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DWS LONG VIEW

Introduction

The return outlook for the next decade

2023 was a tale of two monetary regimes. After a brief pause in the beginning of the year, US Treasury yields continued their significant selloff through the summer months and into the fourth quarter driven by unexpectedly resilient economic growth and labor market health. Somewhat surprisingly, most major economies were able to altogether avoid economic recession in 2023 with the US economy growing at more than 2%, Europe generating modest positive growth, and Emerging Asia growing at nearly 5%. Despite slowing inflationary pressures, prices continued to rise above the Fed's target level of 2%, manifesting in the continued tightening of financial conditions throughout most of the year.

As monetary conditions eased at the end of 2023, equity and credit markets accelerated their already strong returns, with robust double-digit returns across most global equity markets in the last two months of the year. After experiencing a challenging environment in 2022, US equities in particular, driven by the "Great Eight" technology-related names have again returned to all-time highs, but in price terms and in valuations. Robust technology earnings growth bolstered by renewed optimism around Artificial Intelligence ("AI") helped propel equity markets despite still-elevated discount rates and the prospect of a slowing but resilient global economy.

Although the investment landscape for sustainability has not been as dynamic perhaps as in previous years, environmental risk remains the one of the most significant secular risk factors for the global macroeconomy and financial markets over the coming decades. The risk and return implications of climate risk are an important component to our investment processes, where climate transition and physical climate risk present unique risks but also opportunities for different asset classes, regions, and sectors within the global investment landscape.

Entering 2024, return forecasts are modestly lower versus a year ago. Valuations across equity and credit markets are modestly more demanding, and medium and longer-term sovereign bond yields, despite a volatile year, ended 2023 largely unchanged from the previous year. Looking forward over the next decade, fixed income nominal return forecasts still look robust version the previous decade driven by higher yield levels as interest rates have largely normalized following over a decade of quantitative easing ("QE"). Despite modest compression in equity return forecasts driven by more challenging valuations, growth and income return pillars still look quite constructive, and nominal returns do provide some protection again the risk of persistent inflationary pressures.

In aggregate, our nominal return forecasts across asset classes are modestly lower relative to the previous year. Strong returns across risk assets have compressed equity and credit risk premia, and starting yield levels across fixed income are flat to modestly lower, with more yield compression across credit asset classes.

Table 1: Forecasted vs. realized returns, annualised (10 years)

	Forecasted returns (2024-2033)	Change from last year's 10Y forecast	Realized returns (2014-2023)
Equity			
ACWI Equities	6.3%	-0.5%	9.0%
World Equities	6.2%	-0.4%	9.5%
EM Equities	6.9%	-0.6%	5.2%
US Equities	6.2%	-0.5%	11.4%
Europe Equities	6.4%	-0.3%	6.3%
Germany Equities	6.0%	-1.3%	4.3%
UK Equities	8.0%	0.5%	5.2%
Japan Equities	4.4%	-0.3%	8.5%
Fixed Income			
EUR Treasury	2.3%	-0.4%	1.3%
EUR Corporate	3.3%	-0.7%	1.4%
EUR High Yield	5.5%	-0.6%	3.5%
US Treasury	4.0%	-0.2%	1.3%
US Corporate	4.7%	-0.2%	3.0%
US High Yield	5.7%	-1.1%	4.6%
EM USD Sovereign	7.3%	-0.3%	2.9%
EM USD Corporate	6.4%	-0.8%	2.7%
Alternatives			
World REITS	4.9%	-0.4%	6.0%
United States REITS	5.4%	-0.9%	7.5%
Global Infra. Equity	7.5%	0.8%	5.3%
US Infra. Equity	7.8%	0.9%	2.9%
Private RE Equity US	3.7%	-0.1%	8.2%
EUR Infrastructure IG	3.3%	-0.6%	1.5%
Private EUR Infra. IG	4.4%	-0.4%	2.7%
Broad Commodities Fut.	5.4%	1.2%	-1.1%

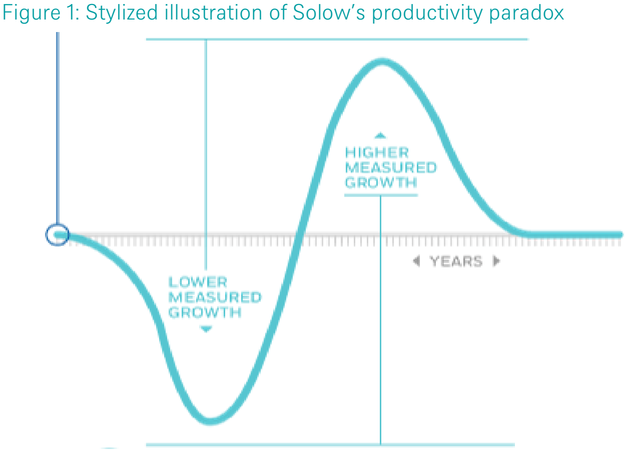
Source: DWS Investments UK Limited. Data as of 12/31/23. All returns (incl. forecasts) are in local currency. See appendix for the representative index corresponding to each asset class.

AI: Impact on Growth and Productivity

The productivity paradox

It was in 1987, in the midst of the first IT revolution, that the godfather of growth economics and Nobel laureate Robert Solow made his famous observation: "You can see the computer age everywhere but in the productivity statistics."[1] This observation later became known as the Solow productivity paradox, which seeks to explain the observation that investments into new and potentially game-changing technologies do not seem to have an immediate effect on productivity – neither on labor productivity nor total factor productivity ("TFP"). Labor productivity hereby is simply defined as economic output divided by total hours worked by all people while TFP reflects the part of economic output that cannot be explained by growth in investments or by the productivity of labor. Statistically speaking, it remains a residual and has been called "a measure of our ignorance".[2] Figure 1 shows a conceptual illustration of Solow's productivity paradox, which overestimates productivity gains in the short term but underestimates the productivity impact of technological investment over the longer term.

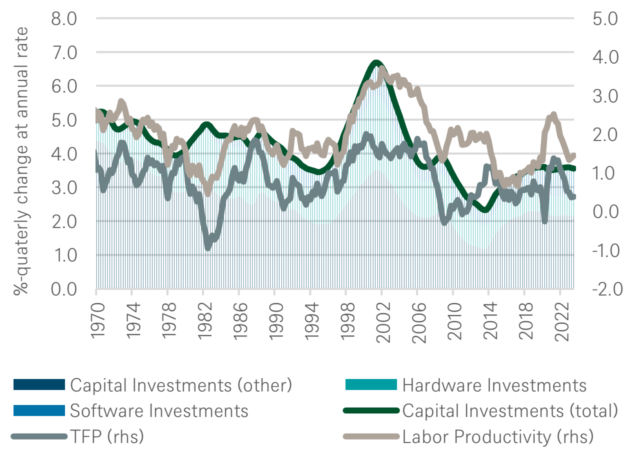
Figure 1: Stylized illustration of Solow's productivity paradox



Source: Brynjolfsson et al., 2021. For illustrative purposes only.

While the relationship between rising investment and productivity appeared to be less correlated at the time Solow made his observations, the more immediate impact of technology on productivity has become apparent in recent decades of technological advancement. In the late 1990s and early 2000s, the second wave of IT investment, the widespread adoption of the personal computer, and the emergence of the World Wide Web may have significantly boosted labor productivity (see Figure 2) before growth rates declined again for the following two decades. While some might argue that the subsequent slowdown in productivity was also a consequence of the Global Financial Crisis ("GFC"), recent research suggests that other mechanisms related to capital stock flattening were also at work.

Figure 2: Productivity in the US (5-year averages)



Source: Fed San Francisco, John Fernald, DWS Calculations Data as of 9/30/2023.

This view on the cycle of technology and productivity might argue that the growth impact of recent technological trends may play out in a similar fashion. The widespread use of smartphones (analogous to the introduction of the personal computer), or perhaps more recently the adoption of remote working (analogous to the introduction of computers in the workplace), may have been responsible for a modest upward trend in labor productivity from the mid-2010s to the early 2020s. The caveat remains, and we know this from past observations, that such an acceleration has tended to be short-lived. Moreover, the ultimate source of productivity gains is difficult to pinpoint, as other macroeconomic developments may also be at play. However, as the digitalization of the world seemingly touches every component of the economy, there seems to be a strong qualitative case for assuming that this technology will indeed be the driving force behind economic growth in the late 20th and early 21st centuries.

Looking ahead, recent advances in machine learning and artificial intelligence once again promise a bright future, raising high hopes not only for helping to overcome the demographic hurdles of lower potential growth in aging societies, but also for opening the doors to even more advanced technological discoveries that promise gains in economic prosperity. But before examining the potential impact of these new technologies on future growth, we need a better understanding of how to interpret the productivity paradox. Economic research see Brynjolfsson, Rock and Syverson, 2019)[3] suggests a few possible reasons that might help to understand the paradox.

[1] Slow, Robert M. We'd Better Watch Out. New York Times (1987).
2 Abramovitz, Moses. The Search for the Sources of Growth: Areas of Ignorance, Old and New (1993).
[3] Erik Brynjolfsson, Daniel Rock, and Chad Syverson. Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics (2019).

False hopes in technology

The most obvious reason for disappointment in productivity gains has been false hopes and exaggerated optimism about new, potentially game-changing technologies. Too often, technology enthusiasts and avant-gardists have touted visions that have at best been partially realized, if at all. Not that we necessarily dismiss visionaries or technological geniuses, but sometimes some ideas are truly ahead of their time, but with the optimistic promise of reemerging in the future and realizing their impact when the time and the environment are right. It is worth noting that the term "artificial intelligence" was originally coined in the 1950s, long before the booming interest in AI in the mid-2010s, when computers were first able to beat humans at games like Go and Chess. And it took almost another decade for AI to become accessible to non-experts.

Even at its inception in the 1950s, AI scientists themselves were following the same ideas developed in the late 17th century, when Gottfried Wilhelm Leibniz or Thomas Hobbes flirted with philosophies in which human thoughts could be described by mechanical calculus. The term “artificial intelligence” officially appeared in 1955 when Marvin Minsky proposed “a 2-month, 10-man study of artificial intelligence” for the following summer in 1956.[4] Since then, the topic has experienced several booms and busts: the so-called AI summers and winters. Periodically, the topic has been pushed forward with renewed hope, only to be buried in disappointment and eventual defunding of research initiatives. A common characteristic of these past AI winters was an environment of limited computing power and limited data availability. The current AI summer, in contrast to previous ones, is now being fed by huge advances in computing power and the exponential generation of data thanks to the advent of the World Wide Web. These developments have fostered traceable AI applications and use-cases that have matured into everyday applicability.

The new AI summer – justified hopes this time?

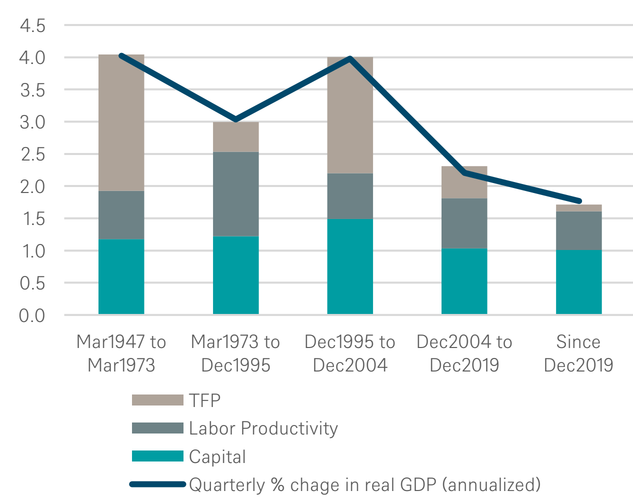
For the general public, the emergence of the well-known chatbot ChatGPT in 2023 was the tipping point that accelerated hopes and optimism around AI to unprecedented levels. Coincidentally, the acronym "GPT," which in the case of ChatGPT stands for "generative pretrained transformer," is also known as "general-purpose technology" (GPT) in the realm of economic researchers seeking to identify technologies that might eventually overcome the false hope argument of the productivity paradox. GPTs in this sense are technologies that have the potential to affect every aspect of the economy on a global scale, as steam engines and electric motors did in the past.[5] And while AI-powered Go or Chess programs were great fun to watch, current AI models are indeed capable of broader everyday applications that might qualify them as GPTs.

A catchy but not definitive example would be generating code from abstract formulated ideas. In fact, it is already possible to feed a research paper to an AI chatbot and ask it for a strategy on how to translate the ideas into executable code. Of course, such code snippets are "just" a recombination of previously available information, but nevertheless, new information is generated that performs a new task or automates a manual one. An employee who uses AI in this way is, in effect, creating a capital good that will henceforth add productivity to the overall company's performance.

Measurement and implementation lags

The question that remains, to stick with our example, is whether and to what extent this locally created technology is measured correctly. If a software package is purchased by a firm, it will show up as an investment in GDP calculations. On a larger scale, this would also be the case if a team within a company carries out a multi-million dollar (AI) software project, and the output is recorded as an intangible capital good. However, it is questionable whether a few lines of executable code created by an employee using an AI chatbot at little or no direct cost will show up in corporate accounting. It may have an impact on overall productivity if that employee uses the time savings from automation for other productive tasks, but we should never underestimate the willingness of employees to optimize their work-life balance. While capital and labor inputs remain fairly constant in such a case, productivity gains may still be visible in total factor productivity (see Figure 3). The same might be true for many of our modern technology-centric daily activities. Smartphones are quite cheap proportionate to their utility, and many online experiences come at little to no cost, yet we spend countless hours using these technologies. In such a case, unlike shopping for traditional goods, our consumption of these online experiences has little direct impact on GDP and instead may depend on the effectiveness of the advertising to which we are exposed through these low-cost technology experiences.

Figure 3: Contribution to growth (sample averages)



Source: Fed San Francisco, John Fernald, DWS Calculations Data as of 2/13/2024.

[4] McCarthy, John, Marvin Minsky, Nathaniel Rochester, and Claude Shannon. A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence (1955).
[5] Bresnahan, Trajtenberg (1992): General Purpose Technologies: Engines of Growth? (1992).

Another prerequisite for productivity to show up in firm or economy-wide performance statistics remains the rate at which that technology is adopted. The mere emergence or existence of a new technology is not enough to raise productivity but instead relies on broad adoption and literacy in utilizing the new technology. This may be another explanation for the productivity paradox. In the case of AI, which seems to be on the verge of overcoming false hopes, it is still reasonable to assume that adoption requires more than just investment in the appropriate infrastructure, i.e. software and hardware. Existing business processes or even entire business models are primed to be affected by such a revolutionary technology, and complementary investments in human capital and restructuring seem necessary to accomplish these advancements.

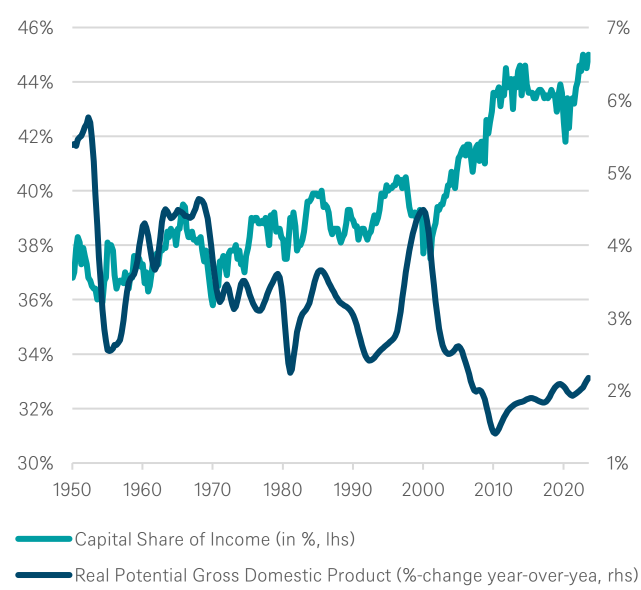
Mobile communication devices or, at an earlier stage, the introduction of e-mail and word processing software could serve as examples. At the time of their introduction, employees had to be trained to use the new technology, and as a result, over time, traditional white-collar jobs such as typists or telephone operators disappeared, and more productive job roles emerged. And while investments in hardware and software may show up in GDP calculations, intangible investments and adjustment costs remain difficult to quantify. Again, the implication is that, by definition, AI-related capital deepening may not be immediately or accurately reflected in traditional measures of productivity, even though adoption has already begun. This view may explain the time lags we observe in the statistics.

