ROBECO
The Investment Engineers

5-YEAR EXPECTED RETURNS

The Stale Renaissance

2026
—
2030

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September 2025

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Foreword

This year's report is all about a renaissance – a kind of new beginning. It reminds me of my early morning walks along the river near my home. These moments always make me feel refreshed and ready to take on the day with focus and energy.

In this report, the renaissance refers to the expected boost in productivity thanks to the growing use of artificial intelligence tools. These tools are becoming widely available and will likely change how we work and invest. This new wave of economic growth is happening in a world full of uncertainty. Global policies are unstable, dampening the excitement. Instead of optimism, the news is filled with concerns about trade restrictions, political tensions, and the weakening of independent institutions. The chance of a negative economic scenario – what we call a bear scenario – has gone up. That means the idea of the US continuing to stand out economically is less likely than it was last year, due to ongoing inconsistent US policies.

Capital market assumptions are a key part of long-term investment planning. This report marks our 15th consecutive five-year outlook, now looking ahead to 2030. That year is important because it's the deadline for the Sustainable Development Goals – global targets to protect the environment, promote prosperity and end poverty. Our forecasts are used by Robeco's Investment Solutions team and can also help guide our clients in shaping their investment strategies.

We've included four special topics that we believe will influence future investment decisions. These topics explore:

• How artificial intelligence can help identify promising small-cap stocks
• What assets could serve as safe havens in the future
• Whether public markets can match the returns of private equity
• And how sustainable investing might develop over time

Robeco has been driven by research for over 95 years. That's why this report is built on respected academic and industry sources, combined with our own market experience and insights. We value the in-depth conversations we have with our clients, especially when we dive into the data and methods behind our forecasts and the special topics.

Much like my early morning walks, this report is meant to energize and prepare us – to clear our minds and sharpen our focus for the journey ahead. We trust it inspires you to dive deeper, ask bold questions, and engage with us as we navigate the currents of change together.

Feel free to reach out to me or my colleagues – we'd love to continue the conversation.

Karin van Baardwijk
CEO Robeco

The authors

This document has been compiled by Laurens Swinkels and Peter van der Welle (September 2025). It represents the views of Robeco's Investment Solutions team, which are not necessarily shared by other teams at Robeco. Please visit our website for more information.

Peter van der Welle is Strategist and member of the Investment Solutions team. He is responsible for the Robeco Multi Asset funds. He conducts and filters proprietary research to generate trade ideas. He developed the underlying asset allocation framework used for this publication. His views appear in financial media on a regular basis. He joined as a Strategist in 2012. He holds a Master's in Economics from Tilburg University.

Laurens Swinkels is Head of Solutions Research and member of the Investment Solutions team. His area of expertise includes empirical asset pricing. He teaches Finance courses and has published his academic work in peer-reviewed journals. Laurens holds a part-time position (with tenure) at Erasmus University Rotterdam and is member of the Research Committee of Inquire Europe. Laurens holds a PhD in Finance and a Master's in Econometrics from Tilburg University.

The team

This Expected Returns publication is produced every year by the Robeco Investment Solutions team, with contributions from colleagues from across the company. The team currently consists of 18 experts, with an average of more than 15 years of investment experience. For its investment solutions the team draws on input from over 200 specialists in our quant, fundamental and thematic investing domains.

A broad suite of assets globally is managed by the team. This includes multi-asset investment strategies, discretionary multi-asset solutions, and customized liability and buy-and-maintain fixed income solutions.

Robeco's approach to multi-asset investing can broadly be split into two approaches: strategic allocation (3-5 years) and tactical asset allocation (0-24 months). These tend not to be correlated to help support diversification and the consistency of returns.

The team can also rely on the expertise of Robeco's 50-strong Sustainable Investing Center of Expertise, which houses our sustainability thought leaders and investment researchers. Sustainability can be used to target specific impact metrics, for example in emphasizing exposures to companies scoring well on the Sustainable Development Goals, or those with a good climate alignment strategy.

The research that creates Expected Returns provides the baseplate from which a coherent and forward-looking multi-asset strategy can be developed. The predictions that it makes for the likely returns of all the major asset classes over the coming five years, including commodities, real estate and cash, can form the benchmark from which to proceed.

The strategies

Our approach

The team aims to bring together the very best of Robeco's investment capabilities through a range of diversified strategies and solutions. We believe financial markets are at times inefficient and active asset allocation can generate alpha. Investors' narrow focus hinders a smooth distribution of information across different asset classes. The investment process should instead follow a structured, active and fundamental top-down approach.

Multi-asset solutions we offer:

- Sustainable Income Allocation
  This strategy has a balanced approach that actively focuses on generating a stable income of 5% from bonds and capital appreciation largely from equities, though with a wider focus on downside protection. It has a target volatility of 7%.

- Sustainable Diversified Allocation
  This strategy aims for a stable capital growth over time through a balanced mix of bonds and equities. It aims for an average annual return of 6% or more with a target volatility of 10%.

- Sustainable Dynamic Allocation
  This strategy has a higher risk profile, with an investment objective of achieving equity-like returns, but with less equity-like risk. It aims for an average annual return of 7% or more with a target volatility of 12%.

- Flexible Allocation
  This strategy targets a return of cash +4%, aiming to beat inflation, and will not follow a traditional benchmark. Strategic asset allocation is based on the Expected Returns publication.

What do we do within these solutions?

We use fundamental research to identify alpha opportunities from active asset allocation. After deploying the five-year Expected Returns to start building a robust portfolio, tactical asset allocation aims to exploit market inefficiencies and manage downside risk.

The Investment Solutions team can help clients with a range of disciplines, including insurance, pensions and investment skills, backed by expert market knowledge and a deep understanding of sustainability. With a client-centric approach, the team designs customized strategies that align with each client's own individual values and objectives.

1. Introduction

"The paradox of the Italian Renaissance was that it was a time of extraordinary artistic creativity, yet art of the High Renaissance was created during a period of intense political turmoil." As historian Lisa Kaborycha notes, an intriguing contradiction lies at the heart of the historical Renaissance. Today, the global economy enters the second half of this decade in a similarly conflicted state, which we at Robeco view as 'The Stale Renaissance'. It is a world where technological breakthrough meets macroeconomic headwinds. Where progress keeps momentum going even as macro headwinds are fading AI's luster.

The rise of the digital Da Vinci

We are entering a period, as former Google CEO Eric Schmidt put it, "where AI systems will be able to do things that only Da Vinci could do." Except now they can do it in a split second. We are already moving from GPT models to GPT agents, an important stepping stone toward AGI (artificial general intelligence, which promises to accomplish every task better and more cheaply than human workers). Every year AI researchers drop their estimated arrival year of AGI by a multiple. The progress that awaits us will likely bring about a renaissance of productivity growth after the US trend productivity growth rate made a cycle low in 2020 and has seen a sluggish recovery since.

We likely have arrived at a similar juncture as Nobel prize winner Solow in 1987, who could "see computers everywhere, except in the productivity statistics." In turn, we can start to see data centers everywhere, except in the productivity statistics. Yet in 1992, five years later, US trend productivity growth had jumped by a full 1%. Solow's productivity puzzle had largely been solved.

Figure 1.1: Return of a boom?

"I see a coming productivity boom"
Brynjolfsson in Fortune, Sep 2023

"I can see computers everywhere, except in the productivity statistics"
Solow in NYT, July 1987

● 10Y growth rate of output per hour of all persons - business sector: United States
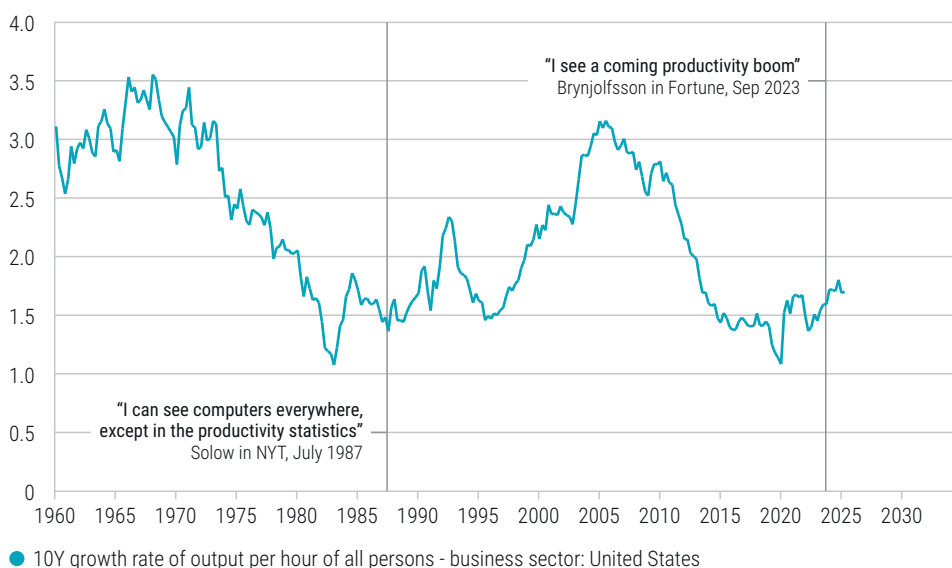
Source: LSEG Datastream, Robeco, July 2025.

Stale upon closer inspection: The four inhibitors

Many economists therefore see a coming productivity boom. While we agree with a notable pick-up in productivity growth, we foresee a renaissance that looks stale upon closer inspection. As a starter, the transformative impact of AI may be dampened as computing power could prove to be a major constraint on progress toward AGI. Furthermore, we see the AI revolution taking shape against a backdrop of four headwinds. While these forces are unlikely to stall progress on AI, they may thwart its vitality.

Conflicted supremacy

While the US remains the global hegemon, its leadership is increasingly undermined by internal policy incoherence and external skepticism. Foreign investors are reassessing their exposure to US assets, raising funding costs and challenging the sustainability of US American exceptionalism.

Contained escalation

Shifting tectonic plates of power, the subtheme of last year's outlook, continue to reshape macroeconomic dynamics with the US trade war as its latest symptom. However, the risk of a geopolitical earthquake remains contained. Taiwan is important for both the US and China, but not important enough to risk a war between the two superpowers. All this results in a world of strategic restraint, and as George Orwell put it, of a "peace that is no peace."

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Constrained normalization

In developed markets, we expect consumer price inflation to move around 2.5% over the next five years. The normalization of monetary policy is constrained by structural forces, leaving less runway for continued easing as inflation for developed central banks will average above their 2% targets. We have raised our US inflation forecast to 2.75% as immigration looks set to fall and will therefore no longer suppress wage growth. New tariffs and a depreciating dollar will exacerbate inflationary pressures in the US. In contrast, for emerging economies, a dollar bear market will reduce imported inflation as emerging market currencies strengthen.

Conditional sustainability

We expect increased skepticism about whether the Paris 2050 goal of the world achieving carbon neutrality can be realized. Our view of conditional sustainability reflects a shift in climate finance: sustainability is no longer a default virtue but a conditional strategy. As green premiums fade and climate risks reprice, capital flows become increasingly contingent on evidence of real-world climate impact rather than ideals. We believe the climate transition will happen, with new technologies enabling a further decline in energy consumption per unit of GDP.

Structural undercurrents of The Stale Renaissance

These cyclical headwinds, which give the renaissance in productivity a stale appearance, are underpinned by structural macro forces. We explore these through seven distinctive insights from our macro thinking.

- **Bond glut replaces savings glut**: Rising sovereign debt and declining convenience yields lift the natural rate of interest.
- **AI's energy constraint**: Productivity gains may be capped by the Jevons paradox as data center demand outpaces energy efficiency gains.
- **Sticky labor dynamics**: Lower than generally assumed capital-labor substitutability slows job displacement and keeps downward rigidity on wages.
- **Managed multilateral drift as evolution from current trade war**: Global trade realigns around new blocs, increasingly sidelining the US.
- **Populism's economic signature**: Policy uncertainty depresses investment and consumption relative to baseline.
- **Defense as stimulus**: European defense spending could act as a supply-side boost in slack economies.
- **Erosion of the US's 'exorbitant privilege'**: Policy incoherence threatens the dollar's dominance and investor confidence.

Our scenarios

Building on these insights, we outline three probable macroeconomic trajectories, each offering a different resolution of the paradox. In the base case (50% probability), The Stale Renaissance, we believe that recent US economic policy incoherence will exert a gravitational pull on the US economy, with the country consequently reverting to its long-term trend growth level over the next five years. Self-defeating policies like constraining migration, the weaponizing of tariffs, and the rise of populism leave the US looking less exceptional to the outside world. As US exceptionalism grows stale (we expect 2.1% real US GDP growth), the eurozone, Japan and emerging markets will see their growth differentials with the US improve.

In our bull case (15% probability), The Luminous Renaissance, the world enters an innovative period marked by a global synchronized cyclical upswing powered by steady diffusion of AI. Goldilocks (above-trend growth, inflation at target) awaits. Major obstacles for broadening AI adoption (access to data and energy) are removed. Industry laggards are able to move toward the technological frontier, broadening AI-driven growth. Geopolitical fragmentation moderates and there could even be a resumption of globalization, albeit without the US's participation in the first half of our projection period.

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In our bear case (35% probability), The Exorbitant Decay, we see a further unravelling of the global economic order. Institutions and principles that still have relevance in our base case, like the World Trade Organization and central bank independence, are sidelined and experience genuine decay. It is an exorbitant decay: a preventable, self-inflicted decay rooted in persisting US policy incoherency, which ultimately undermines the US's exorbitant privilege. The peace dividend morphs into a security premium. Fiscal dominance, central bank lenience and both trade and hybrid wars trigger stagflation.

Navigating returns when breadth fades

What does The Stale Renaissance imply for expected returns in 2026-2030? At this point in time we are seeing a market that is very concentrated and momentum-driven. Markets rally, but breadth and conviction are lacking, with investors climbing a wall of worry rather than embracing a new golden age. This could partially be a sign that the rally in risky assets has legs as the lack of irrational exuberance makes this market more feel like a buzzing instead of a bursting bubble.[1]

However, valuation levels for some asset classes, notably US equities and risky fixed income, look stretched and more reflective of our bull case, The Luminous Renaissance. This suggests elevated downside risk in these asset classes in the coming years, making unloved hedges more appealing like commodities and REITS. We introduced a new asset class in our projections this year: emerging market debt in hard currency. For emerging market assets we expect to see strong relative returns over the next five years. Still, we have to navigate a world where fewer risky asset classes are expected to earn above historical average risk premiums. The good news for investors is that in a world where paradox abounds, great inventions and progress will be made. ●

1. See our Special Topic 'Bursting or buzzing bubbles?' from our Expected Returns 2025-2029 (page 52).

Table 1.1: Expected returns 2026-2030

	5-year annualized return	
	EUR	USD
Fixed income		
Domestic cash	3.00%	3.75%
Domestic government bonds	2.75%	3.50%
Developed global government bonds (hedged)	3.00%	3.75%
Emerging government debt (local)	5.50%	6.25%
Emerging government debt (hard)	3.75%	4.50%
Global investment grade credits (hedged)	3.00%	3.75%
Global corporate high yield (hedged)	3.25%	4.00%
Equity		
Developed market equities	6.00%	6.75%
Emerging market equities	7.50%	8.25%
Listed real estate	5.50%	6.25%
Commodities	5.25%	6.00%
Consumer prices		
Inflation	2.50%	2.75%

Capital at risk. The scenarios presented are an estimate of future performance based on evidence from the past on how the value of this investment varies, and/or current market conditions and are not an exact indicator. What you will get will vary depending on how the market performs and how long you keep the investment/product. Source: Robeco, September 2025.

