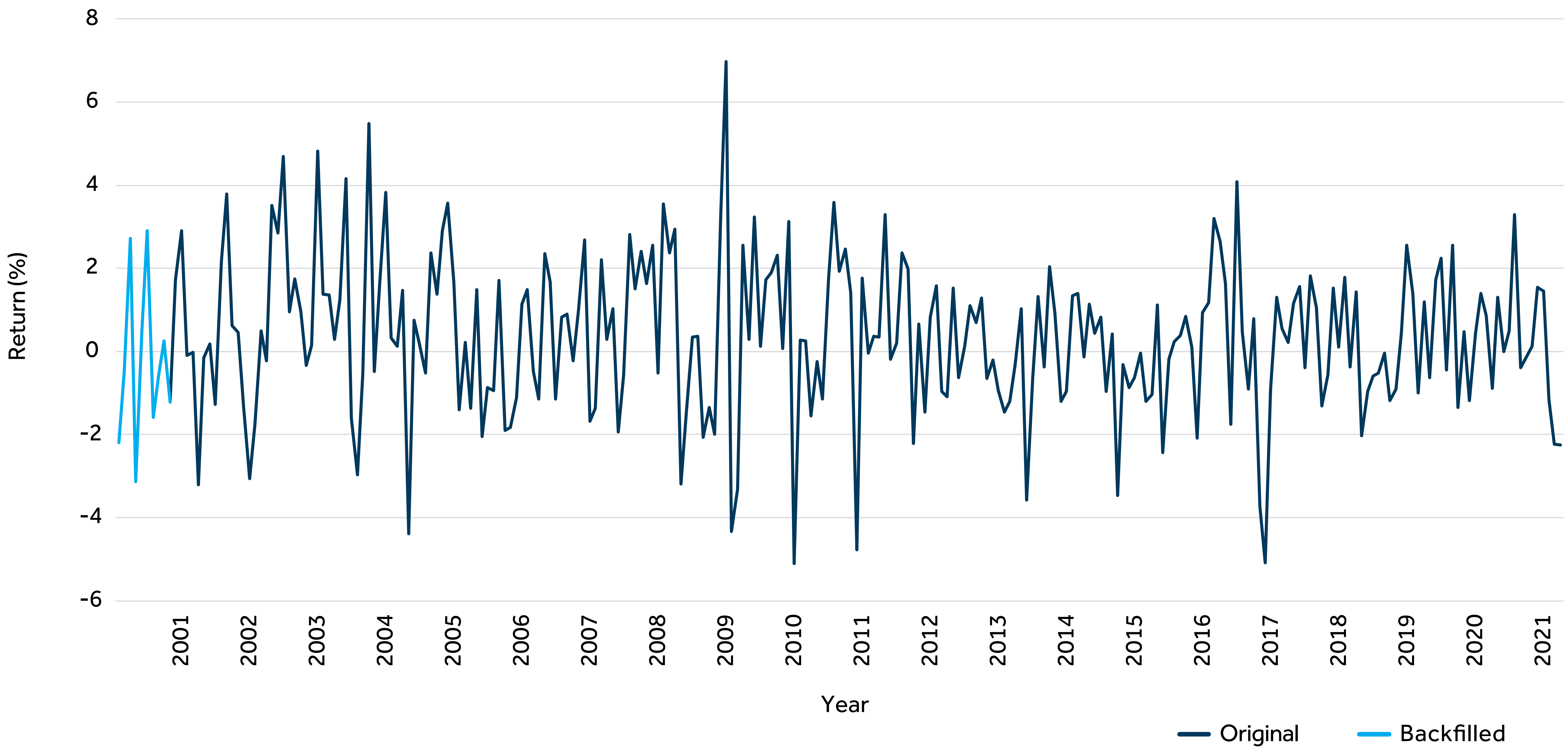
First, data sets comprising a broad range of diverse asset classes often feature time series that differ in length, as asset classes evolve over time and not every asset class has been measured over the full sample. However, computation of the covariance matrix requires input variables to have pairwise entries, i.e. an equal length and matching observation dates.

A simple solution to this problem is to consider only the common returns history. However, this approach implies that one part of the available longer times series would have to be discarded (to match their remaining histories with the shorter time series). In turn, this could result in severe information loss. This approach is particularly problematic if a crisis period is excluded from the sample, because the risks would likely be underestimated. Additionally, data removal lowers the precision of volatility and correlation estimates.

To mitigate the estimation risk problem and harness information available in the full data set, we implement a statistical procedure that allows for backfilling of the missing data and updating of the volatilities and correlations of shorter time series based on the histories of longer time series (see Stambaugh 1997, Pástor and Stambaugh 2002, and Page 2013). Our quantitative procedure is based on a combination of a multivariate regression and machine learning methods for selection of the covariates.

AN EXAMPLE OF THE BACKFILLING ALGORITHM

The output of the backfilling algorithm for the Bloomberg Global Aggregate Treasuries Total Return Index. Dark (light) blue line represents the original (backfilled) returns. The data frequency is monthly.



Source: Preqin, Barclays Private Bank, data as of 15 June 2021. Past performance is not a reliable indicator of future performance. The value of investments can fall as well as rise and you may get back less than you invested.