Moreover, we need to consider another related aspect that might be of particular interest to investors looking to take advantage of such emerging trends: the breadth of adoption. While early adopters of new technologies may be able to significantly increase their productivity at the firm level, it remains questionable whether this increase will show up in the overall statistics because they remain in the minority for some time - the gains of the few are suppressed by the stagnation of the many. Potential late adopters who remain less productive for longer, whether because of internal barriers or because the technology needs more time to mature to their needs, either catch up or, if they miss their chance, are displaced by competition. Recent research suggests that simple mismeasurement is only part of the puzzle, as some of the positive effects should be reflected in overall performance. However, the observation of time lags, as well as the uneven distribution argument, may provide a viable explanation for the productivity puzzle - especially since these time lags seem to have shortened since Solow made his famous observation. From this point of view, it seems like the productivity paradox only exists in a weak form and our interpretation remains that societies tend to overestimate the impact from new technologies in the very short-run on high hopes but underestimate its lasting force in the longer-run as the capital stock deepens and as the existence of time lags often get neglected in initial disappointment.

AI and its implications for economic growth

The question remains as to what potential impact AI as a GPT could have on overall economic growth. In this context, the notion of automation (see Aghion, Jones, Jones, 2019)[6] becomes important. Just as the invention of the steam engine enabled automation in manufacturing, AI has the potential to push automation further into so-called non-routine (Autor, Levy, Murnane, 2003)[7] and highly skilled tasks. Self-driving cars, medical diagnosis, handling complex legal relationships, or programming code are just a few examples where AI promises to unleash this potential. Some visionaries, such as Ray Kurzweil (2005)[8], argue that AI will eventually surpass human capabilities, leading to a so-called singularity. In such a scenario, AI will become self-perpetuating, even taking on the quality that is usually most characteristic of humans: discovery out of curiosity. From an economic point of view, this would be an extreme case after which almost everything, even idea generation, would be automated, and therefore labor productivity would approach infinity as hours worked approached zero - at least from a measurement point of view. The consequence in such an extreme theoretical scenario is that almost no income is earned from manual labor, while almost all income is earned from the capital stock. Taking this scenario as a hypothetical reference point, we acknowledge that the capital share of income could serve as one measure of the degree of automation. Such a perspective seems empirically consistent when looking at the past (Figure 4).

Figure 4: With progress in automation, the capital share increases over time



Source: Haver Analytics, DWS Calculations Data as of 2/13/2024.

[6] Aghion, Jones, Jones. Artificial Intelligence and Economic Growth (2019).
[7] Autor, Levy, Murnane: The Skill Content of Recent Technological Change: An Empirical Exploration (2003)
[8] Kurzweil: The Singularity Is Near (2005)

The accelerated increase in the capital share during the peaks of the second wave of digitization lags the massive investments in software and hardware during the 1990s, which is consistent with our analysis of the productivity paradox. At the same time, estimates of potential growth (i.e., the output that can be achieved when the economy is running at full speed) do not behave intuitively: after rising steeply with investment, they fall as the capital share rises, e.g. the benefits of automation are harvested.

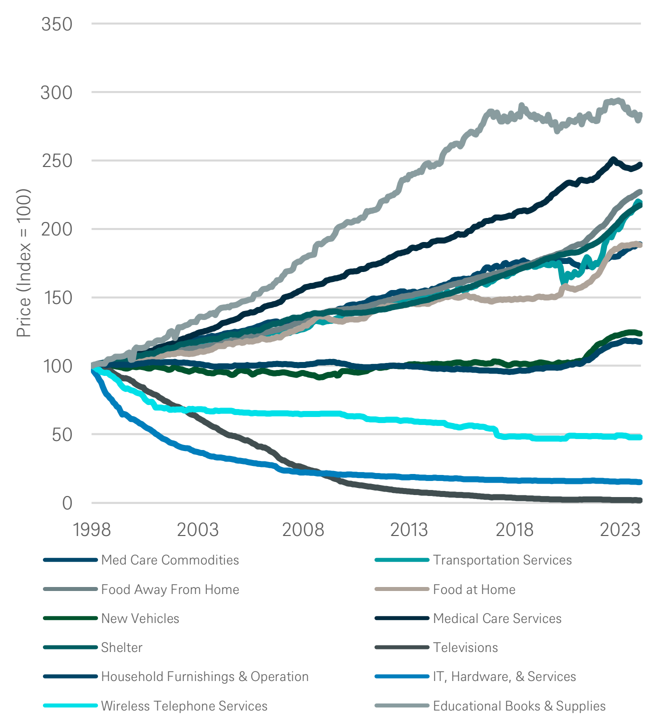
One explanation for this phenomenon may be that the relative prices of goods and services tend to fall once they are automated, reducing their overall impact on GDP growth. This observation is consistent with what is known as Baumol's cost disease (1967)[9]: growth is more likely to be constrained by tasks that are difficult to improve than by tasks that we can automate. This explanation not only enriches our understanding of the productivity paradox, but also explains the phenomenon that economies tend to grow less as they mature. The deterministic factor limiting growth is the elasticity of substitution between capital and labor inputs, i.e. how much can be automated by the new technology. Once the gains from substitution are exhausted as we approach technological limits, the growth of the capital share begins to stagnate. In the absence of other technological innovations, the use of existing technology intensifies, it becomes a complementary, and the increase of capital share begins stagnating or maybe even to shrink again. This assumption may be quite close to reality, as it explains the volatility of the capital share. Periods of investment with high growth and a lagged increase in the capital share and productivity are followed by periods of improvements that intensify the use of the existing capital stock. The stagnation of capital share growth over the past 15 years could be explained by the continuous improvement of existing technologies. The smartphone replaced the desktop computer, and online shopping replaced the mall experience, at least to some extent. But the underlying technologies have not changed much. In fact, there are voices complaining about the deteriorating quality of the Internet, which fits nicely with the notion of capital stock depletion.

Disinflationary potential for AI technologies

In the context of AI-driven automation, we already know that higher productivity should lead to a decline in relative prices in the affected sectors. One reason for this is the so-called displacement effect: workers are replaced by machines when the cost of capital is lower than the cost of labor. This is usually people's greatest fear. However, Acemoglu and Restrepo (2019)[10] show that there are countervailing forces. The creation of new jobs where labor remains more productive than technology, or the creation of new job roles that would not exist without automation, are well described empirically. However, the process of this so-called reallocation of labor takes time and can be painful, as the Industrial Revolution suggests. In the long run, however, it has provided the basis for new jobs and employment opportunities, even laying the foundation for our modern societies.

While it is easy to assume that increasing productivity lowers the absolute prices of goods and services, we also need to understand what the effects are on the prices of the low-productivity sector. A slightly different interpretation of Baumol's cost disease might help. High-productivity sectors can raise wages as less workers are needed, but low-productivity sectors must raise wages to compete for workers. The result is that low-productivity sectors participate in the cost increase but lack the compensating effects of productivity gains. The result is higher prices. The overall effect of automation on the absolute price level is therefore far from straightforward. This tendency to reduce inflationary pressures can be observed with the rapid price decline in technology goods such as personal computers, smartphones, and more recently large-scale data and computing costs. Gordon Moore in 1965 postulated a doubling every year (later amended to every two years) in the number of components per integrated circuit for microprocessors. This observation now known as "Moore's law", while no longer as broadly accepted in the semiconductor industry, can conceptually be applied to technology growth and application, with rapid declines in end user costs coincident with rapid developments in user capabilities. Figure 5 illustrates the trend in prices of technology consumer goods versus other core goods and service prices.

Figure 5: 20 years of price changes in the United States

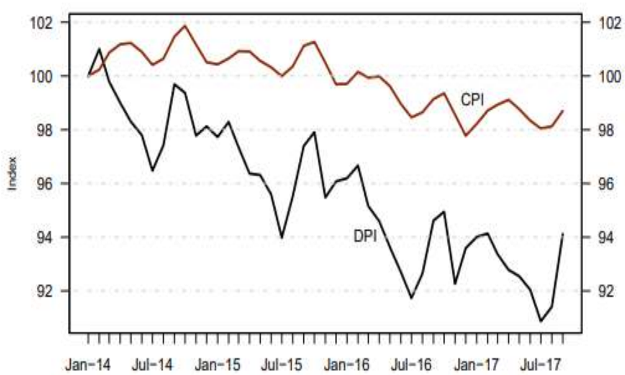


Source: Haver Analytics, DWS Calculations Data as of 2/13/2024.

[9] Baumol: Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis (1967)
[10] Acemoglu, Restrepo: Artificial Intelligence, Automation, and Work (2019)

While highly specialized, labor-intensive segments of the economy such as healthcare and education have experienced significant price growth over the past two decades, even traditional consumer goods have experienced disinflationary dynamics as a direct result of technology growth. The ease at which we can purchase goods in a matter of seconds and have them delivered in a matter of hours is a direct consequence of the rapid development of consumer-related technology application. In fact, a study of E-Commerce prices by Goolsbee and Klenow (2018)[11] documents significantly lower price inflation of online goods relative to CPI for the same categories. The researchers' Adobe Digital Price Index (DPI), consisting of 65 of the 211 CPI categories known as Entry Level Items ("ELIs"), or roughly 19% of the CPI relative importance weights in the Bureau of Labor Statistics in 2018, measured 1.3 percent points lower per year than CPI inflation for the equivalent products. This differential was observed in all CPI Major Groups with the exception of medicine & medical supplies.

Figure 6: Cumulative inflation, DPI vs CPI



Source: .Goolsbee, Austan D. and Peter J. Klenow (2018). Internet Rising, Prices Falling: Measuring Inflation in a World of E-Commerce. NBER Working Paper Series..
*For the 65 ELIs covered by the Adobe Digital Price Index (DPI). Uses CPI relative importance weights for each ELI. Source: Authors' calculations using Adobe Analytics and BLS Data.

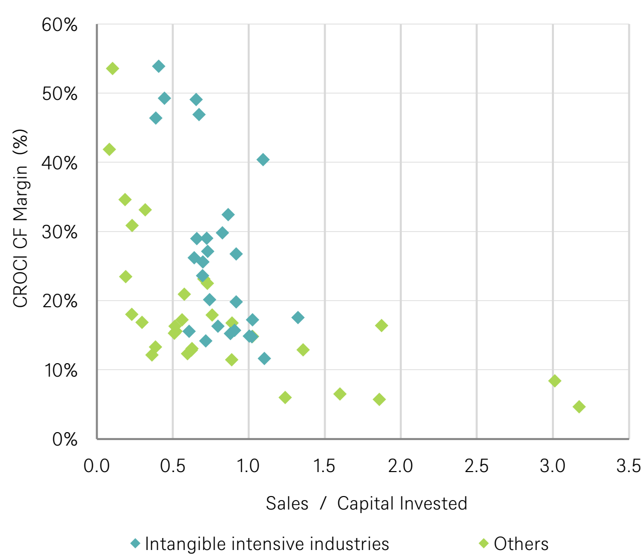
Overall, automation might have a potentially disinflationary effect, but there are limits. Given the capabilities of AI as a GPT, these limits could be pushed further though. The potential capital deepening effects of AI are broad-based across industries and throughout the value chain of goods and services production. For manufacturing productivity, generative AI improvements to productivity have already been well-documented. A 2023 study conducted by Stanford and MIT found that generative AI-based conversational assistants increased average productivity (measured by issues resolved per hour) by 14 percent on average, helping to disseminate knowledge from more skilled to less skilled, newer workers, thus accelerating their move down the experience curve[12]. The effects of this particular case are twofold: improvements in manufacturing or services productivity at the aggregate level but also shortening the learning curve for newer employees and thus the lag between technology and productivity gains.

Looking ahead: the importance of capital ownership

Current data suggest that, at least for the US, investment in AI infrastructure has already begun to pick up, and market valuations for producers of primary technological inputs (e.g., the magnificent seven) reflect this optimism. Our analysis shows that if AI turns out to be a GPT - and the odds are good that it will, given its multi-century development - we can expect growth, productivity, and the capital share to increase, at least for some time. The implications for investors, according to our analysis, are to focus on early adaptors in this phase of the impending technological revolution, while participating in the current creation of the capital stock. Companies, sectors or even countries that can replace manual labor with automation promise to be the winners of the next 10 years or so. Following this first order condition, it might be also worthwhile to screen for companies / sectors where the complementary use of this technology promises a higher rate of return.

Fundamentally, this has empirically been true as well. Using DWS's Cash Return on Capital Invested ("CROCI") methodology for estimating capital return paints a similar story (see Figure 7) industries where intangible assets make up more than 10 percent of capital invested have generally generated higher cash returns despite having a lower economic life of assets. This is driven by a better combination of asset productivity and cash flow margins.

Figure 7: CROCI cash return drivers of aggregations by industry group

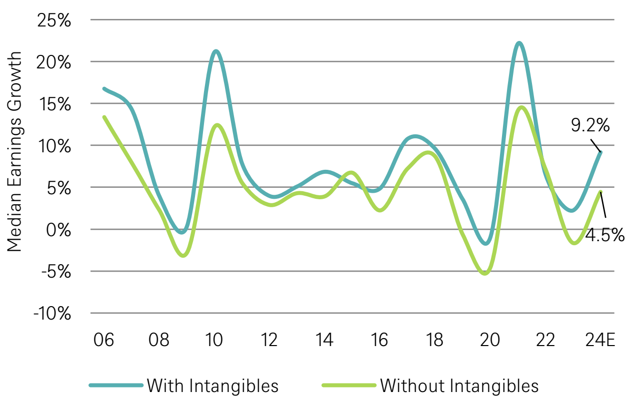


Source: DWS, CROCI. Aggregate 2024E CROCI CF Margin and Sales/Capital Invested grouped by Industry. "Intangible intensive industries" refers to industries where intangibles capitalized by CROCI account for at least 10% of total gross assets. Data as of 1/3/2024.

[11] Goolsbee, Austan D. and Peter J. Klenow (2018). Internet Rising, Prices Falling: Measuring Inflation in a World of E-Commerce. NBER Working Paper Series.
[12] Erik Brynjoffsson, Danielle Li, & Lindsey R. Raymond (2023). Generative AI at Work.

Intangible assets, by this measure, capture both Research & Development and Brand value, where both components seem to help contribute to higher returns and faster paced growth relatively to the rest of the economy. Since 2007, earnings growth among listed large-cap equities has mainly accrued to companies that have such assets while the rest of the market has lagged. Following two figures show the breakdown of CROCI economic earnings for companies where we capitalize R&D or Brands against those without any meaningful intellectual capital. It is evident that the share of overall earnings from the former group has been steadily increasing over the past decade or more (see Figure 8).

Figure 8: Median earnings growth for companies with intangibles and without intangibles



Source: DWS, CROCI. Aggregate 2024E CROCI CF Margin and Sales/Capital Invested grouped by Industry. "Intangible intensive industries" refers to industries where intangibles capitalized by CROCI account for at least 10% of total gross assets. Data as of 1/3/2024.

Technology companies embody this high intangible intensity, where the fast rate of technological change and quite adoption of innovation come with changes in the nature of assets and sometimes changes in the useful life of those assets. Investment into AI technologies has the significant potential to follow a similar path to improved profitability as a direct result of significant capital investment that we've observed from these high-growth companies in recent decades.

Return forecasts for ESG indices

For strategic investors, climate change and its negative impact on economic growth and, by consequence, stability and return on capital investments and potential for investment opportunities, remains as the one of the most significant mega-trends. In a previous Long View report, we explored potential impacts of climate risk scenarios on growth and inflation as well as on equity and credit risk premia, leveraging climate pathways previously establishing through the Bank of England's Climate Biennial Exploratory Scenarios ("CBES")[13].

DWS and broader industry research continues to explore the adverse effects of climate transition risk and physical climate risk on portfolio returns, with research findings demonstrating increasing breadth and depth in estimating the drivers of changes in potential returns associated with climate risk. At a glance, adverse climate scenarios resulted in higher risk premia, lower growth potential, and in some cases, the risk of higher structural inflation levels, although the long-term intensity of these impacts remains a hotly debated topic.

As part of our ongoing analysis of financial materiality related to sustainability, we present our set of return forecasts for 13 ESG equity and fixed income indices to help investors construct strategic long-term portfolios with consideration to both traditional financial metrics as well as ESG impact metrics. Table 2 shows our updated 10-year return forecasts across these ESG and traditional indices.