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2. Valuation

Over the past 12 months, we have seen many macroeconomic and geopolitical developments that have had the potential to substantially affect asset class valuation levels. But have global financial markets been able to weather the storm of the foreboding narratives?

In this chapter we set out our views on the valuation of each asset class. In the following chapters, we examine whether these valuations correspond with our long-term macroeconomic outlook.

The global multi-asset market portfolio is the natural starting point for every investor as it shows how the average invested dollar is allocated across asset classes. Figure 2.1 shows that the size of the market exceeded USD 180 trillion at the end of 2024, a new all-time high after the decline we saw in 2022 due to higher interest rates across the globe. The figure also shows that since 2012, equity markets have become a much larger share of global investments, as the current USD 85 trillion value of global equity markets corresponds to a 46% allocation. At the end of 2012, these numbers were just over a third of global investments at USD 33 trillion.

On the other hand, we've seen allocation decreases in government (30% to 23%) and corporate (19% to 14%) bonds. These reduced allocations come on the back of increased global government indebtedness, which may trigger questions about debt sustainability.[1] Emerging markets debt has increased in size, from 3% in 2012 to 4.2% of the global market portfolio at the end of 2024. Figure 2.1 also shows that private assets have doubled in share, increased from 4% of the global market portfolio to 8%.[2]

1. See our Safe Haven special topic on pages 51 to 58.

2. See our Private Equity special topic on pages 59 to 65.

Figure 2.1: Composition of the global multi-asset market portfolio

Source: Based on data from Doeswijk, Lam, and Swinkels (2014) and updated from the Erasmus University Data Repository of Laurens Swinkels: https://doi.org/10.25397/eur.9371741. The figure shows the market capitalization weights of each asset class at the end of 2024.

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2.1 Government bonds

We assess the valuation of the major government bond markets according to four metrics: carry, term premium, mean reversion, and real interest rates.

2.1.1 Carry

Instead of trying to predict interest rates to determine the value of government bonds, we can start by determining the return they would provide should the interest rate curve remain unchanged. The return in this case is what we call the 'carry'. Here, we ignore the second-order effect of the roll-down return. Since our long-run estimate for the excess return of government bonds relative to bills (in other words, the term premium) is 0.75% per year, we view a carry substantially higher than this as attractive, and a lower carry as unattractive.

Figure 2.2 shows the shapes of the par yield curves of the five main government bond markets on 30 June 2025. The carry, sometimes referred to as the term spread, is often defined as the 10-year yield minus the one-year yield. Over the past two years, we saw that the term structure of many markets was inverted, leading to negative carry. Although this was widely seen as a recession signal,[3] the recession never materialized. In the meantime, short-term interest rates have decreased and vice versa, such that the carry is positive for each of the five regions. For Germany, Japan, and the UK, the carry is close to its long-term average of 75 bps. The carry for the US and China is positive, but lower at around 25 bps.

3. See Harvey (1988).

Figure 2.2: Par yield curves for the five main government bond markets
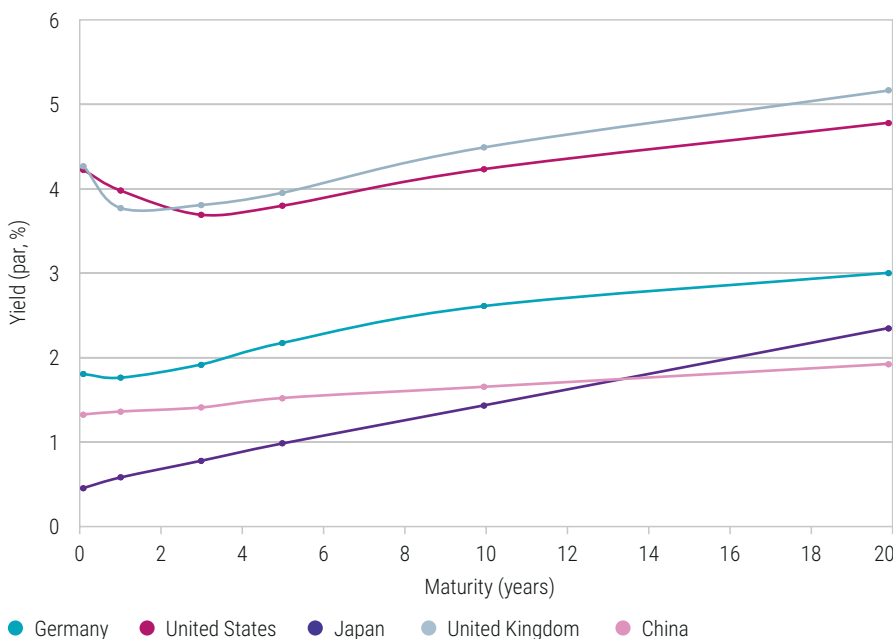
● Germany   ● United States   ● Japan   ● United Kingdom   ● China

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Source: Bloomberg, Robeco. As at 30 June 2025.

2.1.2 Term premium

The term premium refers to the additional return an investor expects to receive from holding a government bond to maturity rather than rolling over bills until the same maturity. Since the expected path of short-term interest rates cannot be observed, the challenge is to come up with a good estimate. For example, if the expected yield earned by rolling over the bills until bond maturity is the current bill yield, the term premium would be equal to the carry we discussed above. Another option would be to use market-implied forward interest rates as the expected future short-term rates. This would by definition

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lead to a term premium of zero; that is, the expected return of bonds equals the expected return of bills. This would contrast with the term premium of around 1% that has been observed since 1900 and the 75 bps we expect on the long run going forward.

Figure 2.3: Term premium estimates for 10-year government bonds

● Germany　　　　　　　　　　　　　● Japan
● US - Adrian, Crump, Mönch (2013)　　●●● Our steady-state estimate
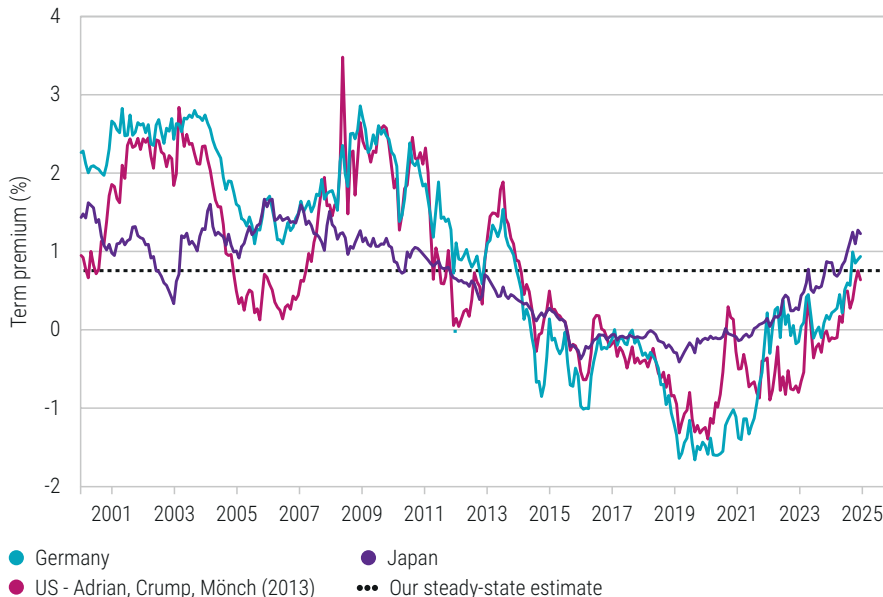
Source: Bloomberg, Federal Reserve, Robeco. Updated data from Adrian, Crump, and Mönch (2013) is maintained online by the Federal Reserve Bank of New York. Data updated to 30 June 2025. For Germany and Japan, we use our own estimates based on the model by Adrian, Crump, and Mönch (2013) with data starting in 1994.

Researchers have been making considerable efforts to determine the expected path of the short-term interest rate.[4] Figure 2.3 shows the US 10-year term premium, which has been updated to 30 June 2025, and is based on data starting in 1961. We show the 10-year term premium as this is what most economists consider. It stands at 0.64% at the end of June 2025. The term premium has increased substantially from its trough below -1% in 2020, and is currently close to our steady-state assumption of 75 bps. For the five-year term premium, which corresponds with the horizon of our outlook, the estimates of the term premium are somewhat below the 10-year estimates, but positive, at 0.14% for the US.

We are not aware of any external data providers that update term premium models for other countries. Our own estimates are based on the Adrian, Crump and Mönch (2013) model with data starting in 1994, also displayed in Figure 2.3. The German 10-year term premium was 0.94% at the end of June 2025, while the five-year term premium was 0.41%. Our estimate for the Japanese term 10-year premium at the end of June 2025 is 1.23%, and for 5-year is 0.64%. These three term premium estimates suggest that we are at near equilibrium levels, and substantially above levels from previous years. We do not have term premium estimates for the other major markets.

2.1.3 Mean reversion

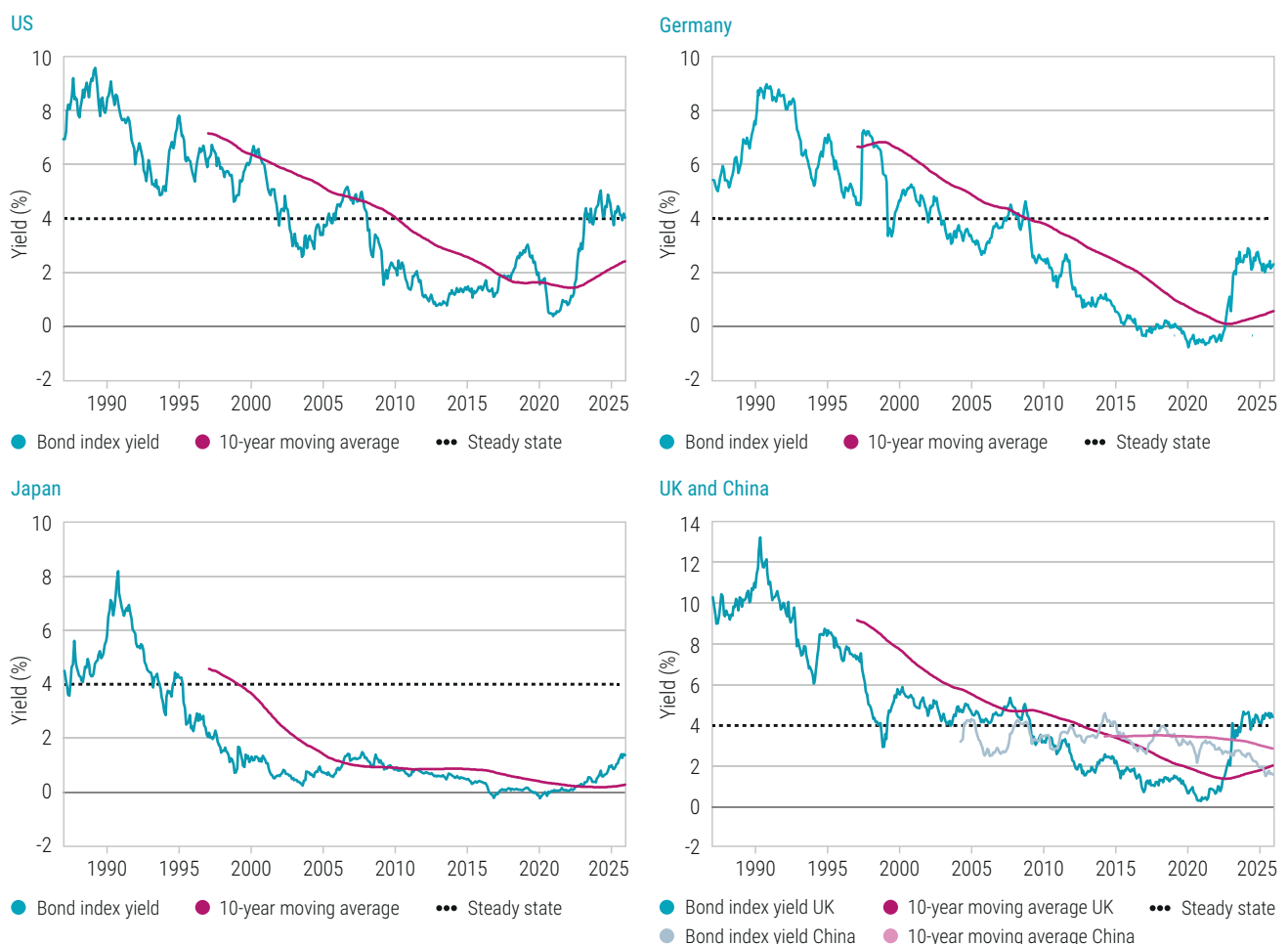Another popular way to look at valuation is to forecast a reversion to the mean. For example, Asness, Moskowitz and Pedersen (2013) use mean reversion as their main valuation signal. This is inspired by the excess returns documented by DeBondt and Thaler (1985) for equity strategies based on mean-reversion signals.

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The challenge with mean-reversion signals is to determine the level the asset should revert to. To keep things simple, we compare the interest rate to its 10-year average rate. This is long enough for the average to cover business cycles, but short enough for it to adapt to persistent changes in the level of interest rates. An alternative would be to take the steady-state expected return of 4% as a starting point.[5]

Figure 2.4 shows the government bond index yields of the five main markets together with the 10-year moving average and fixed 4% as the mean-reversion levels. The figure shows that US, German, UK, and Japanese yields are above their 10-year moving average, suggesting that these bond markets are currently relatively cheap according to this measure. China's yield is the only one below its 10-year average. In the US and UK the bond index yields have risen slightly above the long-run average of 4%. So even compared with the long run, these markets are no longer expensive. Even though the German bond yield has increased substantially over the two years, it is still about 150 bps below the long-term average. Since we view the average yields of the recent decade as a slightly more useful mean-reversion indicator than the 4% that we expect in the steady state, the mean-reversion signal indicates that the US, UK, German, and Japanese bond markets are cheap, while the Chinese market is expensive.

5. See Robeco's Long-Term Expected Returns publication for an explanation on our 4% steady-state projection.

Figure 2.4: Mean reversion of government bond yields

US

Germany

Japan

UK and China

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Source: Bloomberg, Robeco, June 2025. The yield to maturity of the Bloomberg Treasury indices for the US, Germany, Japan, the UK and China, and their 10-year moving averages.