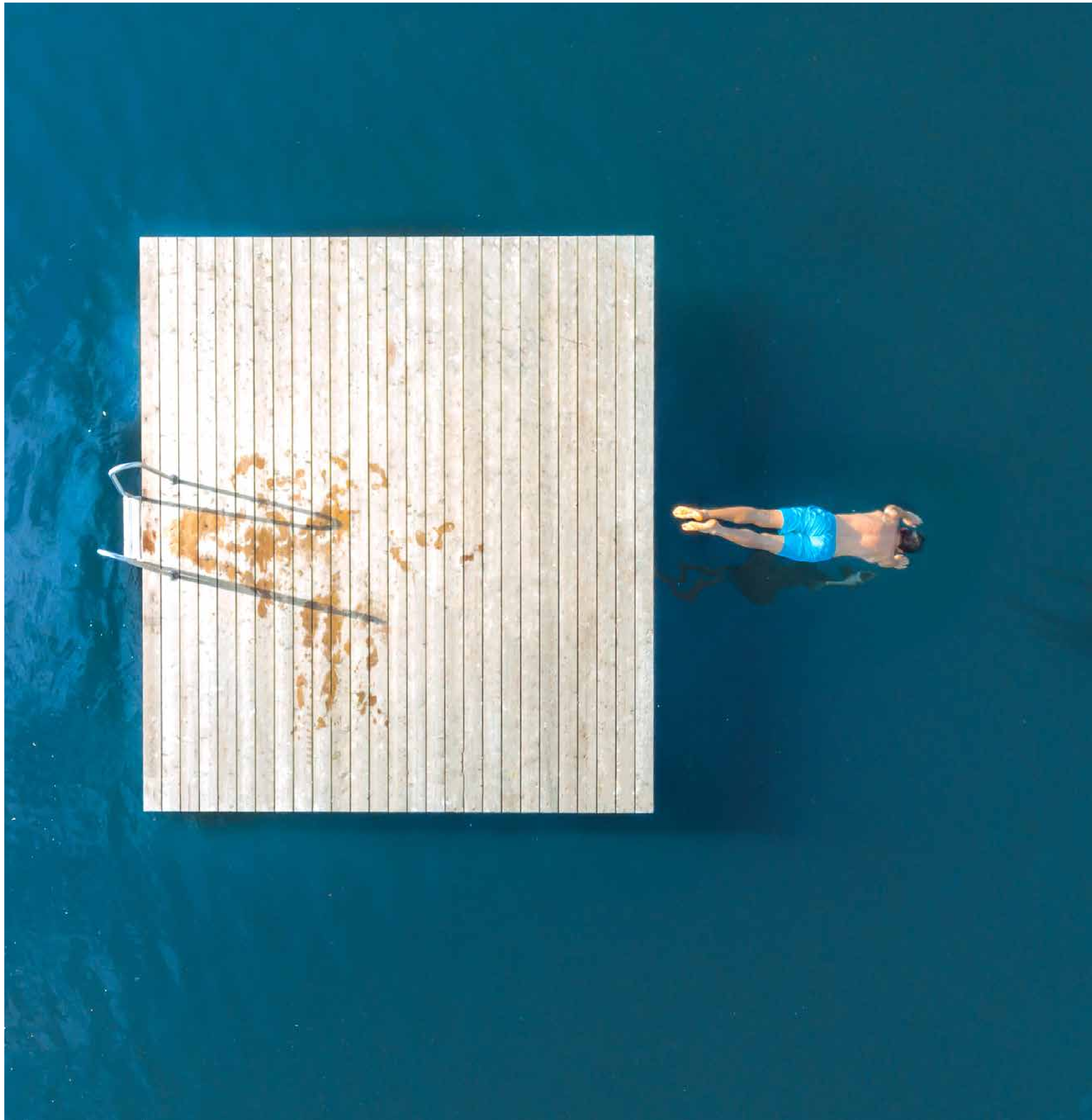
Within our CMA universe, there are five asset classes which have shorter histories and therefore require backfilling. Global developed government bonds, emerging market hard currency bonds and private equity are missing about one year of data relative to the length of our full sample. Data on private debt is missing the first four years and local currency bonds are missing the first eight years.

NEVER UNDERESTIMATE THE ESTIMATION RISK

Computation of correlation matrices in small samples is subject to the estimation risk. More specifically, a statistical issue arises when the number of variables is of the same order of magnitude as the number of observations. In that case, standard errors become large, and some of the correlation coefficients might take on extreme values. Moreover, the estimates are not robust – they are overly sensitive to new data and strongly fluctuate over time.

There are several methods to mitigate the estimation risk. Our approach is based on the shrinkage method of Ledoit and Wolf (2003, 2004). Essentially, the correlation coefficients which take on too extreme values (in either direction) are pulled back towards the values which are obtained using a structural model. This is achieved by mixing the sample covariance matrix with another covariance matrix called shrinkage target.

To build a robust correlation matrix target, we have developed a procedure based on a hierarchical clustering method which is commonly applied in machine learning. Our approach leverages asset classification metadata and our empirical insights regarding the connectivity of different asset classes.



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