Table 2: 10Y return forecasts, annualised. in local currency

	ESG	Traditional
Equity		
ACWI Equities	6.0%	6.3%
World Equities	6.0%	6.2%
EM Equities	7.2%	6.9%
US Equities	6.2%	6.2%
Europe Equities	6.7%	6.4%
Japan Equities	4.1%	4.4%
Fixed Income		
EUR Treasury	2.2%	2.3%
EUR Corporate	3.2%	3.3%
EUR High Yield	4.9%	5.5%
US Corporate	4.6%	4.7%
US High Yield	6.0%	5.7%
EM USD Sovereign	5.4%	7.3%
EM USD Corporate	5.2%	6.4%

Source: DWS Investments UK Limited. Data as of 12/31/23. See appendix for the representative index corresponding to each asset class.

For the ESG index return forecasts, we utilize the same three-pillar approach that we use for traditional indices. These forecasted returns for these ESG indices do not therefore embed any ESG-specific factor risks, although it is reasonable to believe that the negative return implications of adverse climate scenarios we discuss in the next section may depend on the resilience of respective companies and industries to climate transition risk.

We continue to put significant emphasis on considering the financial impact of ESG policy, as evolution of sustainability policies across global economies is paramount to mitigating significant environment risks. As we discussed in considerable detail in the 2022 Long View, significant and early adoption of climate transition policy is tantamount to mitigating climate-related losses across both the real economy and corporate profits.

Climate-related risks and investments impacts[14]

Undertaking climate scenario analysis is a disclosure requirement from financial institution regulators including the UK Financial Conduct Authority (FCA), the EU Corporate Sustainability Reporting Directive (CSRD), the German Federal Financial Supervisory Authority (BaFin) amongst others. These regulations are framed around the recommendations of the Taskforce on Climate related Financial Disclosure (TCFD).

To meet these regulatory expectations, as part of DWS's Annual Report, the DWS Risk team undertook climate scenario portfolio analysis[15]. DWS's Annual Report includes analysis of the company's entire liquid asset class holdings, which we do not re-produce in the Long View.

The assessment uses MSCI's Climate Value at Risk model to estimate the potential impact of adverse climate events on portfolio returns. Scenarios included a global temperature increase ranging from 1.5 degrees to 5 degrees Celsius and draw on central banks' scenarios developed by the Network for Greening the Financial Sector[16]. These scenarios include various temperature rises and integrate assumptions regarding government regulations, macroeconomics, energy systems, land use, business operations, technology advancements, and physical properties.

The identified risks and opportunities are categorized into two primary types: transition risks and physical risks. Transition risks and opportunities focus on the repercussions of policy shifts aimed at fostering a more sustainable economy. This includes potential cost increases for companies and also emerging business opportunities associated with the adoption or development of low-carbon technologies and climate solutions. In this context, we refer to the former as "policy risks" and the latter as "technology opportunities". Additionally, climate change can induce acute and chronic climate events, potentially resulting in property damage or business disruption. These effects are identified as "physical risks" These identified risks

[13] Bank of England 2021.
[14] We are grateful to the DWS Risk team of Renato Von-Allmen, Giulio Siemoni and Roberto Cesca for undertaking the analysis and to Murray Birt for contributions to the section.
[15] DWS Group (March 2024) https://group.dws.com/ir/reports-and-events/annual-report/
[16] NGFS (2023) https://www.ngfs.net/ngfs-scenarios-portal/

and opportunities can be categorized into two primary types: transition risks and physical risks.

Key Drivers of Transition Risks and Opportunities

Transition risks and opportunities indicate the potential financial impacts on companies due to policy shifts and specific climate trajectory assumptions. For the basis of our analysis, we have selected different climate pathways resulting in global warming outcomes ranging from +1.5°C to +3°C. Within these scenarios, the trajectories of greenhouse gas (GHG) emissions and the associated carbon pricing assumptions are crucial input factors.

Policy risks are assessed based on an investee's GHG emissions across the entire value chain. The required carbon price trajectories are modelled considering the intensity and timing of fiscal and regulatory measures. Companies involved in the development of low-carbon technologies may benefit from more stringent climate policies and the potential emergence of growth opportunities. The primary metrics for assessing technology opportunities at the company level are investees' clean-tech revenues and patents, providing insights into research and development investments. However, the models do not consider any company reduction targets. Furthermore, the models and their input parameters make various assumptions, including the assumption that current innovators will also be tomorrow's innovators, but they overlook the unpredictable nature of how companies might evolve in response to upcoming climate-related risks and subsequent opportunities.

Key Drivers of Physical Risk

The anticipated global temperature rise is expected to amplify the frequency of severe weather events, such as intense heatwaves, major storms and floods. In our assessment, we primarily focus on two types of economic impacts on our investees: business interruption and physical damage.

The degree to which our investees are exposed to physical risks depends on the sensitivity of their business to such factors. One crucial aspect is the geographical location of company properties and business operations.

Transition Risks and Opportunities – by Sectors and Regions

The two heatmaps below illustrate policy risks and technology opportunities under an orderly climate transition pathway for a 1.5°C temperature rise. In orderly transition scenarios, it is assumed that climate change policies are implemented early in a globally coordinated manner and gradually intensify over time. Disorderly scenarios would assume late and divergent policies across regions and sectors.

Policy risks are expected to be more material for carbon-intense industries, such as energy, utilities, and materials. However, sectors showing high policy risks also demonstrate higher potential in technology opportunities that may be leveraged by early adopters of policy changes. Asia Pacific and Europe are estimated to benefit slightly more from adoption of low-carbon technology in most sectors compared to other regions.

Physical Risks by Sector and Region

For scenarios with a substantial temperature increase, physical risks are expected to have the most significant impact. These potential physical risks under a 5°C transition pathway indicate that regions such as the Asia-Pacific and Latin America could face more severe consequences from extreme climate events than other regions. The impacts include reduced labour availability and productivity, as well as asset damages. Capital-intensive industries, such as utilities and energy – especially those with production facilities in coastal areas – are likely at greater risks of suffering from acute climate events like flooding and tropical cyclones.

Climate Scenario Analysis

The DWS Risk team undertook similar analysis in 2022 and they found that compared to the 2023 analysis, majority of the change can be attributed to model enhancements by MSCI, as well as updates in the underlying reported climate-related data of investees. This had a particularly high impact on the estimated climate opportunities, making them "less positive" compared to the previous year's data.

The MSCI model incorporates many different factors and assumptions. However, the inherent complexity of climate systems and their impact on micro and macroeconomics introduce a substantial degree of uncertainty in determining the implications for our investees' financial valuations.

Additionally, the response of investees to policy shifts and physical climate impacts is not entirely predictable and not part of the modelling. The analysis should be regarded as guidance and a relative value analysis on how climate change might impact sectors, regions, or asset classes under certain assumptions, rather than as an exact prediction of valuations of individual investments or portfolios.

We recognize that there are critiques, such as from the UK Institute and Faculty of Actuaries[17], on the limitations and assumptions of climate scenario modelling practices in financial services companies. For instance, climate scenarios may not reflect many of the most severe impacts we can expect such as tipping points. We therefore note the work of a major UK pension fund which is taking a qualitative, narrative approach to integrate climate scenarios into their investment decision-making process[18], by developing investment outlooks for asset classes based on four qualitative future climate scenarios. We will continue to monitor and report on climate scenarios within future editions of the Long View.

[17] IFOA (July 2023) Emperor's New Climate Scenarios – a warning for financial services https://actuaries.org.uk/emperors-new-climate-scenarios
[18] Accounting for Sustainability (Feb 2024) A Narrative Approach to Climate Scenario Analysis at USS https://www.accountingforsustainability.org/en/knowledge-hub/blogs/narrative-approach-to-climate-scenario-analysis-uss.html

The Long View

We enter the new year with a visibly different macroeconomic environment versus the previous decade. Technology and artificial intelligence have become top-of-mind for pundits and investors alike, with the expectation of significant implications for economic growth and productivity.

In the last couple of years, monetary policy has also shifted toward tighter financial conditions, with higher nominal and real interest rates across sovereign yield curves reflecting a broad commitment from central banks to address persistent inflationary issues. This has, to a large extent, changed the strategic outlook for fixed income markets both in absolute terms and relative to other asset classes. Nonetheless, investing is about patience, diversification and maintaining a long view. Our framework uses fundamental building blocks for establishing return forecasts of various asset classes. These can provide investors with a strategic baseline view. The following sections take the reader through our framework and findings.

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Executive summary

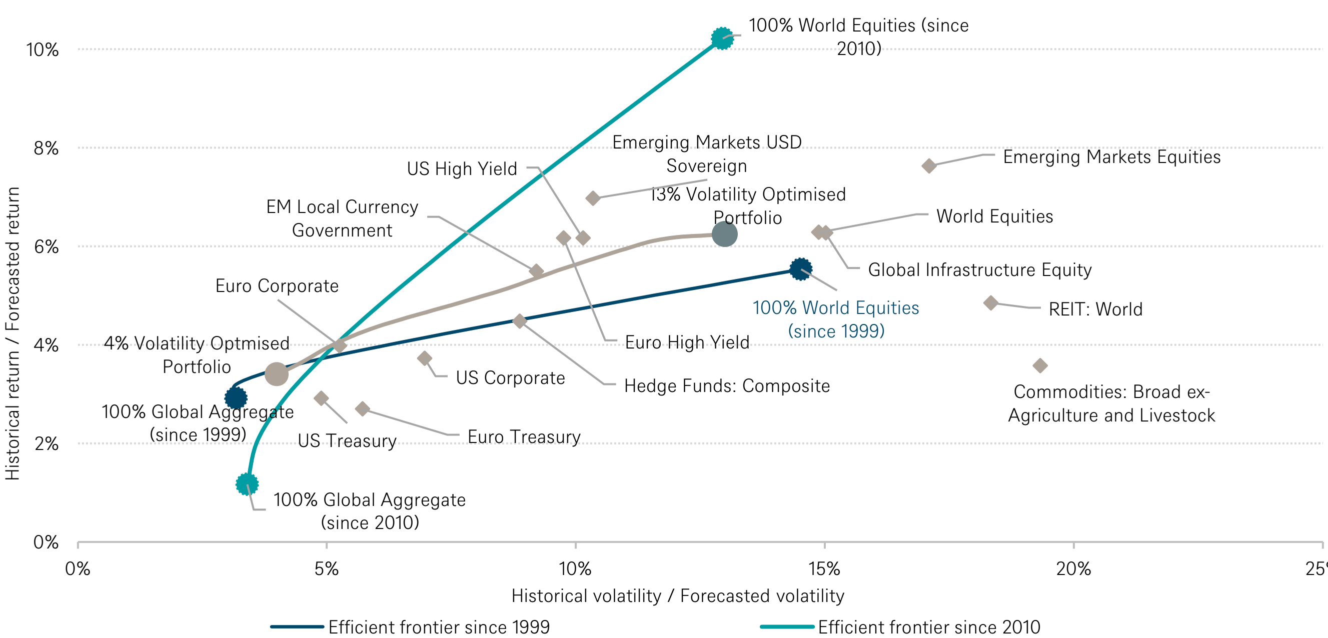
Coming into 2023, the economic consensus called for a shallow recession. Surprisingly resilient labor markets helped support global growth, helped to propel robust investment returns across equity and credit asset classes. While interest rate volatility has somewhat normalized from the previous year, stubborn but slowing inflationary pressures have kept nominal yields high and sovereign bond curves flat and inverted across numerous developed market economies. As central banks gradually shift back toward easy monetary policy, the magnitude and pace of rate normalization remains a point of macroeconomic uncertainty.

Entering 2024, return forecasts are modestly lower versus a year ago. Valuations across equity and credit markets are modestly more demanding, and medium and longer-term sovereign bond yields, despite a volatile year, ended 2023 largely unchanged from the previous year. Looking forward over the next decade, fixed income nominal return forecasts still look robust versus the previous decade driven by higher yield levels as interest rates have largely normalized following over a decade of quantitative easing ("QE"). Despite some compression in equity return forecasts driven by more challenging valuations, growth and income return pillars still look quite constructive, and nominal returns do provide some diversification against the risk of persistent inflation.

As interest rate policy transitions back toward a more normal environment, the neutral level of real interest rates remains a key question that will ultimately impact fair value across asset classes. Over a strategic horizon, global growth prospects continue to trend lower, reflecting a shifting demographic landscape, with working-age populations in secular decline. Nonetheless, positive real interest rates across many developed economies and only modestly expensive valuations across equity and credit complexes leaves investors at a far more favorable starting point for this coming decade. Taking these factors into consideration, we present our long-term ten-year return forecasts across asset classes which we refer to as our "Long View".

In our Long View, we show our forecasted returns across asset classes and regions on the efficient frontier, which represents the trade-off investors must make between risk and returns. Figure 9 depicts the efficient frontier over the last thirteen years since the credit crisis and compares it to the efficient frontier over the past two decades. As seen, the post-financial crisis efficient frontier is steeper. What this suggests is on a relative basis, investors received far greater compensation for commensurate levels of risk in the decade following the financial crisis.

Figure 9: Efficient frontiers: 10 year forecasted and historical returns and volatilities, annualised



Historical Efficient Frontiers are noted above as "Efficient Frontier" and are calculated using historical returns and volatilities over the time frame noted through 12/31/23. Each historical efficient frontier represents the risk-return profile of a portfolio which consisted of two asset classes; World Equities (in euro, unhedged) and Global Aggregate Fixed Income (euro-hedged). The Long View Efficient Frontier represents a forecasted optimal portfolio (EUR) using the various asset classes represented in the figure, subject to certain weighting/concentration constraints that result in component asset classes being able to trade above the line in this instance (please see page 29 for more details on these optimization techniques). Source: DWS Investments UK Limited. Data as of 12/31/23. See appendix for the representative index corresponding to each asset class.

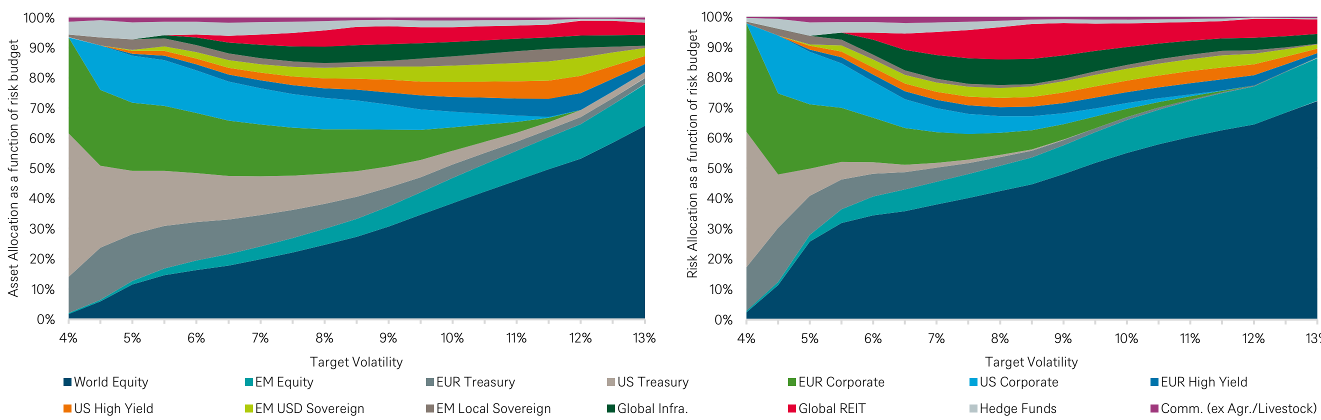
Past performance may not be indicative of future returns. Forecasts are based on assumptions, estimates, views and or analyses, which might prove inaccurate or incorrect. Any hypothetical results may have inherent limitations. Among them are the sharp differences which may exist between hypothetical and actual results which may be achieved through investment in a particular product or strategy. Hypothetical results are generally prepared with the benefit of hindsight and typically do not account for financial risk and other factors which may adversely affect actual results.

This publication details the long-term capital market views that underpin the strategic allocations for DWS's multi-asset portfolios. These estimates are based on 10-year models and should not be compared with the 12-month forecasts published in the DWS CIO View.