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2.1.4 Real interest rates

Bond yields tend to increase when expected inflation increases. If expected inflation increases were equal to nominal yield increases, the real interest rate would remain the same. Figure 2.5 shows that the real interest rates have also gone up considerably since mid-2022, except for Japan where if anything, the real interest rate has decreased a little and is in negative territory. The Japanese interest rates increased, but inflation expectations even more. The real interest rates in Germany and the UK have turned positive and are now close to our steady-state level of 1%. The US real interest rate has come down a little since last year, but is still above our steady-state level. We do not have good estimates of market-implied real interest rates in China.

Figure 2.5: Real interest rates
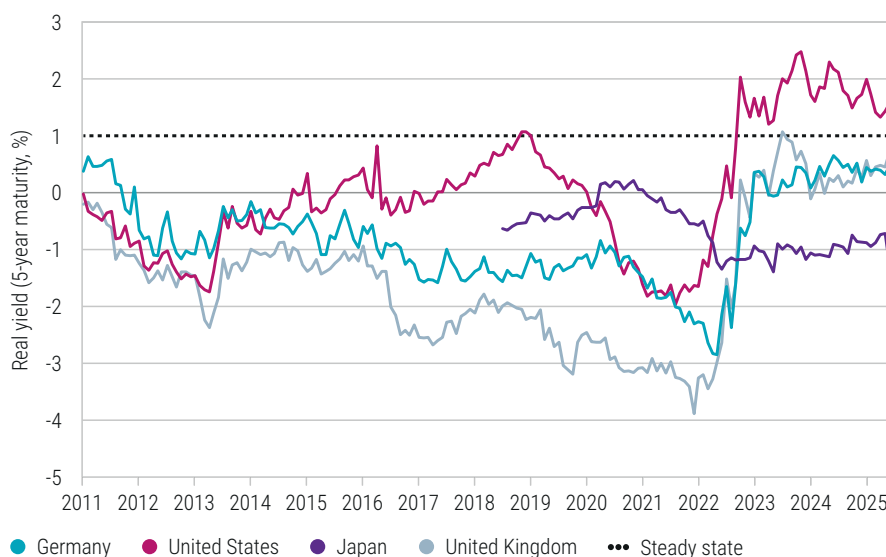
Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: LSEG Datastream, Robeco, June 2025. Real interest rates derived from inflation-linked bond and inflation swap markets.

2.1.5 Summary

We have looked at four different ways to measure government bond valuations in the main markets. The carry and term premium are positive in the four major developed markets, close to our steady-state level of 0.75%, which makes them neutrally valued compared to cash. From a mean-reversion viewpoint, all four markets have interest rate levels well above the 10-year average, implying that bond yields may come down again, even though only the US and UK bond yields are slightly above the steady-state level of 4% and Germany and Japan well below that level. Since real interest rates in the US are higher than in other major bond markets, US bonds seem to offer the most value there, although part of the higher real yield may be a compensation for increased default risk. The real interest rates in Germany and the UK are again close to the steady-state level of 1%. All in all, government bond markets seem to offer decent value these days.

2.2 Corporate bonds

The quality of bonds in the investment grade index has gradually fallen over time, especially in the euro-denominated market. By contrast, the credit quality of the high yield index has increased. Therefore, instead of considering the spreads of entire credit indices over time, we focus on the yields of bonds with specific ratings to judge whether corporate bonds are cheap or expensive. This keeps the credit quality constant – at least as judged by rating agencies.
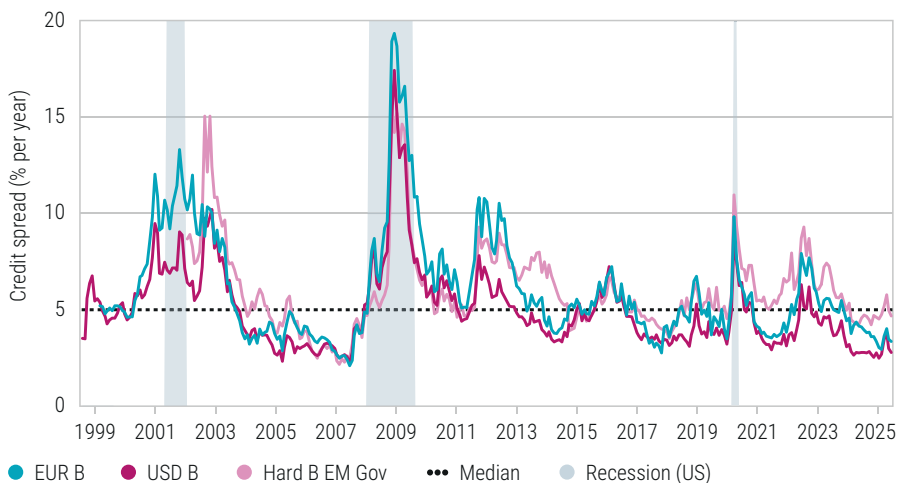
Past performance is no guarantee of future results. The value of your investments may fluctuate.

Even though the companies issuing investment grade and high yield bonds are geographically quite diverse, the currencies in which they issue are limited. Corporate bond markets are dominated by US dollar issues, which account for 66% of the investment grade market and 77% of the high yield market. Euro issues come in second place, at 25% of the investment grade market and 21% for high yield, leaving very limited space for bonds issued in other currencies in the Bloomberg indices. Although many non-US companies issue bonds in US dollars, the indices are dominated by bonds issued by US firms, which account for 57% of the investment grade index and 61% of the high yield index.

Figure 2.6 shows that the credit spreads of investment grade (BBB) and high yield (B) corporate bonds have behaved similarly in recent years. They shot up because of the Covid lockdowns across the globe, but after central banks provided liquidity to the market, contracted quickly again. More recently, spreads have increased substantially once more. As of 30 June 2025, USD BBB spreads were trading at 102 bps and EUR BBB spreads at 106 bps. These are well below the median spread of 156 bps. As spreads and defaults tend to be high during recessions, the current spread well below the median indicates a lot of optimism in corporate bond markets. Even in Europe, spreads are only a tiny bit higher than in the US, despite the war in Ukraine and the lingering issues with European government debt, which may resurface sooner or later. Meanwhile, USD B-rated bond spreads are 281 bps, while they are 336 bps for EUR B-rated bonds, compared with a median of 489 bps over the 1998-2025 period that we show in Figure 2.6. Corporate bonds have rarely been more expensive than they are today.

The global investment grade corporate bond index's credit spread was 89 bps at the end of June 2025. Assuming that about half of this spread will be needed to cover losses due to default, investment grade's expected excess return relative to duration-matched government bonds is below the neutral steady-state level of 0.75%. Meanwhile, the global corporate high yield index's credit spread is 309 bps. If half of this spread is lost due to defaults, the remaining credit return would also be below our neutral steady-state expected return of 1.75%.

In a nutshell, from a valuation perspective, both investment grade and high yield corporate bonds look expensive.

Figure 2.6: Credit spreads of BBB- and B-rated corporate and emerging markets hard-currency bonds

BBB credit spreads

● EUR BBB   ● USD BBB   ● Hard BBB EM Gov   ••• Median   ● Recession (US)

B credit spreads
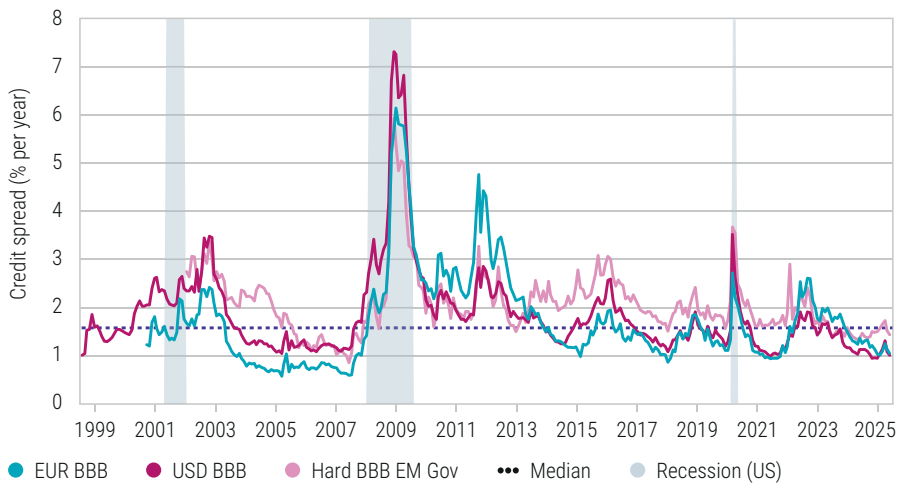
● EUR B   ● USD B   ● Hard B EM Gov   ••• Median   ● Recession (US)

Source: Bloomberg, NBER, Robeco, June 2025. The top figure shows the option-adjusted credit spreads of BBB-rated bonds in the Bloomberg US Corporate index, the Bloomberg Euro Corporate index, and the JP Morgan EMBI Global Diversified. It also shows median corporate credit spreads over the sample period. The bottom figure shows the option-adjusted credit spreads of B-rated bonds in the Bloomberg US Corporate High Yield index, the Bloomberg Euro High Yield index, and the JP Morgan EMBI Global Diversified. It also shows median corporate credit spreads over the sample period. Areas shaded grey indicate NBER contraction periods.

2.3 Emerging markets government debt

To assess the valuation of local-currency emerging market sovereign debt, we use the JP Morgan Government Bond Index-Emerging Markets (GBI-EM) Global Diversified Index, while we use the JP Morgan Emerging Markets Bond Index (EMBI) Global Diversified Index for the hard-currency emerging markets sovereign debt.[6]

The valuation of the hard-currency market can be seen in Figure 2.6, together with those of the corporate bond market. Spreads of investment grade (BBB) and high yield (B) emerging government bond markets are displayed together with corporate bonds with the same ratings. There is clearly a positive correlation between these emerging government debt spreads and corporate bond spreads, even though fundamentally the credit risk on both asset classes is very different. Both are exposed to the lack of global economic growth, but there could be very different situations for US corporates and emerging

6. See Giesta de Mello Fernandes and Swinkels (2025) for more details on the historical composition of these emerging debt indices.

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markets governments to default on their debt. Figure 2.6 shows that while corporate bonds are expensive, hard-currency emerging markets government bonds seem fairly valued with spreads close to the historical median of corporate bond spreads.

Figure 2.7: Yield to maturity of global emerging market bonds and carry to major developed markets
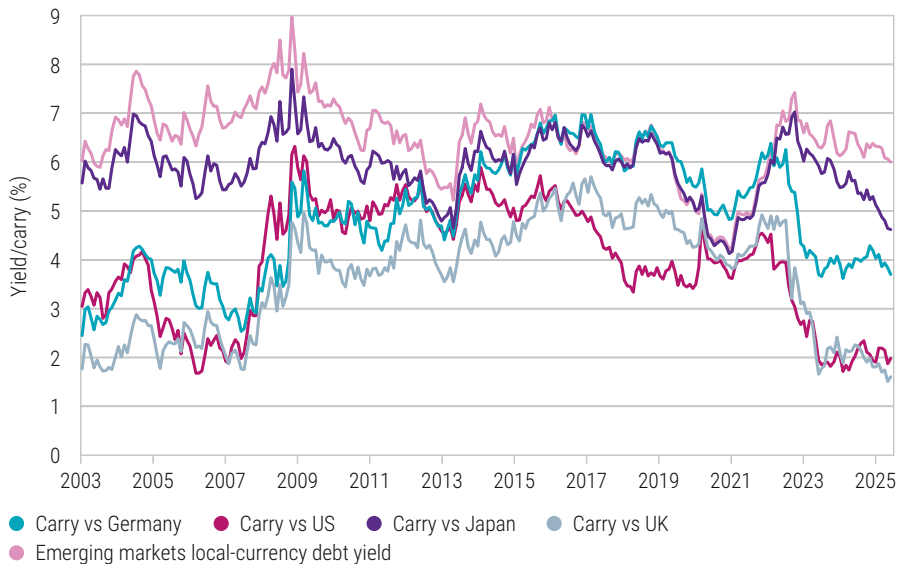
● Carry vs Germany   ● Carry vs US   ● Carry vs Japan   ● Carry vs UK
● Emerging markets local-currency debt yield

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: JP Morgan, Bloomberg, Robeco, June 2025. Yield to maturity of the JP Morgan GBI – Emerging Markets Global Diversified Index ('Global emerging'), the Bloomberg Treasury Indices for the US, Germany, Japan, and the UK.

For local-currency government debt we first examine the yield differential, or the carry, compared with the four major developed government bond markets. Since 2003, emerging debt markets have yielded around 6% per year, with a short-lived spike above 8% during the Global Financial Crisis. Emerging market yields then fell back toward 5%, but the 2013 taper tantrum[7] saw rates jump back up to 7%. After dipping below 5% in 2020, emerging market yields have since risen above 6% again. The other lines are yield differentials, or carry, of investing in emerging markets compared to these four major developed markets. Clearly, the carry has on average been highest relative to Japan, which had a near-zero bond yield for almost the entire period.

Since US and UK bond yields have gone up so much since 2023, the carry for emerging markets has gone down considerably, and is now around 2% compared to around 4% over the entire sample. The carry relative to Germany is a little in between, somewhat below 4%. However, whether a local-currency emerging markets investor has a good return measured in hard currency depends predominantly on the performance of emerging markets currencies. Giesta de Mello Fernandes and Swinkels (2025) show that emerging markets currencies performed relatively poorly over the past decade, but in contrast the decade before the last one these outperformed substantially.

Real yields of those emerging markets with inflation-linked bond markets seem attractive. The real yields of Brazil, Mexico, and South Africa are above 5% and therefore well above the steady state of 1% for developed markets. In assessing the overall valuation of local-currency emerging debt, we also need to consider currency valuations. To do so, we use Bank for International Settlements (BIS) real effective exchange rates (REERs) for the emerging market bond index based on its composition at the end of June 2025. We subtract its 15-year average from each of the REERs as we assume that such a long-term average is a good representation of its fair value.

7. The 2013 taper tantrum was a spike in US Treasury yields that followed the Federal Reserve's announcement to reduce its bond purchases as part of its quantitative easing policy.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 2.8: Currency valuations using real effective exchange rates

Source: BIS, Robeco, June 2025. The BIS real (CPI-based) effective exchange rates as of 30 June 2025 are compared with their 15-year historical averages. The lines for emerging markets are combined based on individual currencies' index weights in the JP Morgan Global Diversified index on 30 June 2025. NB: BIS does not report REERs for the Dominican Republic, Serbia, and Uruguay, so we have assumed all three are fairly valued.

In Figure 2.8, we compare the emerging market REERs with those of the US dollar, euro, pound, and yen. From 2009 to 2014, emerging market currencies were overvalued, while the latest figures suggest that these currencies are close to fairly valued compared to their trading partners, at least on average. The valuation difference with the US dollar is 14%, which is substantially less than the 19% valuation difference from last year. Whereas emerging currencies were valued similarly to the euro last year, the euro is about 5% overvalued this year. The Japanese yen is substantially undervalued compared to each of the other currencies, but it has become less cheap over the past 12 months (-32% has become -24%). The British pound has seen its valuation steadily increase after the stark cheapening after the Brexit vote, and is now 5% overvalued relative to the euro and hence about 10% compared to emerging markets.