Central to this document is our belief that clients should consider a long-term perspective beyond 1-5 years when it comes to constructing investment portfolios. Perhaps, counterintuitively, extending the investment horizon has, in the past, produced less volatile, more precise forecasts, as shown in Figure 11: while risk still matters and there is still a distribution of investment outcomes around any central forecast, this distribution has tended to become narrower when investing for longer investment horizons. One consequence of this is that entry points become less relevant (even though of course by no means irrelevant) for longer investment horizons (because cyclical and tactical drivers are overtaken by fundamental, structural drivers of asset class returns). This is true even at times of extreme valuation: taking one of the biggest previous bubbles (the dot.com boom) as an example, the difference between buying US equities exactly at the peak of the dot.com boom in April 2000 vs. a year later (after valuations had collapsed) only amounts to one percent compounded annually when investing with a 15-year time horizon (as we show in Figure 15 on page 18). However, if an investor had had a shorter horizon of five years, the difference in returns generated from buying at the peak versus one year later was far greater, amounting to roughly six percent per annum. Thus, the longer the holding period for an investment, the stronger the case that its return is primarily driven by the underlying fundamental building blocks.

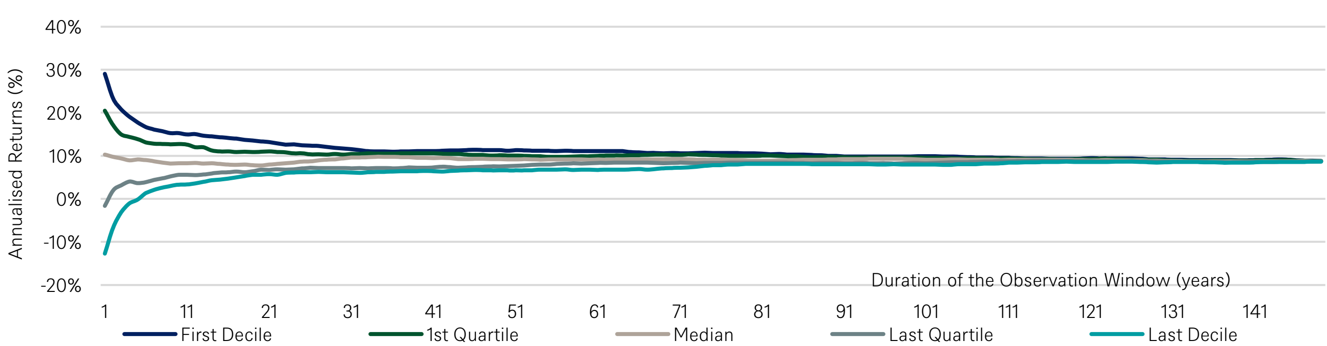
Looking at rolling one-year price returns of the S&P 500 from 1871 to 2023, a negative two-standard-deviation move equated to a 27 percent decline in prices (Table 3 on page 191). When calculating a negative two-standard-deviation move using rolling 10-year returns over this same time frame, the decline in prices is less than 1 percent per annum. More stable long-run returns can be helpful in establishing more stable strategic-asset-allocation targets. Hence, skeptics may be surprised to learn that the volatility of returns historically has been lower when using long-term horizons, although past performance may not be indicative of future results.

Figure 10: Asset allocation and risk allocation by target volatility



Source: DWS Investments UK Limited. Data as of 12/31/22. For illustrative purposes only. See page 29 for details. See appendix for the representative index corresponding to each asset class.

Figure 11: Distribution of U.S. equities: Historical returns over different holding periods, annualised



Source: Robert J. Shiller, DWS Investments UK Limited. Data from 1871 to 2023.

Framework

We use the same building-block approach to forecasting returns irrespective of asset class. We believe this approach brings consistency and transparency to our analysis and also may help clients to better understand the constituent sources of forecasted returns.

The Long View framework breaks down returns into three main pillars: income + growth + valuation, each with their own sub-components. The pillars and components for the traditional asset classes under our coverage (equities, fixed income and commodities) are show in Figure 12.

Meanwhile, alternative asset classes under our coverage (listed real estate, private real estate, real estate debt, listed infrastructure equity and private infrastructure debt) are forecasted using exactly the same approach, sometimes with an added premium to account for specific features, such as liquidity.

Figure 12: Long View for traditional asset classes: Pillar decomposition

Asset class	Income		Growth		Valuation		
Equity	Dividend yield	Buybacks & dilutions	Inflation	Earnings growth	Valuation adjustment		
Fixed income	Yield		Roll return		Valuation adjustment	Credit migration	Credit default
Commodities	Collateral return		Inflation	Roll return	Valuation adjustment		

Source: DWS Investments UK Limited

Figure 13: Long View for alternative asset classes: Pillar decomposition

Asset Class	Income	Growth		Valuation			Premium
Hedge funds		Hedge funds' full exposure to each pillar are calculated by means of a multi-linear regression of hedge fund performance vs all liquid asset classes					Hedge-fund premium
Listed real estate equity	Dividend yield	Inflation		Valuation adjustment			
Private real estate equity	Dividend yield	Inflation		Valuation adjustment			
Private real estate debt	Yield	Roll Return		Valuation change	Credit migration	Credit default	Liquidity premium
Listed infrastructure	Dividend yield	Inflation	Earnings growth	Valuation adjustment			
Private infra-structure debt	Yield	Roll Return		Valuation change	Credit migration	Credit default	Liquidity premium

Source: DWS Investments UK Limited.

Return forecasts

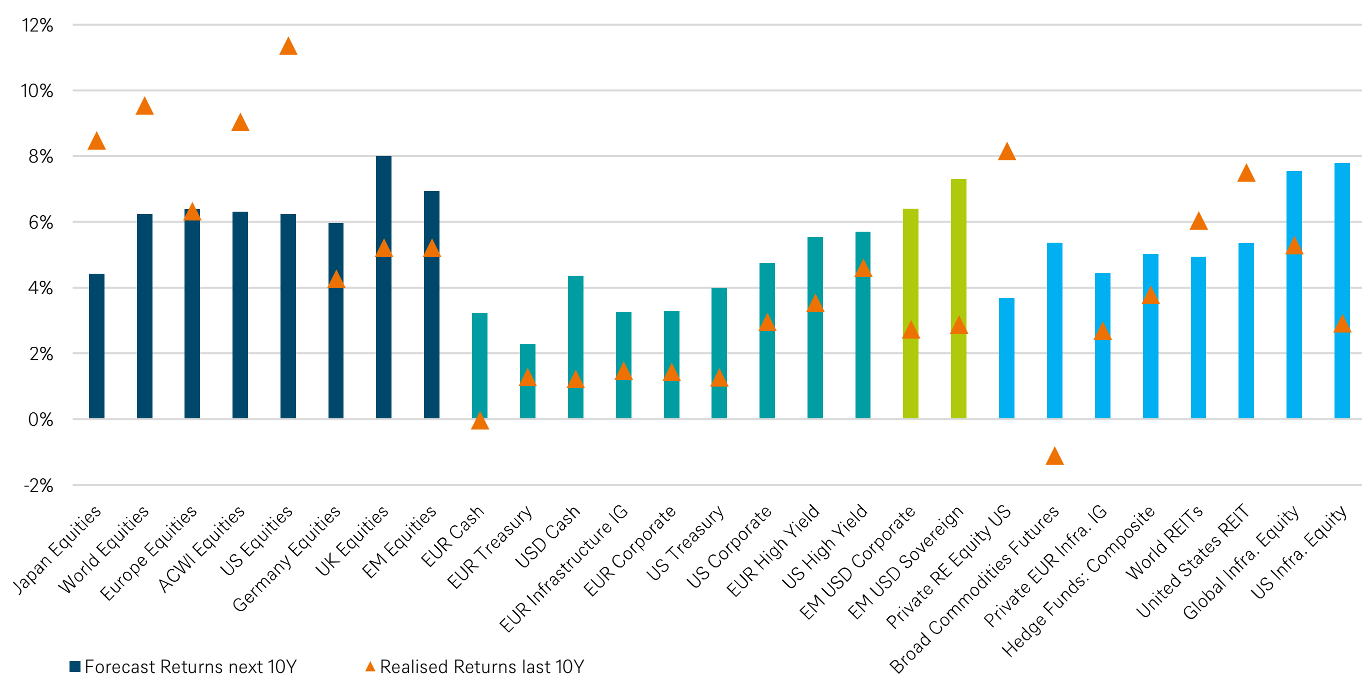
Our Long View forecasts for all asset classes can be seen below. The bars are ranked by ascending forecasted return within each asset class.

In summary, we make the following key observations from the results:

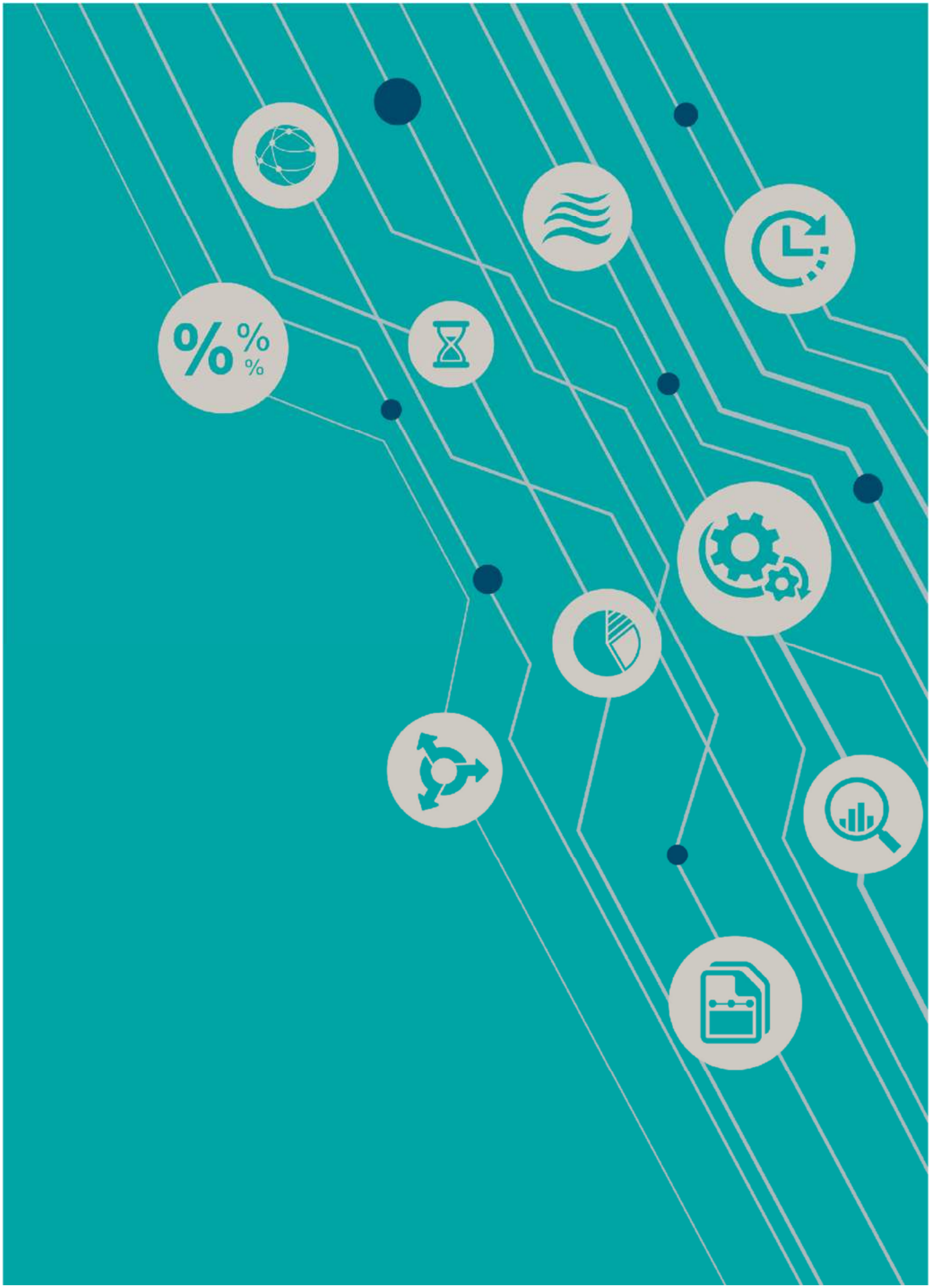
- Return forecasts across equities have significantly increased from last year's forecasts; in Europe and EMs they are now in line with or modestly above the realized returns over the past decade, whereas in US equities they are still well below the strong realized returns over the past 10 years.
- Across regional equity markets, the emerging markets are expected to offer the highest forecasted returns, but only marginally ahead of some European markets and the US.
- Fixed income return forecasts show the most positive change, both versus the previous year's forecasts and relative to the previous decade. Both core fixed income and credit offer higher nominal return outlooks, given high current starting yield levels.
- Within credit, (across IG and HY corporates as well as sovereign and corporate EMD), return forecasts are well above previous decade returns. EM USD sovereign and corporate debt in particular are the highest across credit asset classes.
- Alternative asset class return forecasts at in line with to modestly below traditional asset class forecasts. Within alternatives, infrastructure equity has the highest return outlook. Decline in private RE equity forecasts reflect both a methodology change to earnings contribution but more importantly less attractive valuations relative to TIPS yields.
- Commodity future return forecasts are healthier now than the very poor realized returns of the previous decade and could provide useful diversification benefits and potential inflation protection.

Investors should be conscious of the impact of foreign-exchange (forex) risk on base-currency returns and volatilities. Depending on risk appetite and return objectives, investors may want to consider hedging currency risk.

Figure 14: Forecast and realised returns for 10 years, annualised (local currency)



Source: DWS Investments UK Limited. As of 12/31/23. See appendix for the representative index corresponding to each asset class



The DWS Long View

Patience, diversification and forecasted returns

Long-term investors could enjoy less volatility

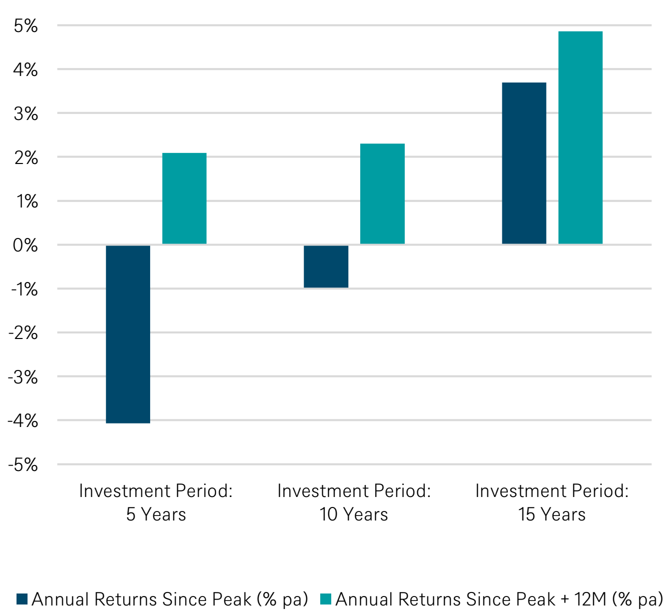
A long-term view reduces the problem of market timing

Why is it so important to have a long-run perspective? For us, the reason is simple. We believe that only over a market cycle can an investor potentially capture the risk premium[19] available for each asset class.

To illustrate this, Figure 15 compares the annual return for an investor buying U.S. stocks either in April 2000 or 12 months later. April 2000 was one of the most expensive valuation points for most equity indices and, as such, it represented a challenging period for investors. Surely, this was a terrible time to buy the market?

Indeed, it was. If we look at returns over the subsequent five years from the market peak on April 28, 2000, performance was significantly impacted by market timing. If an investor had waited and instead bought into the market 12 months after the peak, subsequent annual returns would have increased by 6 percent per annum, turning negative 4 percent return per annum into a more comfortable 2.1 percent annual return over the ensuing five-year period.

Figure 15: U.S. equity performance over various time periods, annualised



Performance based on the 5 worst equity months (for U.S. equities) from 1992-2023. Total return performance represented by S&P 500 TR
Source Bloomberg Finance L.P., DWS Investments UK Limited. Data from 12/31/1991 to 12/31/23.

However, if we take the same example over a 15-year investment horizon, Figure 15 shows that an investor's total return would have been much less sensitive to market timing as prices reverted to their long-run trend and fundamentals over time. What is more, it has been suggested that about 90 percent of portfolio returns come from asset allocation. In other words, taking a Long View means portfolio allocation decisions are usually far more critical than trying to time the market by picking the highs and lows. These portfolio allocation decisions are of course not time-independent: a strategic asset allocation crucially depends on long-term expectations for return and risk (and these evolve over time), but the key is that taking a long view enables investors to focus on how to invest rather than whether or when to invest (which may be the overriding concerns for short horizons). For many investors, not being invested in financial markets at all for long periods is not an option.

Under the assumption of past behaviour of market cycles and the tendency for prices to revert to their long-term trend, returns measured over long periods of time (15 or more years) may establish a more reasonable expectation of future performance compared to shorter time frames (5 or fewer years). However, we recognize the real world is rarely so patient. Hence, our Long View forecasts are based on a ten-year horizon, which we believe is near term enough to be relevant, while still a reasonable timeframe for a full market cycle to occur.

[19] We often use the term risk premium in this publication. We define risk premium as the excess return an asset class is expected to deliver compared to other asset classes, usually carrying a low or null risk, like cash or government bonds. "Equity risk premium" usually refers to the past or expected excess returns of equities compared to risk-free money markets, and "Bond risk premium" refers to the same concept applied to bonds, usually referring to the incremental returns expected for a higher level of duration risk borne by the investor.

Measuring returns over longer timeframes (five or more years) can reduce volatility

Consider the performance of U.S. equities since 1871 (Figure 16) based on Robert Shiller data.[20] This equity composite has delivered a 9.2 percent annualised nominal return, which translates into 6.9 percent real return – outperforming real output growth in the U.S. by 3.7 percent.

Figure 16 makes clear that over most of the time periods covered in this chart, equities have historically produced steady above-inflation returns, despite some nasty short-term[21] losses.

To quantify historical return versus short-term risk, Figure 17 shows the distribution of annualised U.S. equity returns across different time horizons. It illustrates that with a longer investment horizon, realised returns converged towards their long-run average.

We continue to believe that a longer time horizon reduces the range of volatility of U.S. equities

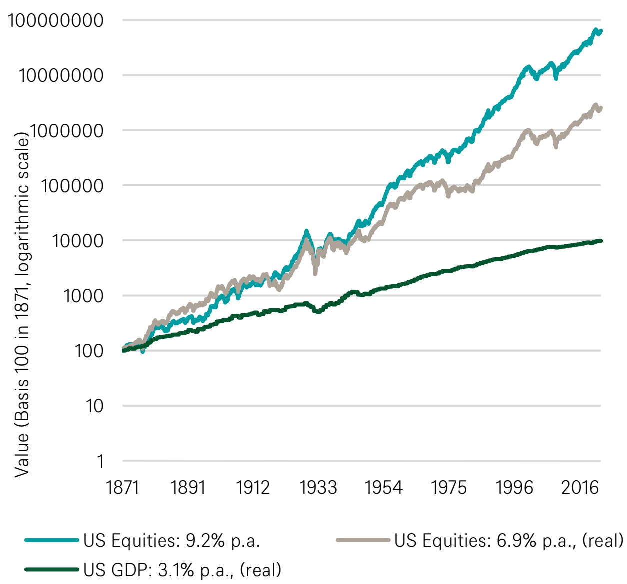
How does the Long View's ten-year time frame look in terms of return stability? Table 3 provides average and various standard deviation levels for annualised returns across different time periods for U.S. equity investors. As can be seen, the range of returns becomes narrower as the time horizon increases.

Table 3: Average and standard deviation of realised U.S. equity returns over different time periods, annualised

Maturity (year)	1	5	10
Average (IRR) – 2 St Dev	–27.3%	–5.9%	–0.4%
Average (IRR) – 1 St Dev	–9.3%	1.4%	4.2%
Average (IRR)	8.7%	8.8%	8.8%
Average (IRR) + 1 St Dev	26.7%	16.1%	13.4%
Average (IRR) + 2 St Dev	44.7%	23.4%	18.0%

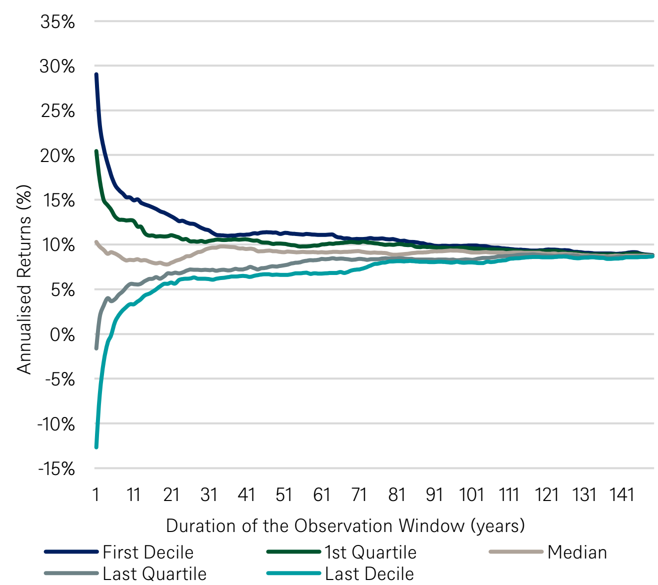
Source: Robert J. Shiller, DWS Investments UK Limited. U.S. equity returns for respective time periods between 1871 and 2020 Data as of 12/31/23.

Figure 16: U.S. equity returns and U.S. GDP growth (1871–2023)



Total-return performance represented by S&P 500 TR
Source: Robert J. Shiller, Maddison Project Database 2023, DWS Investments UK Limited as of 12/31/23.

Figure 17: The longer the holding period, the more consistent the average return of U.S. equities (January 1871 to December 2023)



Total-return performance represented by S&P 500 TR
Source: Robert J. Shiller, DWS Investments UK Limited as of 12/31/23.

[20] Long-term U.S. equities data is available at (Shiller, Online Data Robert Shiller 2022) and long-term macro-economic data is sourced from (Maddison 2022).
[21] "Short term" for the purpose of this publication refers to a time frame of up to five years, while "long term" refers to a time frame of at least ten years.
Past performance, [actual or simulated], is not a reliable indication of future performance.

A longer time frame leads to more consistent equity-return forecasts

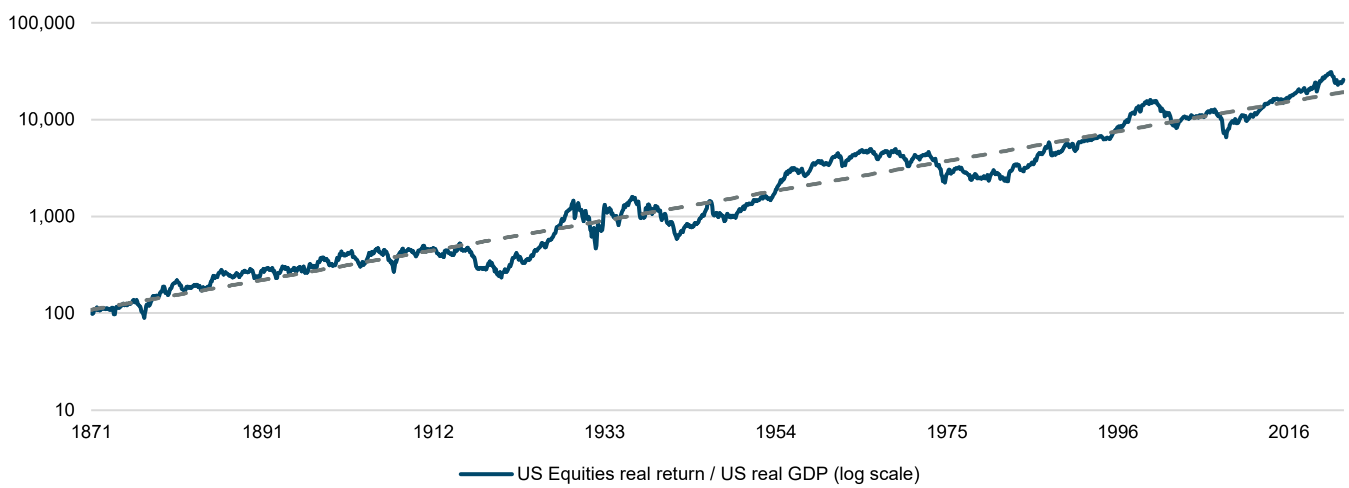
Equity returns as a function of economic growth

Many believe forecasting market returns is a fool's errand, but over extended time horizons it has been shown that returns have historically tended to revert to their average. As a result, when examining long-term relationships with various economic variables, such as economic growth (GDP) and inflation, trends can be identified. Take the ratio between real total returns for U.S. equities and real output.,

Figure 18 suggests that U.S. equities outperform economic growth over the long run by 3.7 percent per annum as reported by Robert Shiller. This relationship does not guarantee future outperformance, but it does provide some long-term evidence of the behaviour of equities over time relative to these variables.

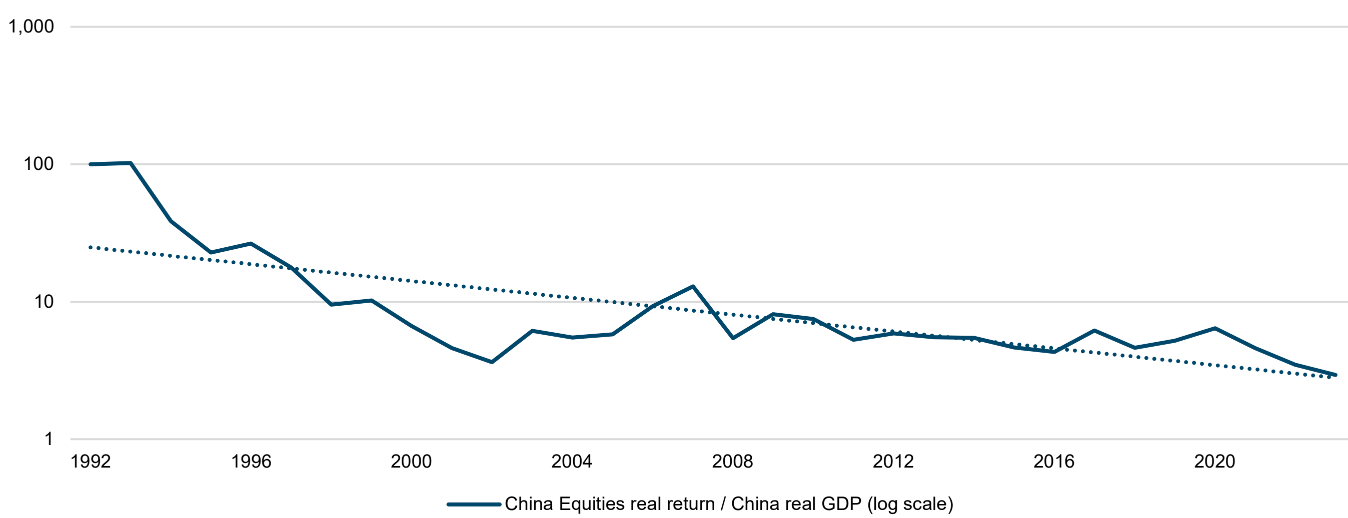
In emerging markets, however, our analysis suggests that for certain countries, GDP growth has not translated proportionately into earnings growth for broader equity indices (see the ratio for the MSCI China in Figure 19 as an example). One potential reason for this divergence, in our view, is the difference in the structure of the economy and the composition of equity benchmarks.

Figure 18: The ratio between the real total return of U.S. equities and U.S. real GDP has grown at 3.9% (1871-2023), log scaled and indexed: 01/1871 = 100



Source: Robert J. Shiller, Maddison Project Database 2020, DWS Investments UK Limited. Data from 1871 to 2023.

Figure 19: The ratio between the real total return of MSCI China and China real GDP growth (1992-2023), log scaled, indexed: 01/1992 = 100



Source: Bloomberg Finance L.P., IMF World Economic Database, DWS data as of 1992 to 2023.

Equity forecasts

To support the claim above, we back-tested our own Long View equity forecast methodology to test its reasonableness over the long run. We utilised long-term return and fundamental data (Shiller, Online Data Robert Shiller 2019) and decomposed performance into the building blocks as described in Figure 20.

Figure 20: Pillar decomposition: Equities

Income	Growth		Valuation
Dividend yield	Inflation	Earnings growth	Valuation adjustment

Source: DWS Investments UK Limited.

For this exercise, we made two adjustments and applied the following assumptions, described below:

- For historical expectations of future ten-year inflation expectations (a so-called backcast) we followed the methodology developed by (Groen and Middeldorp 2009).
- This gives a theoretical estimate for breakeven inflation based on all inflation forecast data that has been made available since 1971. We use this backcast until the respective dates where Treasury Inflation-Protected Securities (TIPS) prices and then inflation swaps quotes are available.
- In the absence of robust historical data, earnings growth is estimated from its long-term trend observed during the testing period.

Subject to these adjustments and assumptions, we created a data set that we used to examine the necessary data to provide forecasted return backcasts from 1971 to 1981 and rolled this ten-year forecast forward each year thereafter. This is long enough to cover at least one market cycle.

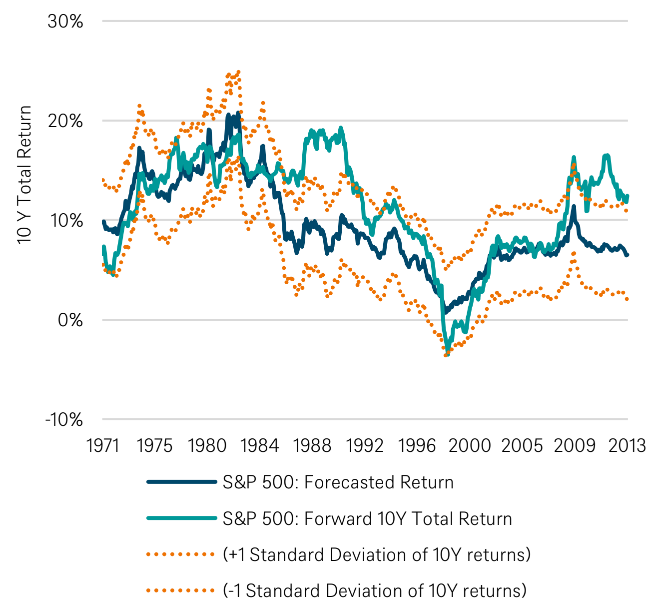
The results suggest the return forecast of our Long View equity methodology appears to provide a reasonable estimate of future performance. Figure 21 shows the return forecasts versus realised returns. While there are periods where divergence exceeds one standard deviation, we would highlight two statistics in support of the methodology.

The first is that in 85 percent of the observations the forecasted return has been within one standard deviation of the subsequent actual ten-year realised return.

Second, the gap between the return forecasts and subsequent realised return has been less than half of one standard deviation 60 percent of the time.

To conclude, we believe Figure 21 illustrates what investors may observe from our ten-year forecast methodology: a reasonable indicator of long-run market trends.

Figure 21: Our forecast would have provided estimates for U.S. equity returns within one standard deviation (1971 through 2013)



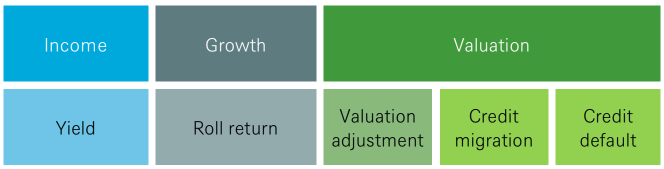
Total return performance represented by S&P 500 TR. Source: Robert J. Shiller, Maddison Project Database 2023, DWS Investments UK Limited. Data from 1971 to 2023. The forward 10Y return show the realised return over the subsequent 10 years. The first10-year forecast and actual results represent the compound annual return from September 1971–September 1983. A simplified forecast would have provided estimates for S&P 500 returns within a standard deviation interval with an 85 percent probability. [f]

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. Past performance, actual or simulated, is not a reliable indicator of future results. Any hypothetical results may have inherent limitations. Among them are the sharp differences which may exist between hypothetical and actual results which may be achieved through investment in a particular product or strategy. Hypothetical results are generally prepared with the benefit of hindsight and typically do not account for financial risk and other factors which may adversely affect actual results.
Back-tested performance is NOT an indicator of future actual results. The results reflect performance of a strategy not [historically] offered to investors and do NOT represent returns that any investor actually attained. Back-tested results are calculated by the retroactive application of a model constructed on the basis of historical data and based on assumptions integral to the model which may or may not be testable and are subject to losses. General assumptions include: Firm would have been able to purchase the securities recommended by the model and the markets were sufficiently liquid to permit all trading. Changes in these assumptions may have a material impact on the back-tested returns presented. Certain assumptions have been made for modelling purposes and are unlikely to be realized. No representations and warranties are made as to the reasonableness of the assumptions. This information is provided for illustrative purposes only.
Back-tested performance is developed with the benefit of hindsight and has inherent limitations. Specifically, back-tested results do not reflect actual trading or the effect of material economic and market factors on the decision-making process. Since trades have not actually been executed, results may have under or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity, and may not reflect the impact that certain economic or market factors may have had on the decision-making process. Further, back-testing allows the security selection methodology to be adjusted until past returns are maximized. Actual performance may differ significantly from back-tested performance.