We expect that these relative valuation levels disappear over time. The early literature (Rogoff, 1996; Frankel and Rose, 1996) found that, on average, half the REER gap closed in about five years for developed currencies. More recent estimates by Rabe and Waddle (2020) find that half of the convergence occurs within three years. This seems considerably faster than what our own research shows. Therefore, we incorporate currency valuation with care.

Moreover, when we consider the relative strength or weakness of individual currencies, we might be tempted to hedge currencies that are overvalued and are therefore predicted to weaken. However, currency hedging comes at a cost, which is equivalent to the difference in interest rates between the foreign country and the investor's home country. We have to adjust for this cost to determine whether currency hedging is expected to be profitable or not.

We conclude that the hard-currency emerging sovereign bond market is fairly valued compared to historical levels, but that it is cheap compared to corporate bonds. The local-currency emerging sovereign bond market is slightly expensive. Yield differences with the US and UK are small, but this is partially compensated by relatively attractive currency valuation levels. Yield differences with Germany and Japan are higher, but compared to the euro and the yen, emerging currency markets do not look so cheap. Taken together, emerging local-currency government bond markets seem also fairly valued.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

2.4 Developed market equities

There is evidence that the equity premium can be predicted, even though much of the variation in actual returns typically remains unexplained. One of the predictors that stands out is Campbell and Shiller's (1998) cyclically adjusted price-earnings (CAPE) ratio.[8] This is the main indicator we discuss here, in addition to Tobin's Q and the Buffett indicator.
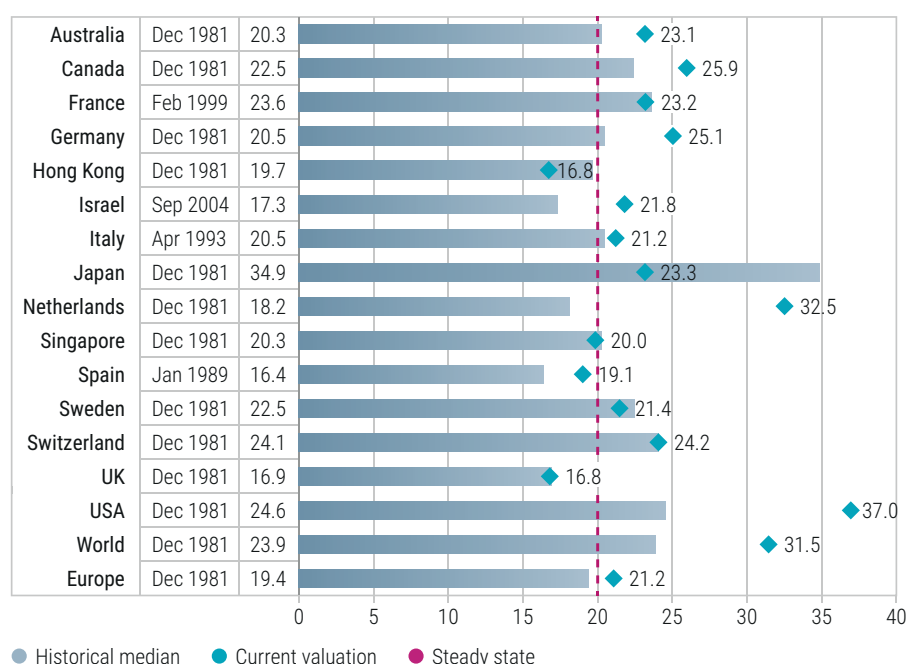
These are all measures of equities' absolute valuations and do not necessarily indicate how expensive stocks are relative to bonds. This might be important because – all else being equal – lower bond yields result in higher equity prices due to there being a lower discount rate for future cash flows. The reverse also applies: in periods of rising bond yields, equity valuation ratios should fall.

2.4.1 CAPE ratio

The CAPE ratio is a valuation measure that uses real earnings per share (EPS) over a 10-year period to smooth out fluctuations in corporate profits that occur over different periods of a business cycle. Jivraj and Shiller (2017) show that the CAPE's out-of-sample performance is strong compared with many of its competitor valuation signals.

Figure 2.9 contains the CAPEs for the largest developed equity markets. For most countries, the data history for the CAPE starts in December 1981, which means we have over four decades of international data. As structural differences between countries might lead to different CAPEs, we compare each country with its own valuation history (the bars) and the steady-state CAPE of 20 (the dotted line).

Figure 2.9: Cyclically adjusted price-earnings ratios for developed countries

Country	Start	Median	Current
Australia	Dec 1981	20.3	23.1
Canada	Dec 1981	22.5	25.9
France	Feb 1999	23.6	23.2
Germany	Dec 1981	20.5	25.1
Hong Kong	Dec 1981	19.7	16.8
Israel	Sep 2004	17.3	21.8
Italy	Apr 1993	20.5	21.2
Japan	Dec 1981	34.9	23.3
Netherlands	Dec 1981	18.2	32.5
Singapore	Dec 1981	20.3	20.0
Spain	Jan 1989	16.4	19.1
Sweden	Dec 1981	22.5	21.4
Switzerland	Dec 1981	24.1	24.2
UK	Dec 1981	16.9	16.8
USA	Dec 1981	24.6	37.0
World	Dec 1981	23.9	31.5
Europe	Dec 1981	19.4	21.2

● Historical median   ● Current valuation   ● Steady state

Source: Barclays Research, LSEG Datastream, Robeco. The CAPE ratio for each country has been calculated by Barclays Research using the levels of country-specific indices published by MSCI representing the equity markets for the relevant country, adjusted for inflation using data from DataStream. The bars contain the median CAPE ratio from the start of the sample (indicated at the bottom) to June 2025, the blue diamond the current valuation, and the dotted line the assumed steady-state CAPE.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Many developed countries look fairly valued, which we define here as a CAPE that is within two points of its historical median. Two countries look cheap compared to their own historical average: Hong Kong and Japan. The latter is still expensive compared to the steady state. Two countries look very expensive: the Netherlands and the US. The Netherlands only accounts for 1.2% of the developed market equity index, but the US is by far the largest constituent, accounting for 73.0 % of the index. With a CAPE of 37.0, which is well above its historical median of 24.6, the impact of the US makes the global developed stock market index look expensive at a CAPE of 31.5, substantially above its historical median of 23.9, and well above the steady-state level of 20.

Bunn and Shiller (2014) show that when companies buy back shares, the original CAPE might be artificially slightly lower because the growth rate in EPS is positively affected by buybacks. Shiller's data page therefore includes a 'total return CAPE' to adjust for this bias. While the traditional CAPE for the US was 36.4 at the end of June 2025, the total return CAPE stood at 39.1. This difference is about the same as it has been historically, so both versions of the CAPE signal that the US equity market is very expensive.

2.4.2 Tobin's Q

Tobin's Q is the market value of equities divided by their net worth measured at replacement cost, which is typically a better fair-value metric than the historical cost, especially in times of high inflation. The natural 'fair value' of Tobin's Q is 1, in which case the stock market would be paying exactly the same for a company as the cost of replacing its assets, and an investor should be indifferent to buying the shares or setting up the same company from scratch.
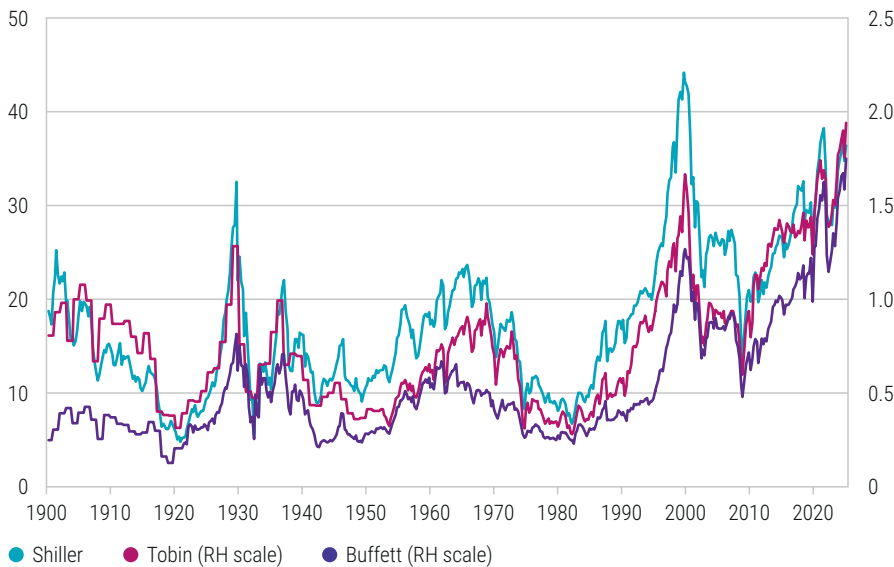
However, it turns out that historically, the average figure has been in the range of 0.6-0.7. Estimates of Tobin's Q for the US from 1900 to 2002 are reported by Wright (2004) and are available from the archive of his website.[9] Figure 2.10 shows that Tobin's Q for the US is currently 1.8, which is substantially above both its historical average and its theoretical value of 1.0, indicating that the US stock market is expensive. Replacement cost data is only available for the first quarter of 2025, but with stock markets rising in the second quarter it is not expected that Tobin's Q will be lower when second-quarter data comes in.

2.4.3 The Buffett indicator

Warren Buffett popularized the market value of equities relative to the nominal GDP of a country as a measure of overvaluation or undervaluation. Lleo and Ziemba (2019) find that using this ratio in market timing can generate additional returns, mainly through predicting crashes rather than equity market rallies. Umlauft (2020) and Swinkels and Umlauft (2022) report on the long-term predictive powers of the Buffett indicator for the US and international markets respectively. Figure 2.10 shows that the Buffett indicator is now at 1.7, close to the peak of 1.63 that it reached at the end of 2021. The US equity market is expensive on all three measures.

An international comparison for this figure is challenging as it is affected by the percentage of companies that are publicly traded compared with those that are private, and whether a country is attractive to list in for multinational corporations. The ratio may also be more affected by new equity issuance than by valuation changes, even for an individual country over time.

9. https://web.archive.org/
    web/20151028070108/http://www.bbk.
    ac.uk/ems/faculty/wright/pdf/
    Wright2004dataset.xls

Figure 2.10: Tobin's Q, Shiller CAPE and Buffett indicator for the US equity market

● Shiller ● Tobin (RH scale) ● Buffett (RH scale)

Source: LSEG Datastream, Federal Reserve, Robeco, June 2025. The Tobin's Q is calculated using data from the Fed and from Wright (2004) before 1951. The Buffett indicator is the market value of S&P 500 companies divided by the GDP of the US. Before 1964, we use the market value of the NYSE divided by US GDP.

2.4.4 Implied equity risk premium

An obvious explanation for equity market valuations remaining above average used to be low interest rates. However, both nominal and real interest rates have since 2022 increased, so this argument is not so strong anymore. One way to put absolute valuations into perspective is to examine the equity risk premiums that are priced in by the market. Damodaran (2020) explains that there are several methods to determine the implied equity risk premium from observable data. Here we obtain it by dividing expected earnings by the price and subtracting the government bond yield. This method is known as the Fed model.

At around 0.3%, the implied equity premium for the US is currently relatively low, especially compared with its level of 4.3% in Europe. The current implied US equity premium shows that expected returns for equity investors are only slightly above those of bond investors. High interest rates and an expensive stock market lead to positive but very low expected excess returns for equity investors. For developed markets as a whole, the implied equity premium stands at about 2.1%, historically low, but mostly because the US stock market drags it down.

Figure 2.11: Implied equity risk premiums
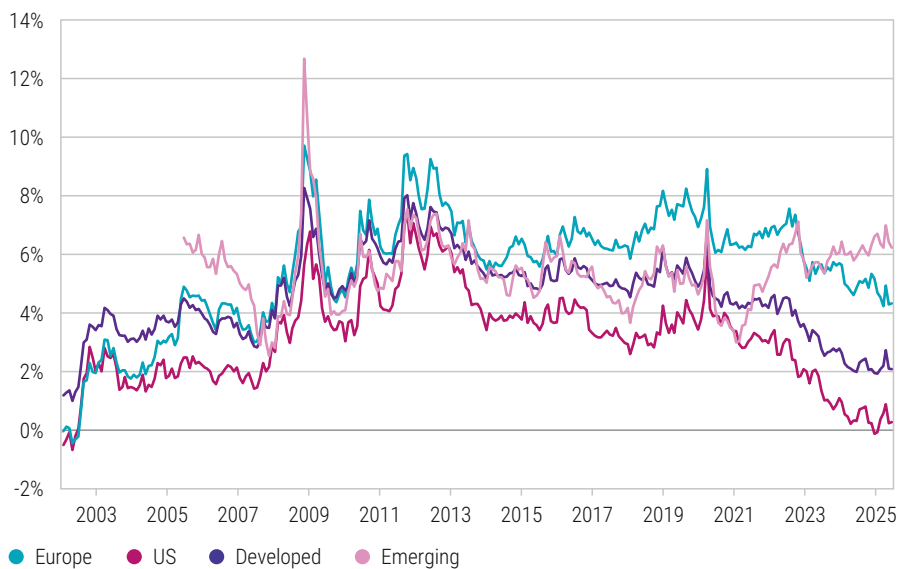
Source: LSEG Datastream, Robeco, June 2025. Forward earnings (12 months) to price minus the government bond yield. For emerging markets, Chinese government bond yields are used as a proxy.

Back in 2021, Shiller introduced the 'excess CAPE yield', which is the inverse of the Shiller CAPE adjusted for long-term real interest rates. It serves as a proxy for the expected risk premium on equities, and currently stands at 1.4%.[10] Even though the model underlying the implied equity premium in Figure 2.11 and the excess CAPE yield are somewhat different (in the sense that nominal interest rates or average real interest rates are used as a proxy for the hurdle yield) both methods currently predict a low implied risk premium for US equities.

2.4.5 Summary
Most developed equity markets are currently neutrally or slightly expensively valued, but three indicators points out the US is an outlier in that it is very expensive. Because of the impact of the US market, which accounts for almost three-quarters of developed world market capitalization, developed equity markets are expensive overall.

2.5 Emerging market equities
The CAPE ratio for emerging market stocks has historically provided useful information about valuations in emerging markets.[11] Although the figures for developed and emerging markets are not entirely comparable because CAPE data for emerging markets starts substantially later than for developed markets, Figure 2.12 shows that the weighted average CAPE for emerging equities is 19.3, substantially lower than the 31.5 of developed markets.

There are several possible explanations for this. First, the higher systematic risk in emerging markets is reflected in higher discount rates, leading to lower prices for the same expected earnings. Second, emerging markets may not be fully financially integrated with the rest of the world, and this market segmentation leads to higher discount rates. Third, emerging equity markets may be tilted toward industries with lower growth potential and therefore lower valuations than developed markets. Therefore, it may be more relevant for valuation purposes to compare each country with its own historic CAPE levels than comparing CAPEs across countries.

10. For more information about the excess CAPE yield's predictive power for US equity markets, see Catanho and Saville (2022).