Fixed income forecasts

As with other asset classes in our framework, we split the forecasting of fixed income returns into three fundamental pillars: income, growth and valuation. Each is then decomposed into one or several components, as shown in Figure 22.

Figure 22: Pillar decomposition: Fixed Income



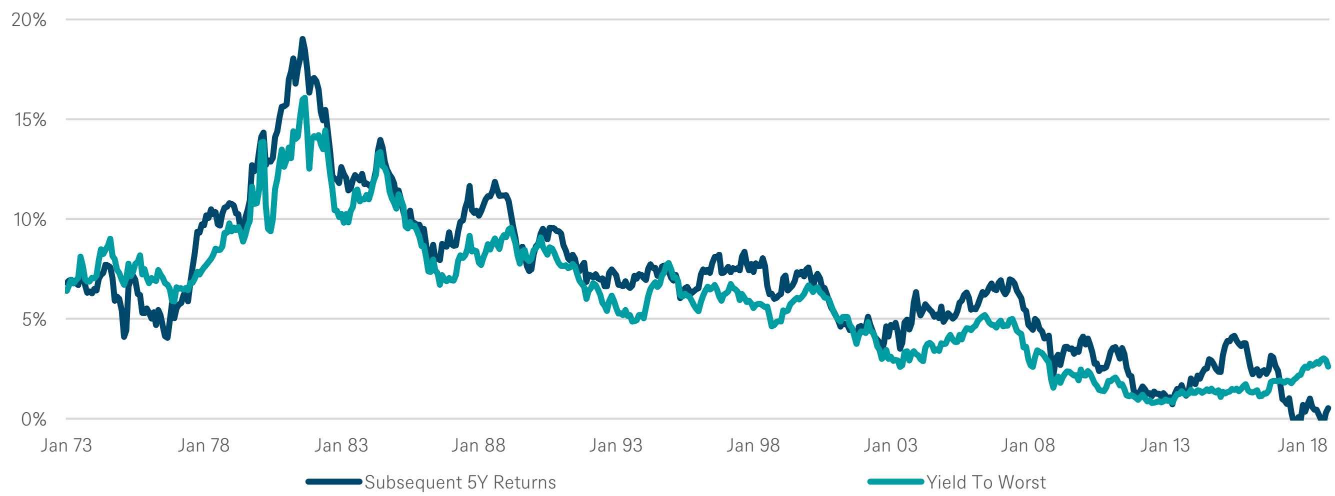
Source: DWS Investments UK Limited.

Various types of fixed income instruments may feature different levels of return, and this drives our methodology. Whereas the equity method presented earlier makes use of both financial and economic data, our approach to fixed income assets focuses on calculating and discounting potential cash flows. In particular, we mimic the development over time of debt securities.

Our starting point is the average current yield of the portfolio. Comparing the historical yield of a government bond index and its subsequent total return gives us an interesting perspective as shown in **Figure** 23.

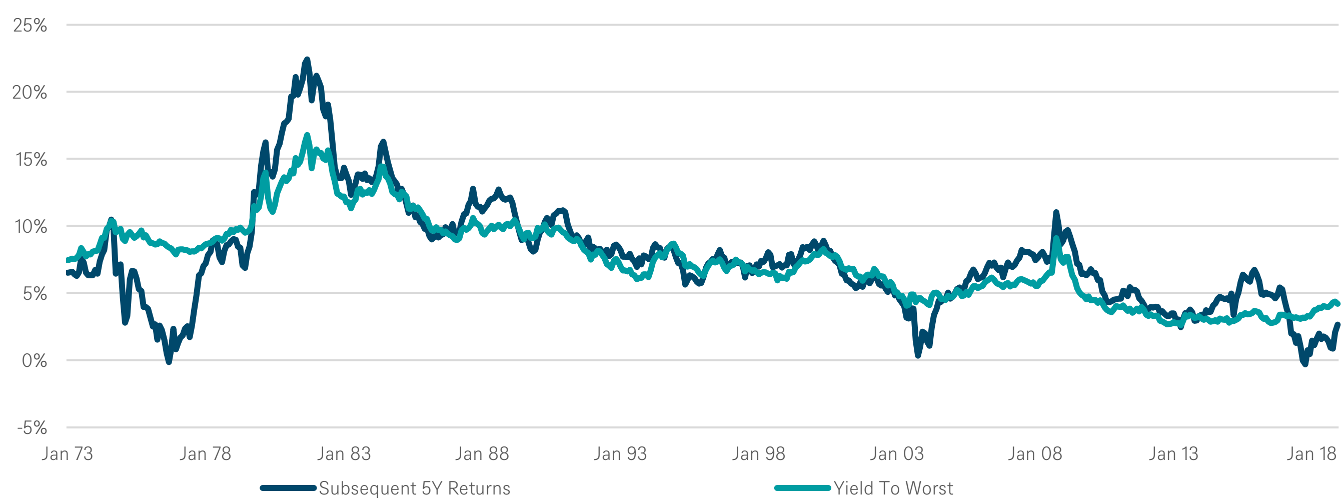
However, we show below that the reality is more complicated. Other components demonstrate a significant role in forecasting fixed income returns. This is already apparent when looking at corporate bonds (**Figure** 24) which can be riskier than government bonds (**Figure** 23). In this graph, yield and future performance vary more over time, and on some occasions, the difference has been material.

Figure 23: Historical yield to maturity and subsequent five-year total-return of 5-Year U.S. Treasury bonds, annualised (1/31/73-12/31/23)



Source: Bloomberg Finance L.P., DWS Investments UK Limited, data from 1/31/73 to 12/31/23. See appendix for the representative index corresponding to each asset class.

Figure 24: Historical yield to maturity and subsequent five-year total-return of 5-Year U.S. Corporate bonds, annualised (1/31/73-12/31/23)



Source: Bloomberg Finance L.P., DWS Investments UK Limited, data from 1/31/73 to 12/31/23. See appendix for the representative index corresponding to each asset class.

Forecasted returns and long-term insights

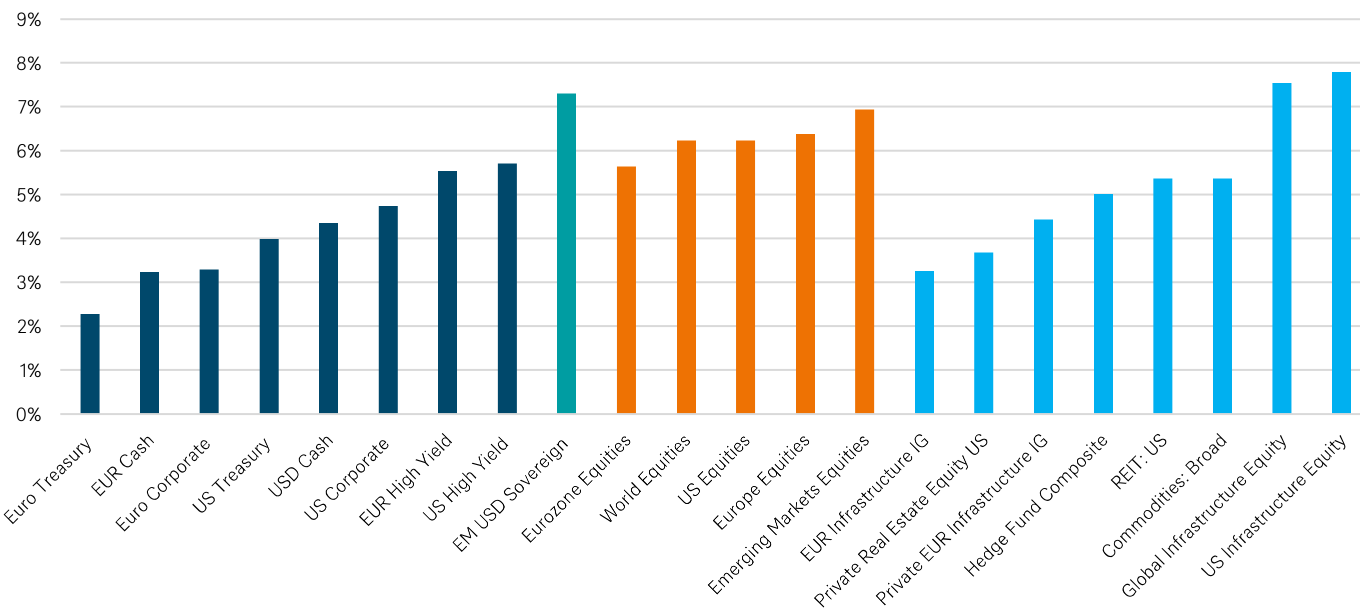
Our forecasted returns for the next decade

In this section, we summarize our Long View forecasts. Figure 25 shows the total-return forecasts for each asset class.

Across asset classes, return forecasts are noticeably higher versus previous years both in absolute and real terms. Our return forecast for global equities in local currency is 6.6 percent per annum, with local currency emerging markets equities modestly higher at 7.1 percent. Fixed income returns look significantly more constructive versus previous years, reflecting significant increases in starting yield levels across both sovereign and credit asset classes. US Treasury forecasted returns now exceed 4.0 percent, and US high yield and emerging markets sovereign bond forecasts are now 6.8 percent and 7.6 percent, respectively. For historical context, these return forecasts now exceed the previous decade realized returns across all fixed income asset classes.

Across the alternative asset classes, returns are still constructive, although less so on a relative basis versus traditional assets as compared to previous years. Among the listed segments of alternative assets, US REITs and US Infrastructure equity are 6.8 percent and 6.9 percent, respectively, largely in line with broad equity market return forecasts. US Private RE equity is somewhat more muted, at 3.8 percent, where valuations have become more challenging. The commodities return outlook, while still below equities, reflects a much more constructive view at 4.1 percent.

Figure 25: Long-term (10-year) forecasted returns for the next decade, annualised (local currency)



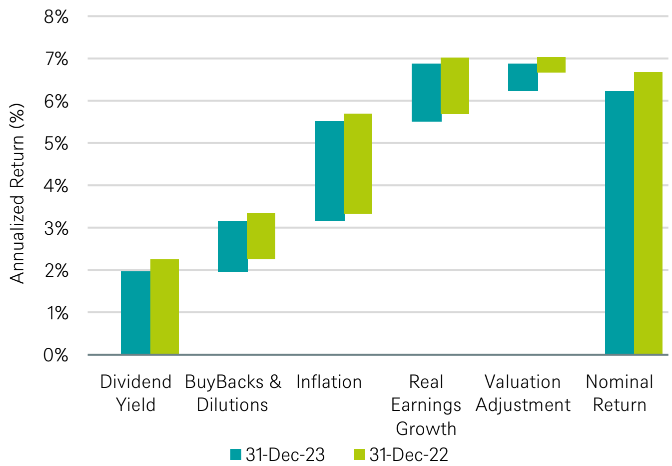
Source DWS Investments UK Limited. Data as of 12/31/23. See appendix for the representative index corresponding to each asset class.

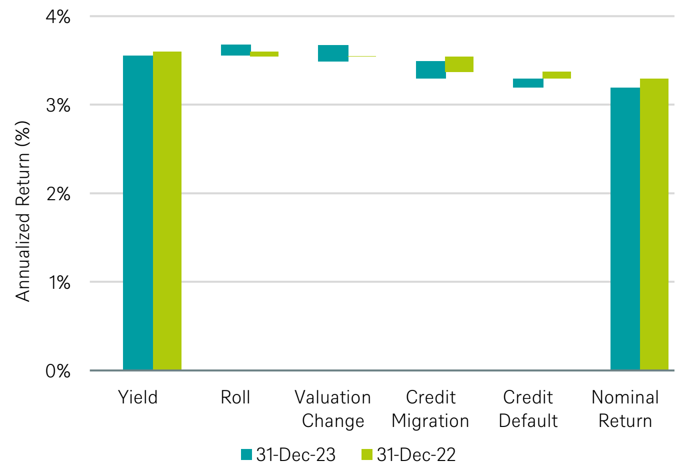
Comparing our current return forecasts to the downward trend in our nominal return forecasts over the previous couple of years illustrates a significant change in the strategic outlook for asset class returns across both global equities and global bond markets (see Figure 26).

As compared to the previous year, in equities, the valuation adjustment has become less prohibitive reflecting equity price decline in 2022. Dividend yield contribution is also modestly higher, increasing from 1.6 percent to 2.3 percent from the previous year.

Across fixed income markets, starting yield levels embed a much more comfortable income buffer for investors. Particular across core fixed income asset classes, nominal return forecasts imply both higher income contribution and also, to a lesser degree, more modest valuations (in this case, yields) relative to history.

Figure 26: 10 year forecasted total returns for MSCI World (Left) and Global Aggregate Bond Index (Right) now vs two years ago, annualised and in local currency, with the contributions from individual pillars





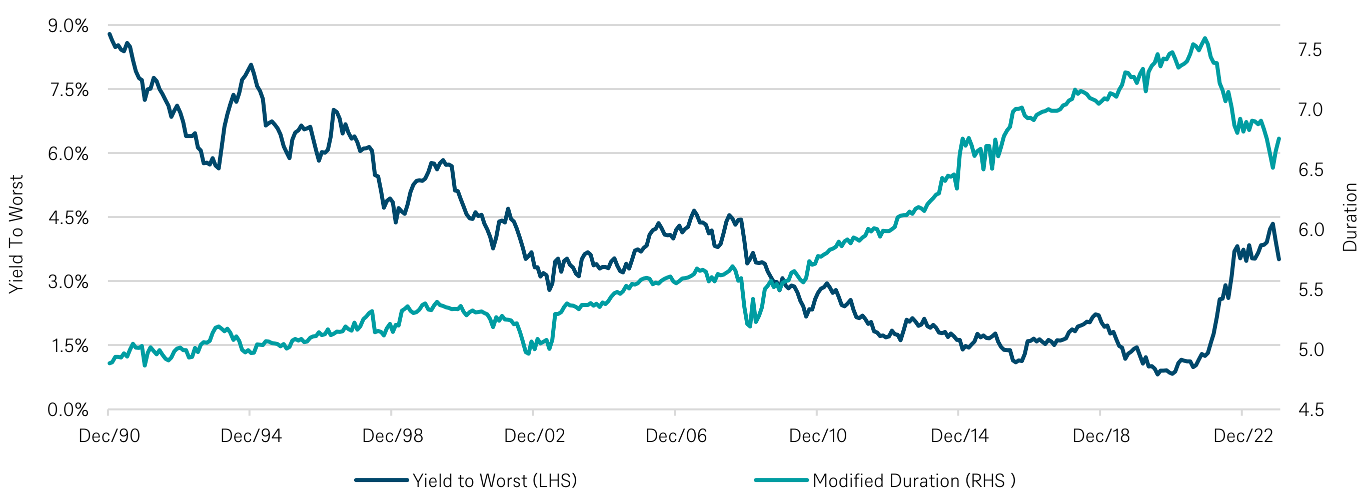
Source DWS Investments UK Limited. Data as of 12/31/23. See appendix for the representative index corresponding to each asset class.

After years of secular decline in our strategic return forecasts across asset classes, driven increasing valuations and declining interest rates, market repricing over the course of 2022 has, to some extent, normalized financial markets. The sharp reversal in accommodative central bank policy brings some semblance of normality back to investors and savers, at least for the time being. Figure 27 shows the sharp reversal in the multi-decade downtrend in interest rates across global fixed income in 2022.

Still, there remain secular trends toward lower potential growth rates globally, but particularly across many developed countries where ageing populations not only affect long-term economic growth prospects, but also likely mean increasing savings requirements and increasing retiree demand for fixed income assets.

Whether the shift in central bank policy away from compressing real interest rates is temporary or permanent will depend on the pace and extent to which inflationary pressures moderate. For the time being, both nominal and real interest rates are materially higher versus recent history, reflecting a more sanguine environment for savers and fixed income investors.