11. See Klement (2012).

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The CAPEs of each of the largest emerging equity markets except those of India and Taiwan are currently below their historical median levels, and the CAPE ratios for Türkiye is particularly low at around 8.2. India's CAPE of 37.3 is even higher than that of the US, while Taiwan's CAPE of 31.3 is above that of developed equity markets. This substantial variability in valuation levels between countries suggests that country selection within emerging markets may help to improve investment returns. The weighted average CAPE across all emerging markets is 17.7, which is marginally below the historical median level of 18.5. Although according to this measure emerging markets look fairly valued compared with their historical levels, the valuation gap with developed markets is substantial.

Figure 2.12: Cyclically adjusted price-earnings ratio for emerging countries
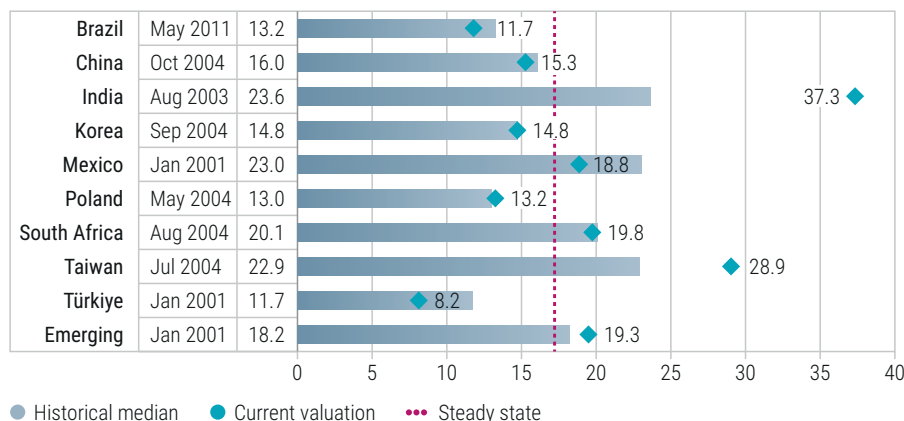
Source: Barclays Research, LSEG Datastream, Robeco. The CAPE ratio for each country has been calculated by Barclays Research using the levels of country-specific indices published by MSCI representing the equity markets for the relevant country, adjusted for inflation using data from DataStream. The bars contain the median CAPE ratio from the start of the sample (indicated at the bottom) to June 2025, the blue diamond the current valuation, and the dotted line the assumed steady-state CAPE.

Figure 2.11 includes the implied equity premium for emerging markets. It is elevated at 6.2%, which is above that of Europe, suggesting that emerging market equities are relatively attractively valued. We also drew this conclusion based on the CAPEs. To further test the robustness of these valuation measures, we also look at other bottom-up measures of value: price-to-book, price-to-cashflow, price-to-earnings and price-to-forward earnings ratios. Figure 2.13 shows that since 2014, the valuations of emerging market equities have been consistently below those of developed market equities, trading at a discount of 20-30%. Just like with the CAPE, we expect the valuation ratios to be below one on average. A long-term discount of valuation ratios of emerging relative to developed markets can be estimated when we use our assumption of a 0.5% higher cost of capital for emerging market equities over the long term. Under the assumptions of the Gordon growth model, this leads to a relative valuation discount of 14% over the long run.[12] As such, Figure 2.13 shows that emerging equities' current discount relative to developed equities of around 35% on average over the four valuation measures (and based on the price-to-book ratio the discount is now approaching 50%) appears high.

12. This model dates back to Gordon (1959) and is a benchmark model described in most finance textbooks.

Figure 2.13: Emerging equity valuations relative to global developed equity valuations

● Price to book   ● Price to cashflow   ● Price to earnings
● Price to forward earnings   ••• Steady state
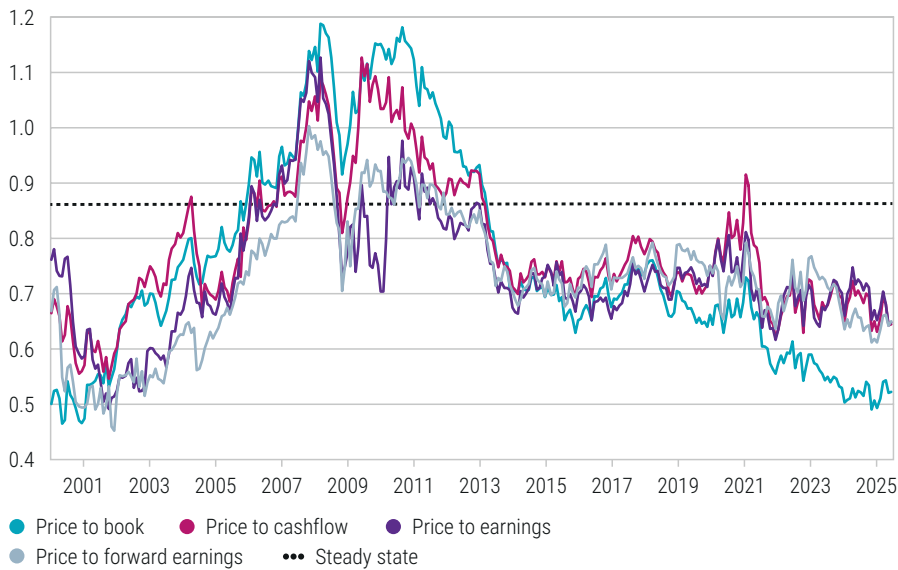
Source: LSEG Datastream, Robeco, June 2025. Each month we divide the bottom-up-derived valuation ratio of the MSCI Emerging Markets Index by the same valuation ratio for the MSCI World Index. The MSCI World only contains developed markets.
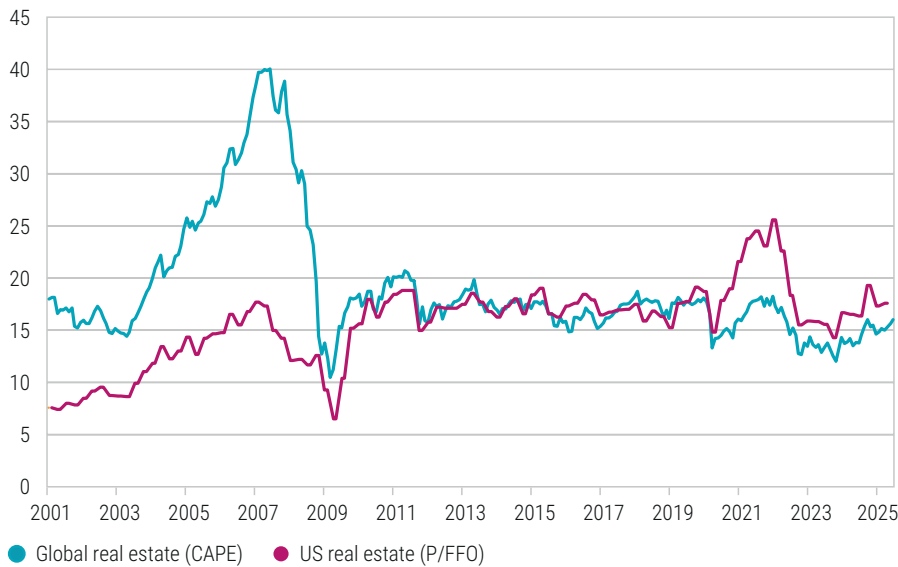
In conclusion, emerging equities look attractively valued compared with developed markets.

2.6 Listed real estate

We compare listed real estate valuations with those of global equities. Although the CAPE ratio is admittedly not an ideal measure for assessing the valuations of real estate investment trusts, it is one of the best available. The CAPE ratio of global real estate is currently 15.9 which is well below the steady state of 20, which is close to its historical average too. The CAPE of global equities is almost twice as high at 31.5, and the CAPE of global real estate is also welll below that of European (21.2) and emerging market equities (19.3). As such, real estate looks relatively cheap according to this valuation measure.

A valuation measure commonly applied to real estate investment trusts involves comparing their price with their funds from operation (FFO). The FFO is calculated as net income plus depreciation and amortization minus gains on sales of properties. In the US, the price-to-FFO is reported at the market level. Research shows that the market reacts more to FFO announcements than to other announcements, such as about net income.[13]

13. See Seok, Cho, and Ryu (2020) for more information about the reaction of US REIT prices to FFO announcements.

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Figure 2.14: REIT-specific valuation ratio for US REITs

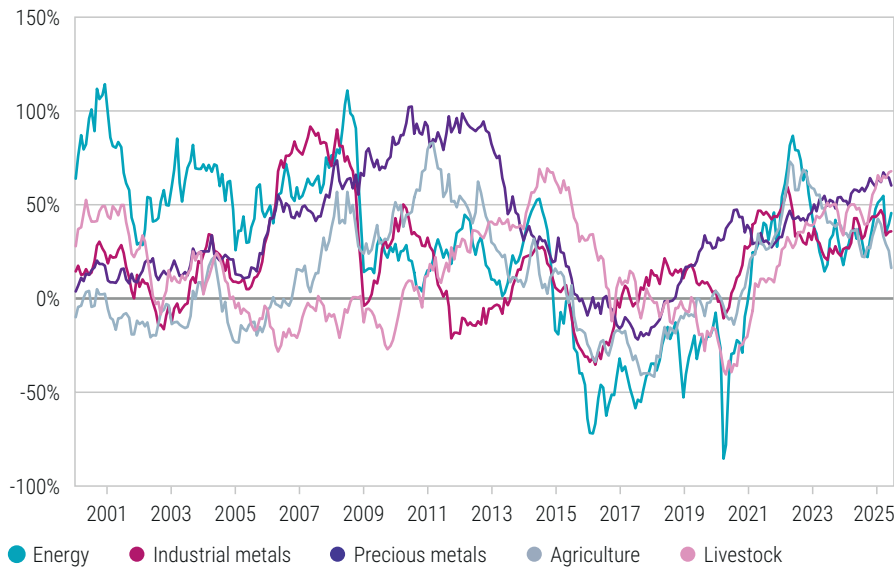● Global real estate (CAPE)   ● US real estate (P/FFO)

Source: S&P Global Market Intelligence, LSEG Datastream, Nareit T-Tracker, Robeco, June 2025.
The valuation ratio specific to US Real Estate Investment Trusts is the price (P) divided by the funds from operation (FFO).

Figure 2.14 shows this specific real estate valuation ratio up to the second quarter of 2025. This measure fell from its record high at the end of 2021 of 25.6 to 14.2 in the third quarter of 2023. Since then, it has increased again to almost 20, but currently has a value of 17.5. It is difficult to determine what a 'normal' ratio is given that this measure has only been available since 2000. Based on the limited data series available to us it appears that, according to this measure, real estate is neutrally valued compared with its past levels.

Based on real estate's relatively low CAPE, suggesting that it is cheap, and its neutral price-to-FFO ratio, we conclude that real estate is cheaply valued.

2.7 Commodities

Here we use the definition of commodity valuation presented by Asness, Moskowitz and Pedersen (2013). This involves comparing the current spot price with the average spot price from 4.5-5.5 years ago. The idea is to use the price five years ago, but averaging ensures that temporary outliers do not affect the valuation signal too much. Instead of calculating the valuation of each traded commodity separately, we consider the five main commodity categories: energy, industrial metals, precious metals, agriculture and livestock. If the commodity price is the same as five years ago, the signal would stand at 0% and suggest a neutral valuation. A level above zero means that the current price is higher than five years ago and indicates that the commodity group is expensive.

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Figure 2.15: Valuation signals for the various commodity categories

Source: LSEG Datastream, Robeco, June 2025. The figure shows the natural logarithm of the commodity category price index divided by the natural logarithm of the average of the same price index from 5.5 to 4.5 years ago, minus one. Monthly data in US dollars.

Figure 2.15 shows that energy commodities were in general overvalued from 2000 to 2014 as their price had increased relative to five years previously. In 2015 and 2020, however, they were more than 50% undervalued. They recovered strongly after the Covid crisis and the war in Ukraine, such that they were more than 75% overvalued by the middle of 2022. But since then, energy prices have fallen, with their overvaluation having dropped to 45% by the end of June 2025. All other commodity categories are overvalued by a similar amount, ranging from 16% for agricultural commodities to 60% for precious metals and 68% for livestock.

We therefore deem commodities to be expensive overall at present. ●

3. Climate

Measuring climate change risk and its associated costs is difficult: it requires a massive amount of specific data on temperature increases, consequential severe weather events, resulting damage, and gradual societal adaptation, not to speak of the incalculable consequences of loss of human life and human suffering. To a certain extent, the effects of climate change are already considered in asset class valuation and macroeconomic scenarios. However, since climate change risk may have such a large impact on societies, this chapter aims to explicitly address its impact on financial markets.

A possible way of handling physical risks without taking direct climate action is mass migration from such high-risk areas. However, that may lead to long-term geopolitical tensions and negative economic consequences. Enacting effective climate policies, ranging from subsidies to green energy innovations to carbon pricing, can also cost society billions. Investing in climate action or inaction: both options are costly, so we expect that economic growth will be lower over the coming decades than when carbon emissions were cost-free and deemed harmless. Specifically, we estimate economic growth to drag 0.25% per year until 2050. This is a reduction of around 10% of total economic growth. Many researchers believe that quick carbon emissions reductions will on balance be cheaper than taking no action.[1]

1. See Rebonato, Kainth, and Melin (2022).

We estimate that until 2050 the negative impact of 'no action' on the environment will be 0.35% per year. In this chapter, we take a shorter-term look at the next five years, where we forecast which climate change policies will be adopted and what the price consequences might be for different asset classes.

3.1 Physical climate risks

We start by examining the recent trends in economic damage from natural disasters that are likely to be at least partially attributable to climate change, such as droughts, floods, wildfires, and extreme temperatures. We exclude volcano outbursts and earthquakes, as they are most likely unrelated to climate change. Our focus here is on economic damage, which tends to be larger in developed markets where destroyed buildings or infrastructure are typically valued higher. As mentioned earlier, for the purpose of forming expected returns, we disregard the costs and risks of disaster-related human loss and human suffering.

Figure 3.1: Total global economic damages of natural disasters (excluding earthquakes and volcanos)
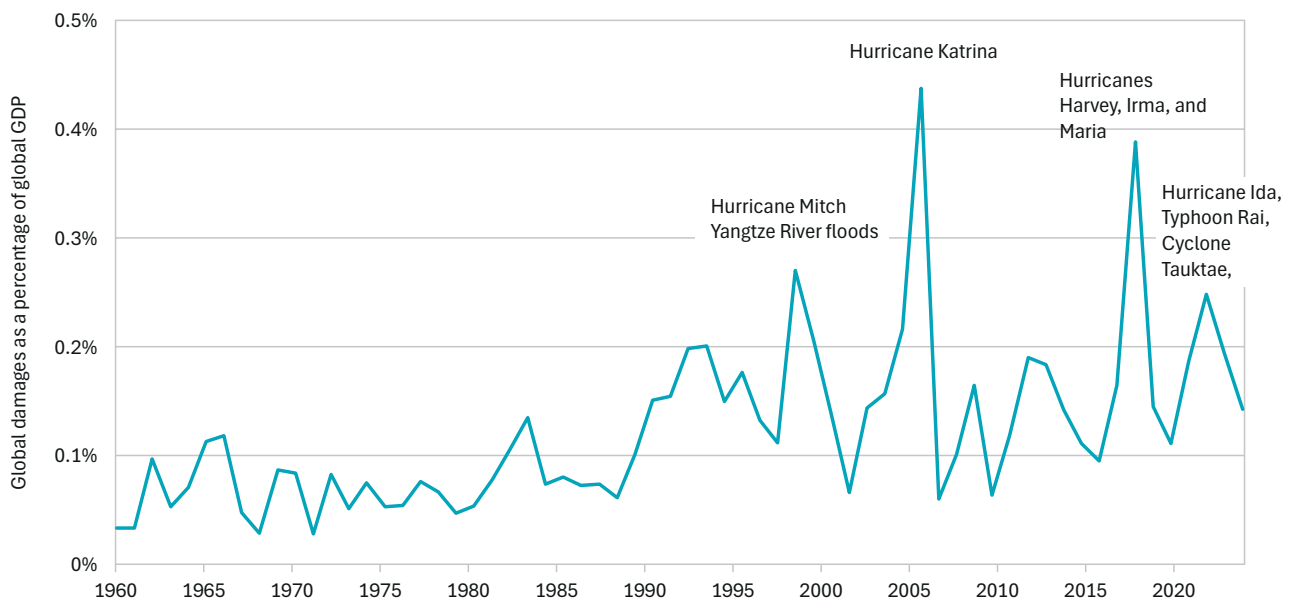
Source: Robeco, Our World in Data, June 2025.

Figure 3.1 shows that physical risks have cost about 0.17% of GDP since the 1990s, with four spikes above 0.25% of GDP. Most of the economic damage is caused by storms (hurricanes, typhoons, or cyclones). The graph further shows that global economic damages have increased over time, but there does not seem to be a strong trend after 2000.

Munich Re (2025) indicates that about a third of the economic damage caused by natural disasters is insured and therefore is directly affecting the bottom line of (re)insurance companies. This also means that two thirds are not insured, and the cost of these will be borne by corporations when production facilities are damaged, by governments when infrastructure or public buildings need to be repaired, or by the general population when their uninsured property is damaged. Investors need to take these physical risks into account when they decide to purchase financial instruments issued by governments or companies.
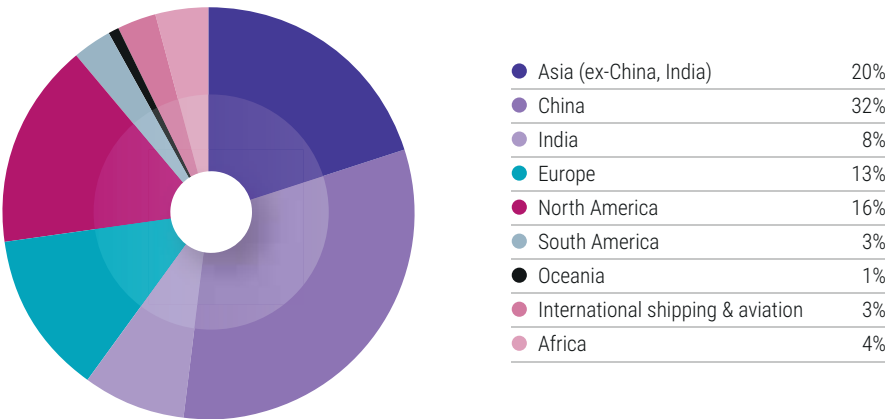
3.2 Regional impact of climate change

In a world where each country acts in its own best interest (without coordination about what is best for the world) we will likely end up in the non-cooperative equilibrium of a prisoner's dilemma where short-term local economic and political gains are prioritized over long-term coordinated climate solutions.

Research indicates we are heading in this direction. The Swiss finance consultancy South Pole's annual survey confirms that most financial institutions plan to keep financing new fossil fuel projects in the coming decade. Meanwhile, the Robeco Global Climate Investing Survey 2025 shows that investors have become more negative about the probability of achieving the goals of the Paris Agreement, with a notable downward trend in the US.

Even though Europe and North America emit relatively little today compared to Asia, the two continents' cumulative carbon emissions since 1960 are much higher, especially on a per capita basis. Therefore, developed markets are expected to take the lead in decarbonization efforts. Rich countries backtracking on their decarbonization commitments could signal to emerging markets that it's acceptable to also lower their

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decarbonization ambitions. And a lacking ambitious energy transition in emerging Asia would exacerbate existing climate issues, regardless of the policies in other continents. In order to reduce global carbon emissions, it is essential that Asian countries are willing and able to transition to low-carbon economies, as they are responsible for about 60% of global emissions, with China responsible for about half of that; see Figure 3.2. Absolute annual carbon emissions have declined in Europe and North America with about 20% since their peak about 20 years ago, but a further reduction in these geographies alone is not sufficient to achieve the goals of the Paris Agreement. The world needs Asia to decarbonize too.

Figure 3.2: Carbon emissions by region, 2023

Asia (ex-China, India)	20%
China	32%
India	8%
Europe	13%
North America	16%
South America	3%
Oceania	1%
International shipping & aviation	3%
Africa	4%

Source: Robeco, Our World in Data. Data retrieved in June 2025.

3.3 Regulatory developments

According to the Robeco Global Climate Investing Survey 2025, 57% and 66% of European and Asia-Pacific investors, respectively, expect US climate policies will be reinstated or even strengthened in the next administration, but US investors are among the most skeptical about this with only 47%.

This skepticism may be justified. The Columbia Law School's Climate Backtracker lists 197 climate- or nature-related regulations that have been undone by the Trump-Vance administration since January 2025.[2] The largest economy in the world is clearly reducing its regulatory policies related to climate. Innovation and tech adoption that help prevent more climate change may be accelerated by government subsidies or regulatory pressures. Since these policies are disappearing fast under the current administration, the energy transition will likely be slower as only already economically viable projects will be undertaken. Preventing more carbon emissions is no longer on the federal policy agenda. Even though currently state-level policies are still aimed to accelerate the energy transition, the federal administration is trying to abolish all state-level climate policies too.[3]

The potential game changer in the regulation developed to combat climate change is the Carbon Border Adjustment Mechanism (CBAM) that will officially start on 1 January 2026 for goods exported to the EU.[4] It dictates that EU importers should purchase carbon certificates priced similarly to the EU carbon allowances for imported goods to create a level playing field between companies inside and outside the EU. These certificates do not need to be bought by EU importers if exporting countries impose a similar price on carbon emissions to the EU. This policy may spur other countries to start pricing carbon emissions, as this would mean income to their own governments instead of the EU. As a result, the global coverage of priced emissions is expected to increase over the next five years.

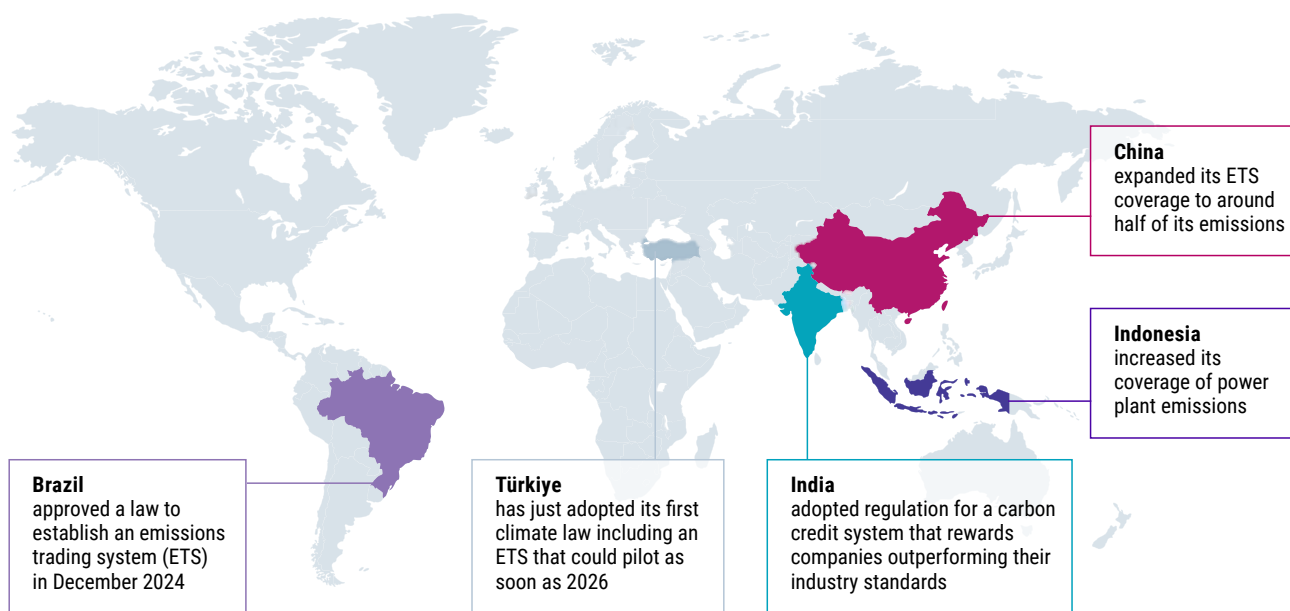**Past performance is no guarantee of future results. The value of your investments may fluctuate.**

2. See Climate Backtracker | Sabin Center for Climate Change Law

3. See Executive Order 14260 from 8 April 2025.

4. Penn (2025) states that recently parts of the regulation have been watered down to reduce administrative costs.

According to the World Bank (2025), several large emerging markets have recently introduced or expanded their carbon pricing, sometimes citing or implicitly linking the ETS to the EU's CBAM (see Figure 3.3). Similarly, other countries are planning to implement their own carbon borders, such as the UK, Australia, Canada, Japan, Chile, Thailand, and Taiwan. The recent turmoil around trade tariffs may lead to delays or amendments of regulation, but we do not expect that planned carbon policies will be abandoned.

Figure 3.3: Examples of global carbon pricing efforts

China expanded its ETS coverage to around half of its emissions

Indonesia increased its coverage of power plant emissions

Brazil approved a law to establish an emissions trading system (ETS) in December 2024

Türkiye has just adopted its first climate law including an ETS that could pilot as soon as 2026

India adopted regulation for a carbon credit system that rewards companies outperforming their industry standards
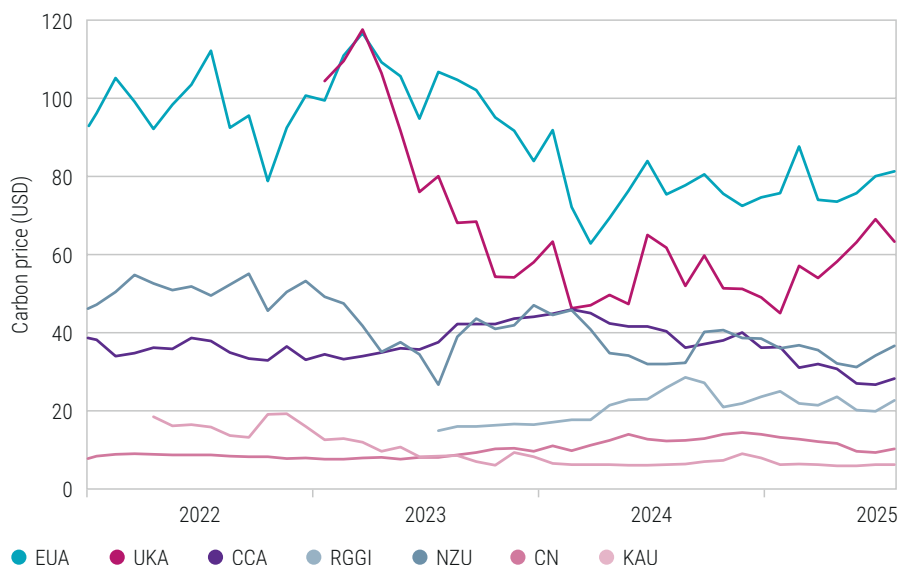
Source: Robeco, June 2025.

3.4 Carbon pricing

The concept of negative 'externalities' refers to the negative environmental impacts inflicted on wider society, not solely by those who produce or consume goods. Economists such as Arthur Pigou have long argued that we should 'internalize' these externalities by making producers and consumers pay for the carbon emissions they are responsible for. Since most corporate executives and shareholders prioritize profitability over sustainability, the most likely route to decarbonization is to internalize the negative externalities. More often than not, financial incentives work.

Some governments and regulators have introduced taxes on carbon emissions or developed carbon emissions trading systems. One advantage of carbon taxes is its fixed emissions price, but the actual reduction in emissions remains unclear. Similarly, emissions trading systems typically fix the total amount of emissions that are permitted, but the price of carbon emissions can fluctuate with volatile demand. Döbbeling-Hildebrandt et al. (2024) study the effectiveness of carbon pricing and conclude that in 17 out of 21 carbon pricing schemes, there have been immediate and substantial reductions in carbon emissions ranging between 4% and 15%.

Today, around 23% of global emissions are priced – either via a carbon tax or emissions trading scheme – which means 77% of global carbon emissions are untaxed. The global average carbon price is currently around USD 5 per ton.[5] Research warns the global price of carbon needs to increase to USD 100 for externalities to be priced in appropriately. Azlen, Gostlow and Child (2022) collected global carbon price predictions for 2030 from several climate models and report a wide range, from USD 55 to USD 249, with a median of USD 125.

5. Source: Real Carbon Price Index: https://www.realcarbonindex.org/

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 3.4: Carbon prices of major emissions trading schemes across the world

Source: Bloomberg, LSEG Datastream, Robeco, June 2025. Futures prices for European (EUA), United Kingdom (UKA), California (CCA), Northeast US (RGGI), New Zealand (NZU), China (CN), and Korea (KAU).

Figure 3.4 shows the price variation of the most important emissions trading schemes, all of whose carbon prices are substantially lower than their all-time highs. This could be explained by the energy transition to low-carbon alternatives that do not require purchase of carbon allowances, higher supply of carbon allowances following the full-scale invasion of Ukraine, and expectations of lower economic growth that reduces the need for energy. Over the past year, the EU carbon price has not changed much, while the UK carbon price has increased somewhat given discussions to link the ETS from the EU and the UK, such that allowances are fungible. This means that allowances from one system can be used in the other, facilitating a more integrated and efficient carbon market.

In other parts of the world, the price of carbon has decreased. Notably in the US, where there is uncertainty whether the federal government will allow states to operate carbon ETS, prices have come down. But also in China, where substantial uncertainty around trade tariffs with the US and the impact on production has dominated the news, prices have decreased despite the increase coverage of their ETS. There are reasonably liquid derivatives markets that allow investors to take positions on price developments in the EU, UK, California Carbon Allowance, and Regional Greenhouse Gas Initiative (see Swinkels and Yang, 2023). Last year, futures were introduced on the Australian and New Zealand carbon allowances, and Korea is planning for a carbon futures market to start in 2026.