Figure 27: Global Aggregate Bond Index, Yield to Worst (left-hand side) and modified duration (right-hand side), 12/31/1990 – 12/31/2023

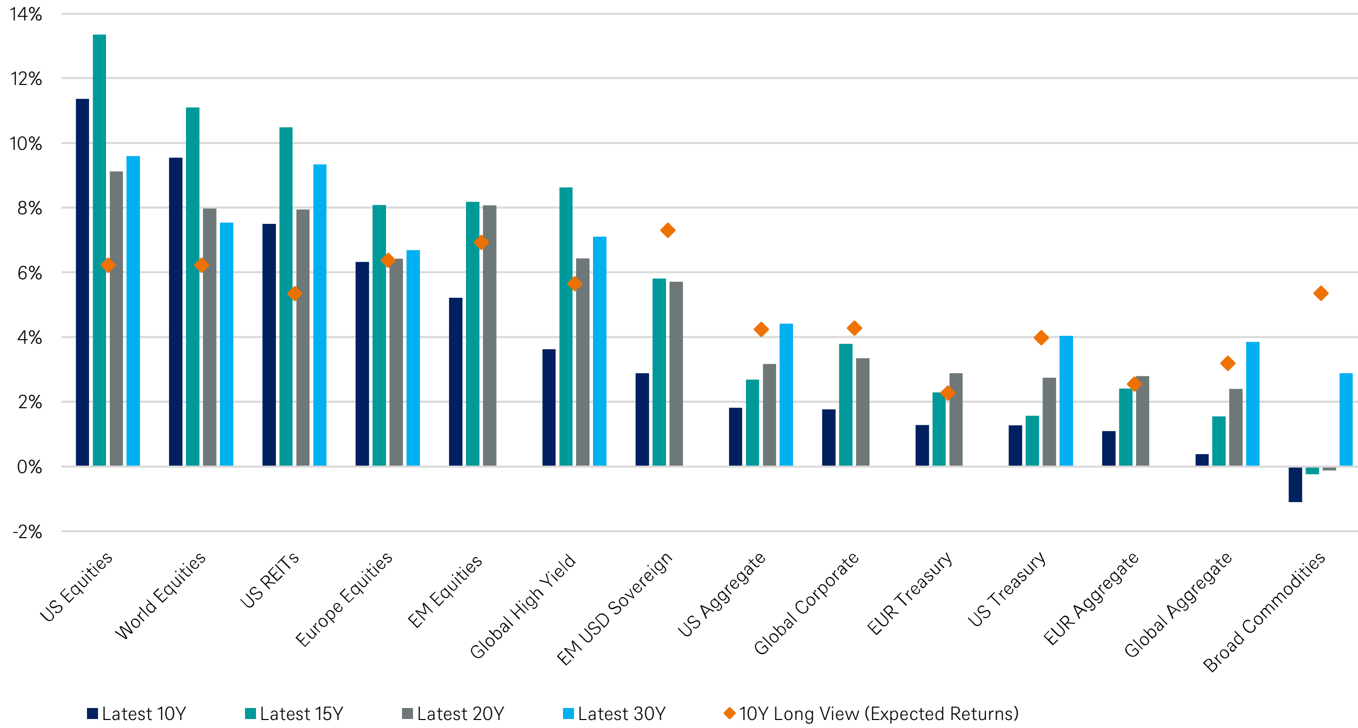


Source DWS Investments UK Limited. Data as of 12/31/23.[f]

Forecasted returns vs. the past

We find it useful to compare the forecasted returns of our main asset classes with their realised performance, which is shown in Figure 28. Again, it can be seen that the past 10 years have been positive for equities and higher-risk fixed-income investments, such as emerging-market and high-yield debt. For most risk assets, our forecasts are moderately below historical returns, whereas forecasts for core fixed income are moderately higher than realized returns of recent long-term periods.

Figure 28: Forecasted and historical returns by asset class, annualised (over 10-, 15-, 20- and 30-year time periods ending 12/31/23)



Source Bloomberg Finance L.P., DWS Investments UK Limited. Data as of 12/31/23. See appendix for the representative index corresponding to each asset class.

Where is the most attractive risk compensation across asset classes?

Financial theory tells us riskier asset classes are likely to compensate the investors via higher forecasted returns. This well-known trade-off between risk and return is the main conclusion from Figure 29. We observe that the usual relationship is presented over our 10-year horizon, with a compensated risk premium for most asset classes.

Using the same data, we can calculate and compare forecasted Sharpe ratios (Figure 30), taking into account our forecasts for money-market instruments. Regarding both of these charts, we would make the following comments:

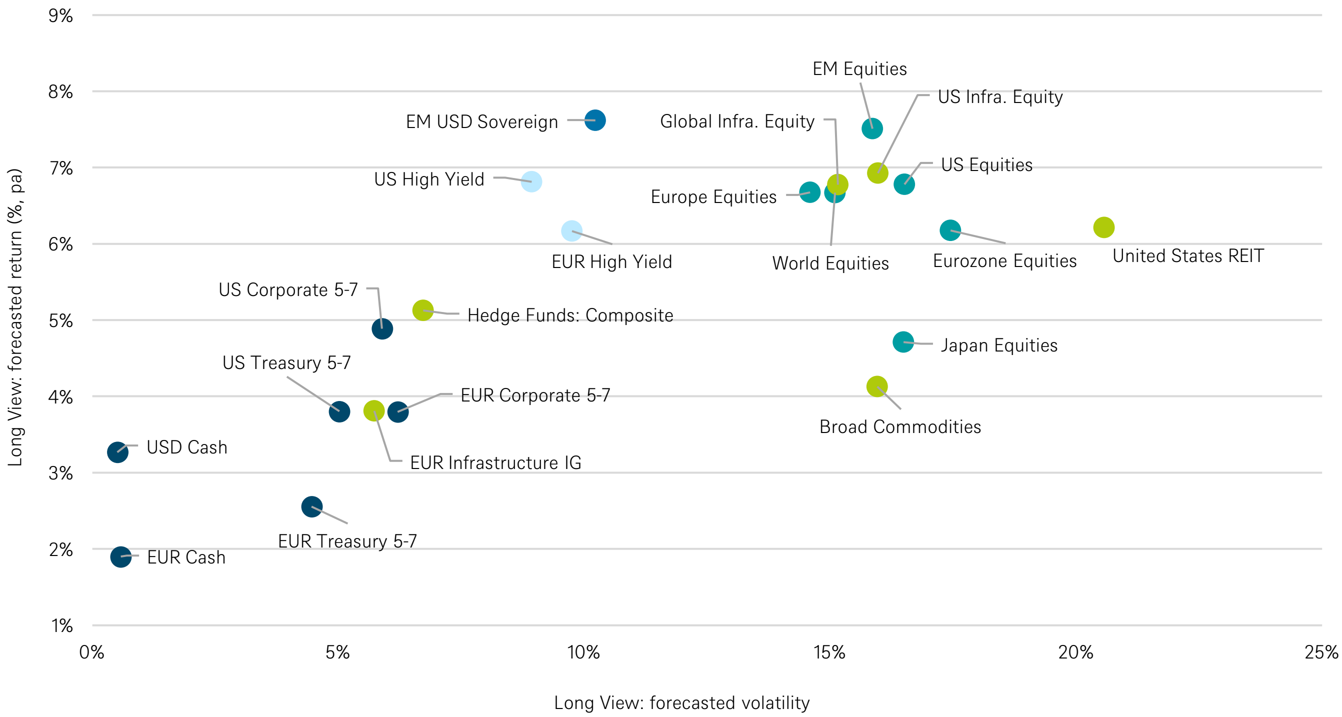
- Based on our research, we believe risk in equities may be compensated reasonably well on a relative basis – only infrastructure equity and, to some extent, High Yield and EM USD Sovereigns offer higher or comparable Sharpe ratios.
- We forecast corporate bonds to realize higher Sharpe ratios than equities going forward, reflecting much higher return expectations in IG and HY corporates.

In the alternative space, it appears that risk is still compensated in REITS and particularly infrastructure equity at a level comparable to equities, offering important investment alternatives in a low-return environment across traditional asset classes.

When translating local currency returns, investors should be conscious of the impact of foreign-exchange (forex) risk on base-currency returns and volatilities: the forecasted returns and volatility metrics underlying Figure 29 and Figure 30 are all based on local currency at the individual security level. Depending on risk appetite and return objectives, investors may want to consider hedging currency risk.

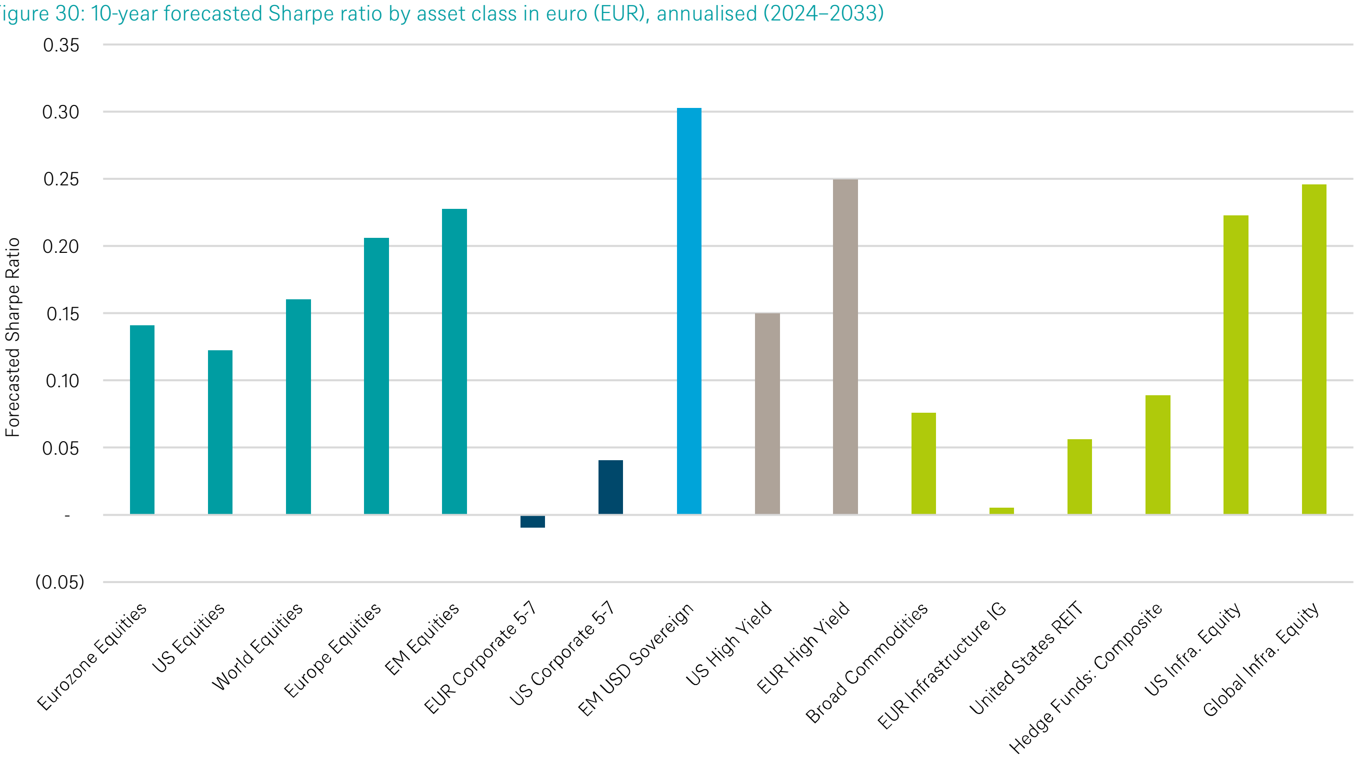
This chart utilises our approach, a macro-level forecasting method, for calculating the forecasted returns and the approach we developed for forecasted volatilities and correlations.
Past performance, [actual or simulated], is not a reliable indication of future performance.
This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are not a reliable indicator of future performance. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect.

Figure 29: 10-year forecasted return and risk by asset class, annualised (local currency) (2024–2033)



Source DWS Investments UK Limited. Data as of 12/31/23. See appendix for the representative index corresponding to each asset class.

Figure 30: 10-year forecasted Sharpe ratio by asset class in euro (EUR), annualised (2024–2033)



Source: DWS Investments UK Limited. Data as of 12/31/23. See appendix for the representative index corresponding to each asset class.

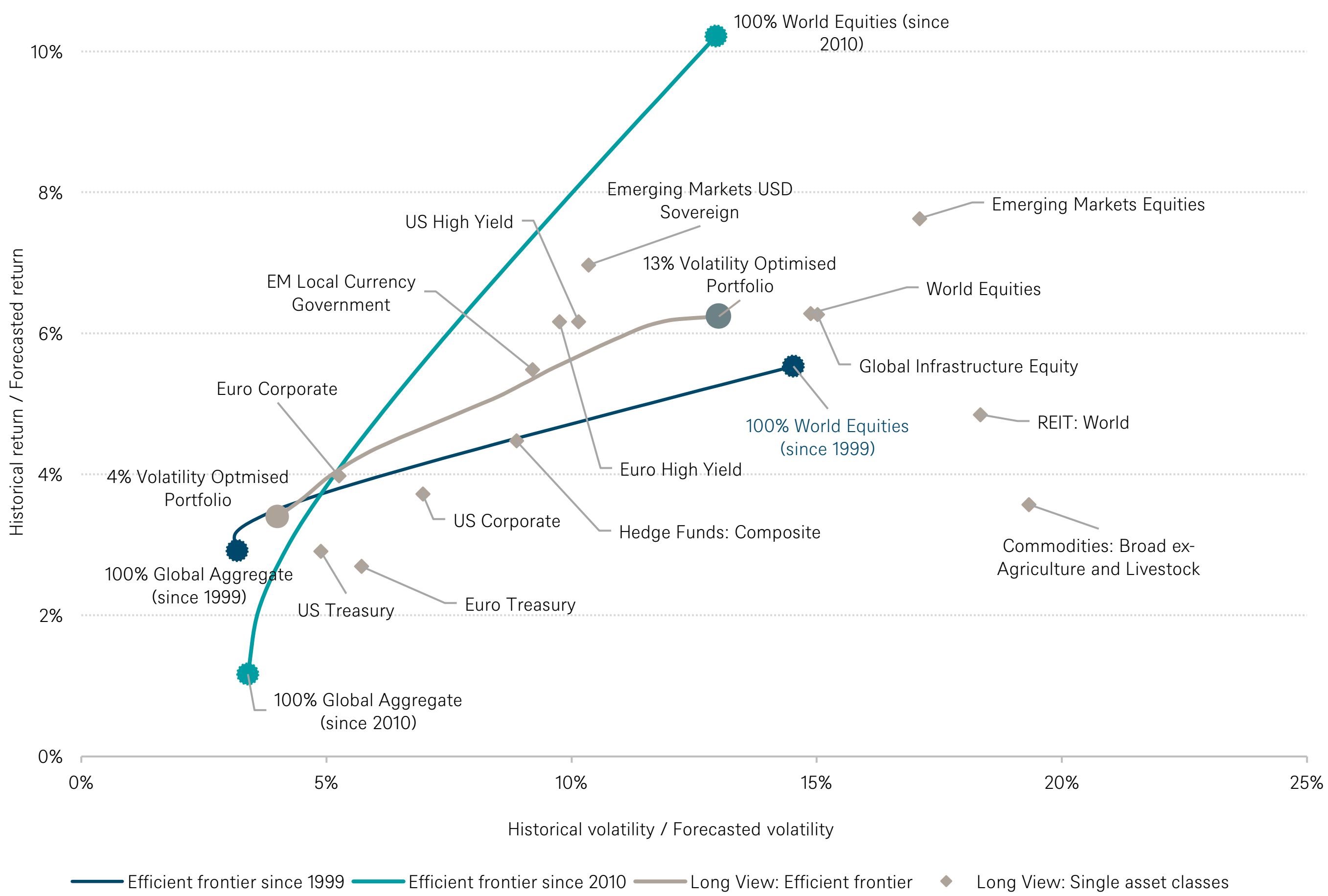
Strategic allocation

Connecting our Long View with portfolios in practice

Since the turn of the century, nominal returns across the efficient frontier have been quite robust, with a steep relationship between realized volatility and realized returns. (Figure 31). Outsized global equity returns combined with low starting nominal yield levels resulted in quite a steep trade-off between historical return and historical realized volatility, particularly in contrast to the long-term efficient frontier, which is notably flatter.