In addition to the regulated compliance markets described above, there is also a voluntary carbon market. Some companies use these to offset hard-to-abate carbon emissions. For example, voluntary carbon credits can be bought when purchasing an airline ticket or when investing in one of Robeco's climate strategies. Many voluntary carbon credits turned out to be of low quality, meaning that they avoided fewer carbon emissions than claimed. This led to strong downward price pressure. Whereas in 2022 nature-based carbon credits were valued above USD 10, some of them trade below USD 1 today. Dagan et al. (2025) indicate that reviving the voluntary carbon market would require coordinated legal policies across the world, such that the quality of carbon credit supply will increase and as a result demand will pick up again.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

3.5 The impact of climate change on asset classes

3.5.1 Government bonds

As we have argued in our Long-Term Expected Returns report, we expect that economic growth will be 25 bps per year lower than it would have been without climate change. This estimate is still uncertain and varies considerably across regions. In the long run, government bond yields tend to be lower when economic growth is lower, so this lower-growth argument has a negative effect. However, nominal bond yields tend to be higher when inflation risk is higher, as nominal bond holders want to be compensated for the risk they take. Volatile energy prices in combination with high indebtedness make inflation management by central banks more difficult in the coming years and could lead to higher inflation risk premiums, which would have a positive effect on government bond yields and may counteract the negative effect from lower real economic growth.

It is difficult to separate climate change risk from other factors that impact government bond yields, especially for emerging markets where government bond yields are often not considered to be risk-free. Nevertheless, several studies claim that there is a positive relationship between the two.[6]

6. See Beirne, Renzhi and Volz (2021) and Boehm (2022).

On the next five years, we expect that physical risks on average will be as least as high as previously reached (See Figure 3.1; above 0.25% of global GDP), but of course it is difficult to predict when and where exactly in the world a devastating storm or other natural disaster will appear. As we are primarily interested in comparing our base currencies, developed market government bonds, and emerging markets government bonds, we can calculate the ex-ante vulnerability and readiness of governments to deal with climate change. Below in Table 3.1, we take data from the Notre Dame Global Adaptation Initiative (ND-GAIN)[7] and compare it with the Robeco Climate & Energy sub-scores from the Robeco Country ESG Framework.[8]

7. For a more detailed description of the way vulnerability and readiness are calculated, see the website of ND-GAIN https://gain.nd.edu/.

8. The ND-GAIN score is one of the inputs for the Robeco Country Sustainability Ranking. For a more detailed description of the Robeco Country ESG Framework, visit the Robeco website.

For the four largest markets, and consequently the entire developed government bond market, the climate vulnerability is low (0.323), while the readiness is high (0.647), leading to a good overall score of 66.22. The Robeco Climate & Energy score is relatively low for developed markets (5.10), mainly because of the low score of the US (3.76). This in turn is largely due to the continued reliance of the US on fossil fuels and their high carbon emissions.

Table 3.1: Climate vulnerability and government readiness

	ND-GAIN			Robeco
	Vulnerability	Readiness	Score	Climate and energy
Germany	0.301	0.694	69.61	6.86
US	0.312	0.641	66.45	3.76
Japan	0.369	0.677	65.38	6.26
UK	0.288	0.685	69.85	7.16
Developed	0.323	0.647	66.22	5.10
Emerging LC	0.390	0.411	51.06	5.08
Emerging HC	0.401	0.401	50.03	4.83

Source: Bloomberg, Robeco, Notre Dame Global Adaptation Initiative. The ND-GAIN score weights Readiness positively, and Vulnerability negatively. The ND-GAIN score ranges from 0-100, where a higher score means less climate change risk. Robeco Climate & Energy is a sub-score of the Robeco Country ESG Framework (as of April 2025). Scores ranging from 0-10, where a higher score is better. Developed is Bloomberg G7 Treasury index. Emerging Local Currency is the JP Morgan Global Bond Index Emerging Markets Diversified. Emerging Hard Currency is the JP Morgan Emerging Markets Bond Index Global Diversified. Index weights from 30 June 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

For emerging markets, both local- and hard-currency, vulnerability is substantially higher than for developed markets (0.390 and 0.401, respectively), while readiness is lower (0.411 and 0.401, respectively), leading to scores around 50. The similarity of these scores is to some extent unexpected, as the local- and hard-currency government debt markets issuer composition is very different.[9] The Robeco Climate & Energy scores are slightly lower for emerging markets compared to developed markets, but the differences are tiny.

9. For a more detailed comparison of local- and hard-currency government debt markets, see Giesta and Swinkels (2025).

Overall, these indicators suggest that from a climate risk perspective, emerging markets are more exposed than developed markets. Therefore, developed government bond markets receive a neutral score, while emerging markets receive a negative score.

3.5.2 Corporate credits
We collect several climate change risk measures, and a biodiversity footprint measure, for investment grade and high yield bonds.[10]

10. See Markwat and Swinkels (2024) for an overview of the carbon data quality for corporate bond and equity markets.

Table 3.2: Climate change risk metrics for corporate bonds

Sector	Index weight (%)		Carbon footprint		Climate Value at Risk (%)		Climate Traffic Light		Biodiversity Traffic Light	
	IG	HY	IG	HY	IG	HY	IG	HY	IG	HY
Total	**100.0**	**100.0**	**103.5**	**185.5**	**-16.0**	**-30.1**	**1.76**	**0.89**	**1.43**	**1.07**
Banking	26.4	3.2	2.1	4.1	-4.1	-5.4	1.87	1.32	2.18	1.25
Basic industry	2.7	7.4	421.7	632.2	-56.7	-70.3	1.35	0.75	0.94	0.74
Brokerage etc.	1.5	1.0	4.1	9.3	-2.8	-13.5	1.20	0.67	1.50	1.19
Capital goods	4.9	9.3	160.3	217.6	-13.3	-19.6	1.57	0.59	1.15	1.18
Communications	6.6	15.9	20.9	25.3	-11.1	-21.1	2.36	1.09	1.96	1.76
Consumer cyclical	7.9	18.2	109.1	125.4	-19.8	-34.4	1.87	0.77	1.03	1.23
Consumer non-cyclical	13.3	12.2	127.9	150.1	-18.3	-25.3	2.10	1.32	1.03	0.92
Electric	7.3	3.6	348.4	884.5	-19.6	-23.9	1.27	1.33	0.86	1.32
Energy	6.0	8.6	313.0	256.8	-66.4	-68.3	0.93	0.40	0.42	0.35
Finance companies	1.1	3.1	10.1	5.2	-7.2	-3.0	0.85	0.90	1.00	1.00
Financial other	1.4	2.5	15.0	35.8	-7.5	-14.3	0.70	0.87	0.76	0.72
Industrial other	0.7	1.5	106.7	131.4	-18.0	-3.0	0.82	0.79	1.02	0.93
Insurance	6.3	2.3	19.1	15.2	-10.3	-11.6	1.93	0.38	1.40	1.24
Natural gas	1.3	0.1	187.6	190.2	-13.6	-41.6	1.65	1.86	0.76	1.00
REITs	2.7	1.6	6.7	16.8	-7.4	-17.5	1.54	0.70	0.78	0.55
Technology	6.5	5.6	25.8	29.8	-3.5	-8.0	2.34	1.16	1.20	0.63
Transportation	2.8	3.2	175.4	387.2	-34.2	-73.1	1.24	0.80	1.08	0.53
Utility other	0.6	0.7	181.3	209.7	-18.2	-20.8	1.60	0.75	1.38	2.00

Source: Robeco, LSEG Datastream, MSCI, TruCost, MSCI ESG Research, Clarity AI. The data was obtained in June 2025. Certain information ©2025 MSCI ESG Research LLC. Reproduced with permission. Trucost Carbon footprint is measured in tons of CO_2 equivalent per USD 1 million invested. MSCI Climate VaR is a percentage change in company value. The scores for the Robeco Climate Traffic Light and the Robeco Biodiversity Traffic Light are market-weighted averages of scores 0 (misaligned), 1 (partially aligning), 2 (aligning) and 3 (aligned).

Table 3.2 shows the various risk measures at the market index level and for each sector.[11] For our expected returns, we only need the investment grade and high yield market levels in the top row, but it is instructive to see how the sectors within these two asset classes differ in terms of climate risk, as well as weight in the overall index. The carbon footprint is represented by carbon emissions divided by enterprise value including cash, which has

11. We do not address differences in climate risk across maturities, nor the increased incentives to decarbonize that investors can provide to companies by investing in short-dated bonds; see Koekkoek and Swinkels (2023).

become the default measure of carbon footprints in Europe.[12] The investment grade universe has a substantially lower carbon footprint (103.5 tons of CO_2e per USD million invested) than the high yield index (185.5). However, this measure is purely backward-looking. The climate value at risk measure provides a forward-looking, returns-based assessment of the climate-related risks and opportunities an investment portfolio is exposed to. At the market index level, it also suggests that investment grade is less exposed to climate change risk than high yield, with a value at risk of -16% for investment grade compared with -30.1% for high yield.

We also include the Robeco Climate Traffic Light in this overview. Robeco's Climate Traffic Light is a forward-looking assessment of a company's alignment with the goals of the Paris Agreement, taking into consideration the "common but differentiated responsibilities" of different nations. The assessment is based on a company's emission reduction targets and the credibility of those targets, compared to what is needed by that company to achieve global warming of well below 2 °C by 2100. Table 3.2 shows that the investment grade market has a considerably higher score (1.76) than the high yield market (0.89). At the sector level, there are differences with the other climate risk measures, for example insurance scores reasonably well on carbon emissions and climate value at risk, but has a relatively poor Climate Traffic Light for the high yield asset class. All in all, the traffic light confirms what we saw for the carbon footprint and climate value at risk: high yield is more climate-risky than investment grade corporate credits.

We also include the brand-new Robeco Biodiversity Traffic Light in Table 3.2. The traffic light is a practical, forward-looking metric to companies based on their current nature performance and their future plans. It categorizes companies into four categories: aligned, aligning, partially aligning and misaligned. This categorization helps investors identify companies that are leading the transition to a more nature-positive economy and those that need to improve their practices.[13] Table 3.2 shows that there is some overlap with the Climate Traffic Light, as companies in the energy sector score poorly on both, whereas companies in the communications sector score well on both. However, the correlation is far from perfect, as is evidenced by the consumer non-cyclical sector, which scores relatively well on the Climate Traffic Light, but not on the Biodiversity Traffic Light.

Investors in corporate bonds are exposed to the relatively safe part of the capital structure, so even if companies are exposed to some climate change risks, safer corporate bonds are less likely to suffer than equities. As we outlined above, we expect transition risk to be much less important in the coming five years than we thought before. We have reduced the impact to about zero, regardless of the asset class exposure to climate transition risk.

3.5.3 Equities

Equity investors need to consider how climate change will affect companies' cashflow and capital costs in their net present value assessment. Future cashflows might fall because of physical risk, such as when droughts or floods damage a company's production facilities, or due to transition risk, such as clean technology investments or higher prices of carbon emissions. Companies developing innovations in support of the energy transition may benefit from climate change risk. The other side of the coin is that policy changes delaying the energy transition may hurt the profitability of green companies. Uncertainty about temperature shocks is associated with increases in the cost of equity.[14] Over the medium term, as more equity investors scrutinize the downside risks of climate change, an increasing cost of capital due to a higher climate risk premium would be a negative signal for equity markets. But over the long run, this would mean the equity risk premium should rise.

Table 3.3: Climate change risk metrics for equities

	Index weight (%)		Carbon footprint		Climate Value at Risk (%)		Climate Traffic Light		Biodiversity Traffic Light	
Sector	DM	EM	DM	EM	DM	EM	DM	EM	DM	EM
Total	**100.0**	**100.0**	**65.5**	**180.8**	**-9.9**	**-21.8**	**2.06**	**1.45**	**1.42**	**1.53**
Communication services	8.5	9.8	13.3	28.3	-4.7	-9.1	2.40	1.22	2.14	2.39
Consumer discretionary	10.1	12.7	48.2	105.4	-7.7	-21.0	1.60	1.53	1.74	1.16
Consumer staples	6.0	4.5	118.8	180.9	-23.1	-33.9	1.55	1.75	1.01	0.97
Energy	3.5	4.3	352.5	645.5	-73.7	-90.6	0.66	0.81	0.41	0.39
Financials	17.1	24.4	10.0	7.2	-4.5	-12.2	1.96	1.06	1.64	1.56
Health care	9.5	3.2	25.7	34.4	-10.2	-11.8	2.73	0.83	1.08	0.88
Industrials	11.4	6.9	88.0	197.3	-6.5	-27.1	1.63	1.18	1.33	0.83
Information technology	26.2	24.1	10.9	68.4	-1.3	-8.1	2.56	2.37	1.39	2.23
Materials	3.2	5.8	362.0	1001.5	-39.2	-62.8	1.77	0.76	1.20	0.81
Real estate	2.0	1.6	13.0	41.3	-8.2	-13.6	1.47	0.52	0.76	0.56
Utilities	2.6	2.6	428.0	1447.7	-23.1	-70.8	1.59	1.15	1.39	1.05

Source: Robeco, LSEG Datastream, MSCI, TruCost, MSCI ESG Research, Clarity AI. The data was obtained in June 2025. Certain information ©2025 MSCI ESG Research LLC. Reproduced with permission. See Table 3.2 for more information on the climate change risk measures.

We assess the climate change risks of the broad developed and emerging equity markets and for each sector within them, using the same metrics as for the corporate bond market. The carbon footprint of developed markets is 65.5, compared to 103.5 for investment grade corporate bonds. The climate value at risk figure is -9.9%, also lower than that of corporate bonds. The four equity sectors with the worst footprints and highest climate value at risk in developed markets are utilities, energy, materials, and consumer staples.

Table 3.3 shows that climate risk metrics are generally worse for emerging markets than for developed markets. The carbon footprint of emerging markets equities is 180.8, about three times higher than the 65.5 for developed markets. Emerging equities' climate value at risk (-21.8%) is more than twice as high as for developed markets (-9.9%). This is not only due to differences in the sector composition of developed and emerging markets, as also within most sectors emerging markets show higher climate change risk. Even though the Robeco Climate Traffic Light recognizes that emerging markets have more time to decarbonize their economies than developed markets in the Paris Agreement, the average score is lower for emerging markets (1.45 and 2.06). The Biodiversity Traffic Light indicates that these risks are about the same for developed and emerging markets (1.42 and 1.53). Despite the fact that the carbon footprint for developed markets equities is lower than that of investment grade credits, we expect the impact of climate risks to be higher for equity markets. Equities are the first assets to suffer when (climate) risks materialize and therefore are more vulnerable to climate transition risk than corporate bonds. In this year's Expected Returns, we do not differentiate expected returns on climate transition risk, and hence both developed and emerging equity markets receive a neutral signal.

3.5.4 Real estate
The carbon footprint of real estate is relatively low, as we can see in Table 3.3.[15] However, the exact location of real estate properties may be a better measure to evaluate the climate change risk exposure than carbon footprints, despite limited research on the impact of climate change on real estate. Several papers have found that properties in coastal or hurricane-prone areas have fallen substantially in value recently, although some

15. Note that this only includes Scope 1, 2, and 3 upstream emissions, and Scope 3 downstream is not included as the latter emissions are notoriously difficult to measure.