Using our Long View forecasts to construct a hypothetical efficient frontier, forecasted multi-asset returns over the next ten years are above the longer-term efficient frontier but below returns over the previous decade[24]. For investors wanting to pursue robust returns, the higher risk required may be concerning. Therefore, in order to keep risk at reasonable levels, dynamic overlays and tactical adjustments may be useful in managing risk.

Figure 31: Efficient frontiers: 10 year forecasted and historical returns and volatilities, annualised



Historical Efficient Frontiers are noted above as "Efficient Frontier" and are calculated using historical returns and volatilities over the time frame noted through 12/31/23. Each historical efficient frontier represents the risk-return profile of a portfolio which consisted of two asset classes: World Equities (in euro, unhedged) and Global Aggregate Fixed Income (euro-hedged). The Long View Efficient Frontier represents a forecasted optimal portfolio (EUR) using the various asset classes represented in the figure, subject to certain weighting/concentration constraints that result in component asset classes being able to trade above the line in this instance. Source: DWS Investments UK Limited. Data as of 12/31/22. See appendix for the representative index corresponding to each asset class.

[24] Hypothetical performance results have many inherent limitations, some of which are described herein. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are not a reliable indicator of future performance. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect.

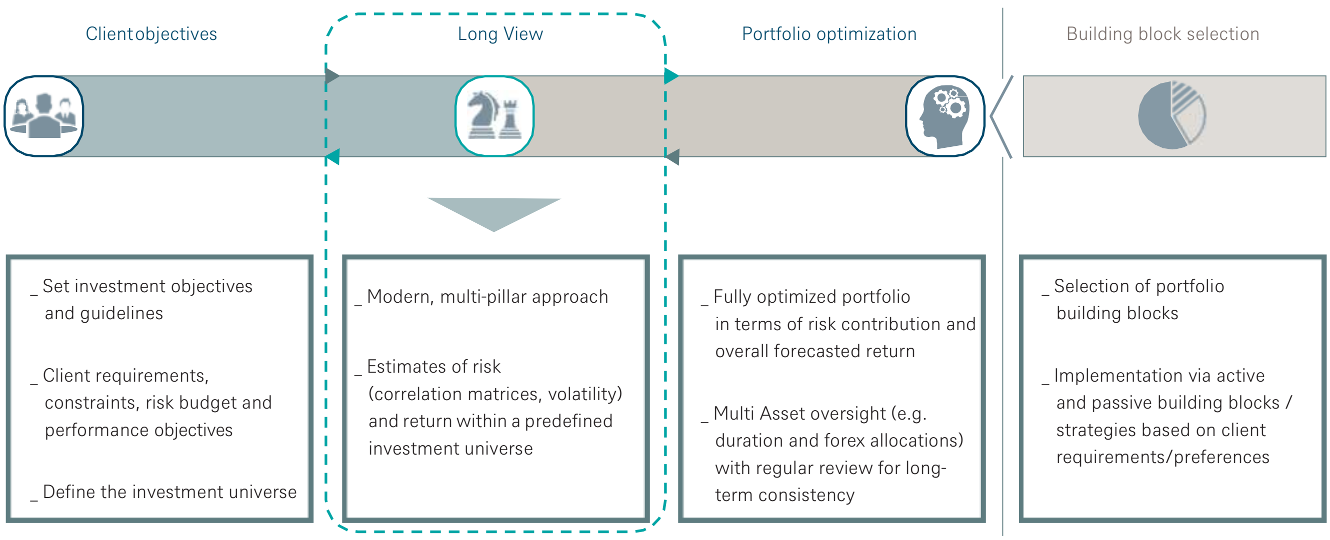
In this section we reiterate our strong belief in strategic asset allocation (SAA). This process endeavours to examine investment strategies in an ongoing effort to assist investors in pursuit of their investment objectives.

A SAA framework is based on:

- The risk and return objectives of the investor
- The historical and/or forecasted risk and return profiles of available asset classes
- The allocation process

Our risk-based investment approach to strategic asset allocation is further described in Figure 32. We believe this multi-pillar approach provides additional insights versus other forecasted return-based approaches and aims to provide stability across parameter changes.

Figure 32: Decomposition of the Strategic Asset Allocation process



Source: DWS Investments UK Limited. As of 12/31/22. For illustrative purposes only.

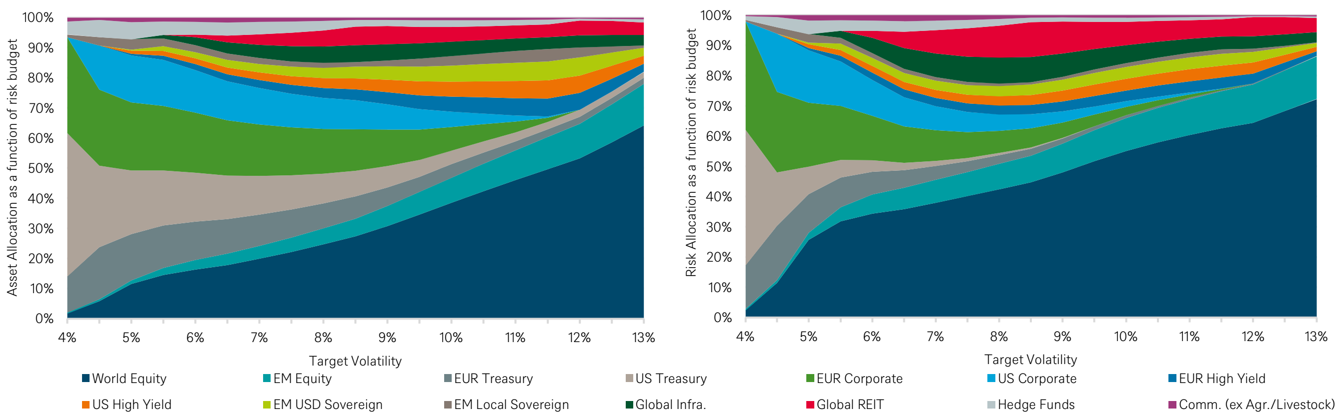
Combining the Long View with our portfolio construction approach

Relying on the GRIP (Group Risk in Portfolios) approach developed by DWS Multi-Asset, in Figure 33, we show a concrete example of a portfolio construction exercise, based on an investor's targeted risk level.

The chart on the left shows an asset-allocation as a function of the targeted risk budget, while the chart on the right shows the corresponding risk allocation. Further analysis shows that by moving beyond the usual risk parity framework, it may be possible to construct allocations that are diversified from a capital-allocation as well as a risk-contribution perspective, with a higher number of uncorrelated exposures, and less extreme weights and risk allocations.

And at the same time, all of this can be achieved while offering a great degree of flexibility. For example, calibrations can be adjusted to only hold long-only positions and ensure that the overall portfolio volatility equals a given target. It is also possible to add further rules or constraints based on the risk profile and specific requirements of an investor.

Figure 33: Asset allocation and risk allocation as a function of the target volatility



Source: DWS Investments UK Limited. Data as of 12/31/23. For illustrative purposes only. See appendix for the representative index corresponding to each asset class.

Appendix 1

Representative indices and their historical returns

Table 9: Each asset class in this publication is forecasted as per its corresponding representative index*

Broad Asset Class	Asset Class	Representative Index	2023	2022	2021	2020	2019
Fixed Income	EM USD High Yield	Bbg Barclays EM USD Aggregate High Yield	13.11%	-12.36%	-3.18%	4.25%	11.48%
Fixed Income	EM USD Sovereign	Bbg Barclays Emerging Markets USD Sovereign	10.96%	-17.43%	-2.32%	5.17%	13.35%
Fixed Income	EUR Aggregate	Bbg Barclays Euro Aggregate	7.19%	-17.17%	-2.85%	4.05%	5.98%
Fixed Income	EUR Cash	EUR 3M Libor TR	2.96%	-0.27%	-0.57%	-0.55%	-0.47%
Fixed Income	EUR Corporate	Bbg Barclays Euro Aggregate Corporate	8.19%	-13.65%	-0.97%	2.77%	6.24%
Fixed Income	EUR Corporate 1-3	Bbg Barclays Euro Aggregate Corporate 1-3 Years	5.11%	-4.77%	0.02%	0.69%	1.34%
Fixed Income	EUR Corporate 3-5	Bbg Barclays Euro Aggregate Corporate 3-5 Years	7.77%	-11.10%	-0.18%	1.56%	4.00%
Fixed Income	EUR Corporate 5-7	Bbg Barclays Euro Aggregate Corporate 5-7 Years	9.91%	-15.89%	-0.78%	2.97%	7.52%
Fixed Income	EUR Corporate 7-10	Bbg Barclays Euro Aggregate Corporate 7-10 Years	11.12%	-21.18%	-1.96%	4.38%	10.92%
Fixed Income	EUR High Yield	Bbg Barclays Pan-European High Yield (Euro)	12.12%	-10.64%	3.43%	2.29%	11.33%
Fixed Income	EUR Treasury	Bbg Barclays Euro Treasury	7.13%	-18.46%	-3.46%	4.99%	6.77%
Fixed Income	EUR Treasury 1-3	Bbg Barclays Euro Aggregate -Treasury 1-3 Years	3.48%	-4.82%	-0.70%	0.02%	0.28%
Fixed Income	EUR Treasury 3-5	Bbg Barclays Euro Aggregate - Treasury 3-5 Years	5.39%	-9.95%	-1.18%	1.29%	1.88%
Fixed Income	EUR Treasury 5-7	Bbg Barclays Euro Aggregate Treasury 5-7 Years	7.15%	-14.34%	-1.81%	2.83%	4.23%
Fixed Income	EUR Treasury 7-10	Bbg Barclays Euro Aggregate Treasury 7-10 Years	8.88%	-19.36%	-2.87%	4.52%	6.74%
Fixed Income	Global Aggregate	Bbg Barclays Global Aggregate	5.71%	-16.25%	-4.71%	9.20%	6.84%
Fixed Income	Global Corporate	Bbg Barclays Global Aggregate Corporate	9.61%	-16.72%	-2.89%	10.37%	11.51%
Fixed Income	Global Government	Bbg Barclays Global Aggregate Treasuries	4.18%	-17.47%	-6.60%	9.50%	5.59%
Fixed Income	Global High Yield	Bbg Barclays Global High Yield	14.04%	-12.71%	0.99%	7.03%	12.56%
Fixed Income	US Agg Intermediate	Bbg Barclays US Aggregate Intermediate	5.18%	-9.51%	-1.29%	5.60%	6.67%
Fixed Income	US Aggregate	Bbg Barclays US Aggregate	5.53%	-13.01%	-1.54%	7.51%	8.72%
Fixed Income	US Corporate	Bbg Barclays US Corporate	8.52%	-15.76%	-1.04%	9.89%	14.54%
Fixed Income	US Corporate 5-7	Bbg Barclays US Corporate 5-7 Years	8.31%	-11.17%	-1.24%	9.45%	12.68%
Fixed Income	US High Yield	Bbg Barclays US High Yield	13.45%	-11.19%	5.28%	7.11%	14.32%
Fixed Income	US Treasury	Bbg Barclays US Treasury	4.05%	-12.46%	-2.32%	8.00%	6.86%
Fixed Income	US Treasury 5-7	Bbg Barclays US Treasury: 5-7 Years	4.53%	-11.23%	-2.87%	8.48%	6.79%
Fixed Income	USD Cash	USD 3M Libor TR	5.01%	1.18%	0.04%	0.58%	2.36%
Fixed Income	USD IL Treasuries	Bbg Barclays US Govt Inflation Linked Bonds	3.84%	-12.60%	6.00%	11.55%	8.75%
Equities	AC Equities	MSCI ACWI	21.61%	-15.98%	20.89%	14.21%	26.24%
Equities	EM Equities	MSCI EM	9.85%	-15.54%	-0.19%	19.12%	18.05%
Equities	EMU Small Cap Equities	MSCI EMU Small Cap	18.78%	-12.47%	22.16%	-1.02%	25.47%

*Realised Returns referenced in this table represent the last five years 2018-2023. It is intended to represent a snapshot in time and not exhaustive for all time periods.
Source: Bloomberg Finance L.P., DWS Investments UK Limited. As of 12/31/23. Past performance, actual or simulated, is not a reliable indicator of future results.

Table 9: Each asset class in this publication is forecasted as per its corresponding representative index*

Broad Asset Class	Asset Class	Representative Index	2023	2022	2021	2020	2019
Equities	Europe Equities	MSCI Europe	14.30%	-8.54%	22.61%	-2.21%	23.75%
Equities	Europe Small Cap Equities	MSCI Europe SmallCap	11.67%	-20.64%	20.97%	5.88%	29.01%
Equities	Eurozone Equities	MSCI EMU	18.80%	-12.49%	22.14%	-1.00%	25.44%
Equities	Japan Equities	MSCI Japan	29.04%	-4.10%	13.81%	9.17%	18.94%
Equities	Switzerland	MSCI Switzerland	5.26%	-17.06%	22.97%	1.91%	29.98%
Equities	US Equities	MSCI USA	26.49%	-19.85%	26.45%	20.73%	30.88%
Equities	US Small Cap Equities	MSCI USA Small Cap	17.86%	-17.55%	19.11%	18.32%	26.74%
Equities	World Equities	MSCI World	23.12%	-16.04%	24.17%	13.48%	27.34%
Alternative	Australia REIT	S&P AUSTR REIT	15.32%	-21.11%	26.08%	-3.88%	18.13%
Alternative	Broad Commodities	Bbg Commodity	-7.91%	16.10%	27.11%	-3.12%	7.69%
Alternative	Crude Oil	Bbg Composite Crude Oil	-1.43%	32.53%	63.34%	-41.92%	34.88%
Alternative	Energy	Bbg Energy	-21.65%	36.22%	52.12%	-42.71%	11.76%
Alternative	EUR Infrastructure IG	Markit iBoxx EUR Infrastructure Index	9.03%	-15.91%	-1.55%	3.15%	6.91%
Alternative	Global Infra. Equity	DJ Brookfield Global	4.51%	-6.62%	19.87%	-6.97%	28.69%
Alternative	Gold	Gold Futures	13.34%	-0.43%	-3.47%	24.59%	18.87%
Alternative	HF - Event Driven	BBG Event Driven Hedge Fund Index	8.28%	-4.72%	16.00%	7.61%	7.75%
Alternative	HF - Merger Arbitrage	BBG Merger Arbitrage Hedge Fund Index	2.67%	2.54%	10.74%	6.61%	7.39%
Alternative	HF - Equity Hedge	BBG Equity Hedge Fund Index	9.27%	-12.43%	12.22%	13.03%	12.68%
Alternative	HF - Equity Market Neutral	BBG Quantitative Equity Market Neutral Hedge Fund Index	7.58%	-1.96%	7.46%	5.30%	7.45%
Alternative	HF - Macro	BBG Macro Total Hedge Fund Index	1.08%	1.28%	6.35%	6.99%	6.47%
Alternative	HF - Macro: Systematic	BBG Macro Systematic Hedge Fund Index	1.93%	-1.27%	-0.40%	9.18%	7.90%
Alternative	HF - Relative Value	BBG Relative Value Hedge Fund Index	8.63%	0.13%	7.34%	6.18%	7.03%
Alternative	Hedge Funds: Composite	BBG Global Hedge Funds Index	7.76%	-6.88%	9.72%	9.53%	9.16%
Alternative	Japan REIT	S&P Japan	-1.33%	-5.72%	19.37%	-13.66%	24.74%
Alternative	Private EUR Infra. IG	Private (Markit iBoxx EUR Infrastructure)					
Alternative	Private RE Equity Asia Pac	Private real Estate Equity Asia Pac					
Alternative	Private RE Equity UK	Private real Estate Equity UK					
Alternative	Private RE Equity US	Private real Estate Equity US					
Alternative	Private USD Infra. IG	Private (Markit iBoxx USD Infrastructure Index)					
Alternative	United States REIT	S&P USA REIT	13.77%	-24.36%	43.05%	-7.52%	24.45%
Alternative	US Infra. Equity	DJ Brookfield US	-2.24%	-5.45%	23.69%	-12.30%	27.86%
Alternative	USD Infrastructure IG	Markit iBoxx USD Infrastructure Index	8.85%	-16.64%	-0.47%	10.30%	15.25%

*Realised Returns referenced in this table represent the last five years 2018-2023. It is intended to represent a snapshot in time and not exhaustive for all time periods.
Source: Bloomberg Finance L.P., DWS Investments UK Limited. As of 12/31/23. Past performance, actual or simulated, is not a reliable indicator of future results.

Appendix 2

Table of figures

Appendix 3

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