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of these falls reversed after the implementation of credible plans to prevent or deal with future disasters.[16]

Overall, physical climate risks can be high for real estate due to extreme weather events. This is because lots of valuable properties are located in areas threatened by climate change.[17] However, since the impact in developed markets over the next five years is likely limited, we give a neutral score this year.

3.5.5 Commodities

Climate change seems to be a double-edged sword for commodities. On the one hand, demand for commodities is likely to decrease as long-run global economic activity slows with 25 bps per year. On the other, increased physical risks resulting from climate change could result in more frequent negative supply shocks hitting commodities, especially agricultural commodities. The overall impact on expected commodity returns under a business-as-usual scenario could therefore be neutral.

However, if progress is made toward the Paris Agreement and the green energy transition, the commodity intensity of economic activity could increase. This is because the battle against climate change is resulting in increased demand for certain commodities used to produce wind turbines, solar panels, and batteries.[18] This rise implies that a greener economy could, at least in the medium term, be beneficial for commodity prices. We realize that short-run demand and supply shocks may create excessive volatility in these transition commodities.

On balance, we assign a positive climate signal to commodity markets as we expect the battle against climate change to exert upward pressure on commodity prices.

Summary

In conclusion, the US is backtracking on its policies that support the energy transition. While this mood does not yet seem to spill over to Europe or emerging markets, there is a considerable risk that it will delay the introduction of new ambitious climate change policies there also. If the richest and most carbon-intensive economy is not taking up its leadership role when it comes to combating climate change, others may also prioritize short-term economic or political gains over long-term partial global coordination. Compared to the last three years that we included climate as a separate medium-term influence, its contribution to expected returns is lowered this time. This means that for the coming five years, only emerging markets debt has a small negative tilt of 25 bps, and commodities a positive tilt of 50 bps, but for the other asset classes we keep or reduce the impact to zero. The climate transition risk exposure may be higher, but we think that the slower progress of the climate transition is already reflected in today's prices. ●

Table 3.4: Overview of climate signals

Fixed income	Signals	Equity	Signals
Developed	≈	Developed	≈
Emerging debt	↓	Emerging	≈
Corporate investment grade	≈	Real estate	≈
Corporate high yield	≈	Commodities	↑

Source: Robeco, June 2025.

16. See Clayton, Devaney, Sayce and Van de Wetering (2021).

17. For an example of flood risk estimation for different areas within Shanghai, see Tu et al. (2023).

18. For a review article on innovation and commodity inputs in batteries, see Hasan et al. (2025).

Special topics

Long-term investors generally face long-term challenges. In this section, however, we address four topics that institutional investors may very well be facing right now or in the near future.

Artificial intelligence for selecting small-cap stocks

Amid an ever-changing economic environment, many equity investors are looking for opportunities to diversify from richly valued and concentrated global large-cap allocations. In addition to emerging market opportunities, small-cap equities present another equity sub-asset class that historically attracted flows in global large-cap market environments.

Now coming into the spotlight with their substantial breadth and lower investor attention, small caps promise fertile ground for quant investors. Specifically, the dynamics of small-cap equities lend themselves naturally to the use of artificial intelligence (AI) techniques.

Although already around for decades, AI has recently seen a large increase in attention driven by increased computation power and improvements in modeling. The applications of AI are numerous and its use has by now permeated almost every area of business.

Most well-known are the applications of Generative AI, such as ChatGPT and DeepSeek. However, AI can also aid in classification tasks, such as distinguishing between which stocks to buy and which stocks to sell.

The small-cap market

Small-cap stocks are publicly traded companies with market capitalizations typically ranging between USD 250 million and USD 10 billion.[1] Small caps are an integral part of the global equity market portfolio, and many consider explicit allocation to them. This is especially the case in today's markets, where mega-cap tech stocks dominate large-cap indices, which also trade at elevated valuations. In contrast, small-cap indices comprise a much wider and more diversified mix of stocks, trading at a discount of approximately 20% compared to large caps.[2]

For illustration, consider the combined weights of the largest ten stocks in the (large-cap) MSCI World Index and MSCI World Small Cap Index, as shown in Figure 1. Out of the 1,352 constituents of the MSCI World Index, Apple, Nvidia and their eight peers make up a remarkable 25% of the total index, whereas the largest ten out of the 3,890 constituents in the MSCI World Small Cap Index only add up to 2%.[3]

1. As of the end of April 2025, based on the market capitalization numbers for the constituents of the MSCI World Small Cap Index, winsorized at the top and bottom 2.5%.

2. As of the end of April 2025, based on four bottom-up-calculated multiples (price-to-book, forward price-to-earnings, price-to-earnings, and price-to-dividend) for the MSCI World and MSCI World Small Cap indices.

3. All numbers are as of the end of April 2025.

Figure 1: The largest ten constituents of the MSCI World and MSCI World Small Cap indices

MSCI World

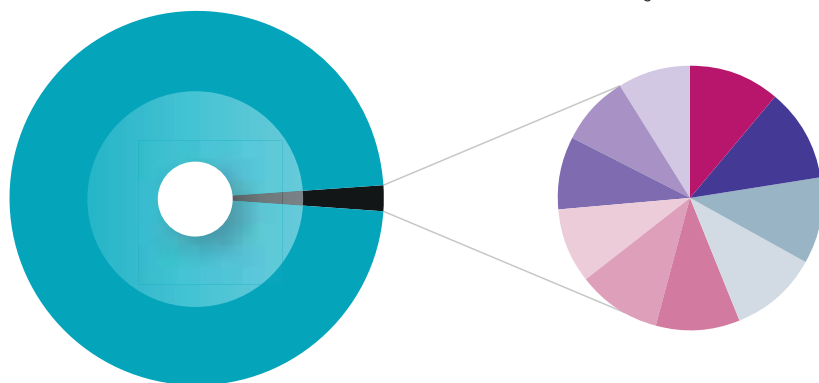1,352 constituents   Largest 10 names
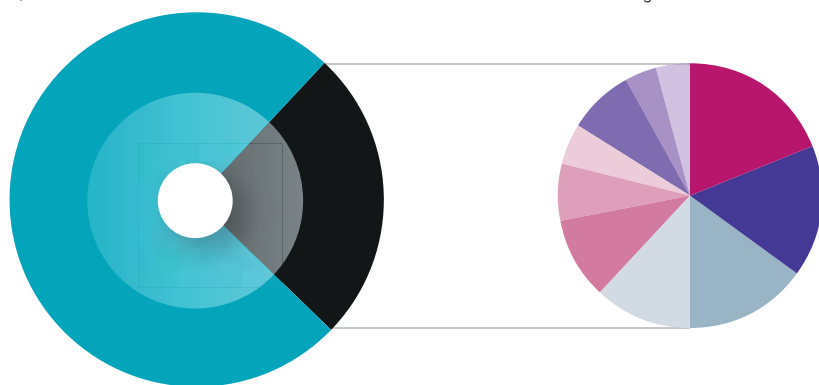
● Others	74.79%
● Apple	4.66%
● Microsoft	4.07%
● Nvidia	3.89%
● Alphabet	3.05%
● Amazon	2.54%
● Meta	1.74%
● Broadcom	1.25%
● Tesla	1.90%
● Eli Lilly	1.06%
● Berkshire Hathaway	1.0%

MSCI World Small Cap

3,890 constituents   Largest 10 names

● Others	98.05%
● Casey's General Stores	0.22%
● Sprouts Farmers Market	0.22%
● Tapestry	0.21%
● Guidewire Software	0.21%
● BJ's Whole Club	0.20%
● US Foods	0.20%
● Comfort Systems USA	0.18%
● Tenet Healthcare	0.17%
● Unum Group	0.17%
● Flex	0.17%

Source: MSCI, as of the end of April 2025. The companies/securities shown on this page are for illustrative purposes only in order to demonstrate the investment strategy on the date stated. The companies/securities are not necessarily held by a strategy/fund nor is future inclusion guaranteed. No inference can be made on the future development of the company. This is not a buy, sell, or hold recommendation.

The small-cap universe presents attractive alpha[4] opportunities for investors who know where to find them, but also sizable challenges due to its broad and heterogeneous nature. Analysts can only cover a limited number of names, and the more niche nature of small-cap firms makes specialization more difficult.

4. Alpha refers to the excess return of an investment relative to a benchmark index and is a measure of performance.
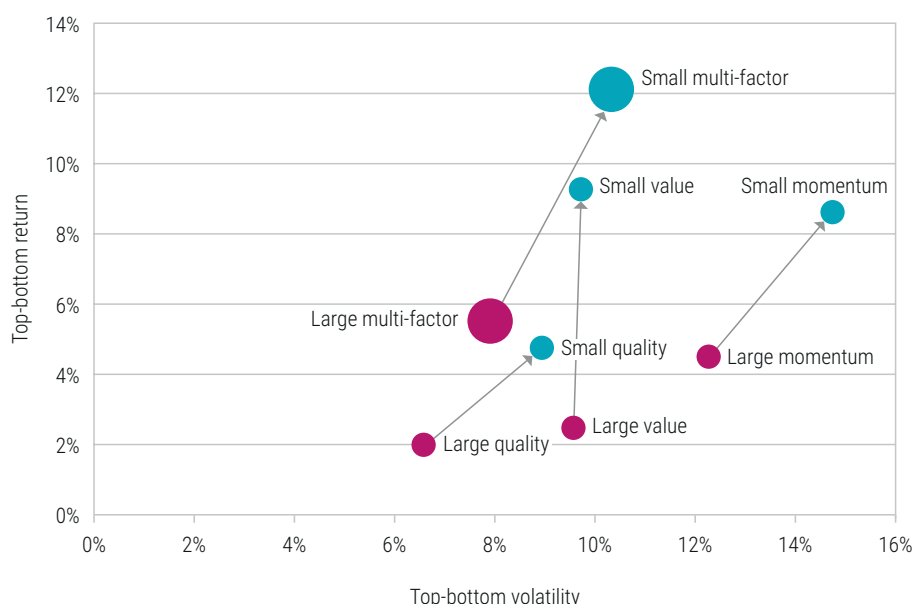
Past performance is no guarantee of future results. The value of your investments may fluctuate.

For example, on average, each small-cap stock is currently covered by about eight analysts, compared to 19 for large-cap stocks.[5] Although fundamental managers might struggle to cover the investable small-cap universe, it fits naturally into a quantitative approach, as the cost of developing a quantitative model does not increase with the investable universe's size. Conversely, quantitative strategies actually benefit from the universe's breadth, from which they can systematically exploit a broad set of opportunities.

The small-cap universe's size, diversity and complexity make it difficult for analysts and fundamental investors to cover it thoroughly. Its resulting market inefficiency and mispricing, however, can create larger opportunities to generate alpha. This greater degree of mispricing can be observed empirically, for example, by analyzing hypothetical top-minus-bottom portfolios based on well-known stock market factors such as value, momentum, and quality. Figure 2 illustrates that the annualized factor premiums and their corresponding volatilities are higher in the small-cap space than in the large-cap space.

Figure 2: Top-minus-bottom factor premiums in small-cap and large-cap space

The performance shown is hypothetical, based on theoretical models and assumptions, and is no guarantee for future results. Source: Robeco. The graph reports the annualized returns and volatilities for 'small' and 'large' cap factors. Factor returns are the return spreads between the top and bottom factor quintile portfolios. Portfolios are equal-weighted and rebalanced monthly. The investment universe consists of the constituents of the MSCI World ('large') and MSCI World Small Cap ('small') indices. The generic factors are Value (book/price, forward earnings/price), Quality (ROE, debt/assets), and Momentum (12-1 month price momentum). The composite factor is an equally weighted average of Value, Momentum, and Quality. The sample period spans from January 2000 to April 2025.

Predicting stock returns with machine learning

To model such stock market dynamics, we turn to machine learning (ML), a subcategory of AI. In this specific case, we are interested in modeling which stocks are likely to yield high returns (and thus are potential buy candidates) and vice versa. Therefore, we aim to develop a model that can predict which stocks will be 'winners' or 'losers'.

One key advantage of ML techniques is their flexibility in capturing data patterns. In a simpler, traditional approach, one would often assume that relationships are linear. However, not all real-life relationships can be linearly approximated. ML algorithms such as random forests and neural networks[6] do not impose such a strict functional form, but instead can be more freely shaped depending on the data given to the model.[7]

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5. Source: IBES.

6. A neural network is a type of ML model that learns to recognize patterns, inspired by how the human brain processes information. A random forest is a group of simple decision-making models (called decision trees) that work together to make more accurate choices than just one tree on its own.

7. For a broader view of the different applications of ML in asset management, we refer to Blitz et al. (2023) and Chen and Zhou (2023).

To illustrate how relationships in financial markets can be nonlinear, we showcase the well-known low-volatility anomaly (see also Blitz and Van Vliet (2007)). Figure 3 presents annualized returns for decile portfolios, where MSCI World Small Cap constituents are ranked from lowest to highest volatility. The relationship between volatility and returns is clearly nonlinear: while returns across low and mid-volatility portfolios are relatively similar, the portfolio with the highest-volatility stocks stands out with negative performance. This sharp drop at the high end of the volatility spectrum, in contrast to the relatively flat pattern among the lower deciles, highlights the nonlinear relationship between past volatility and future returns.

Figure 3: Nonlinear relationship between realized return and past volatility
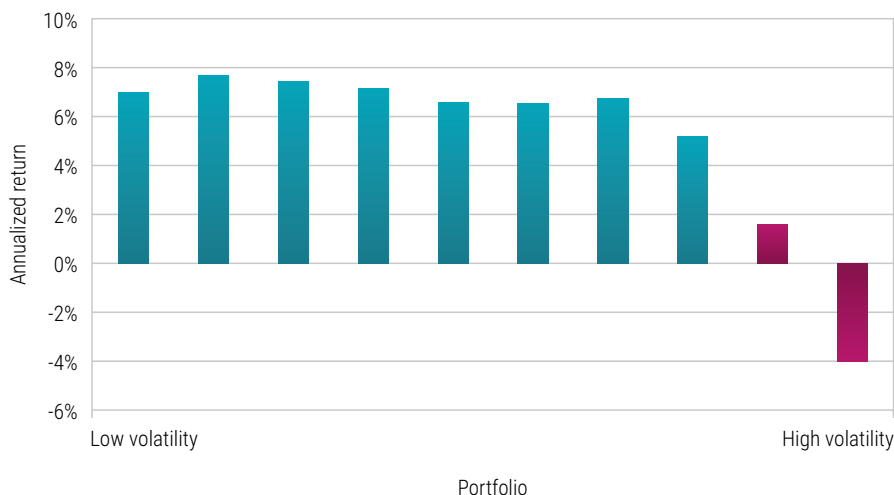
The performance shown is hypothetical, based on theoretical models and assumptions, and is no guarantee for future results. Source: Robeco. The graph shows annualized returns (in EUR) for one-month holding period decile portfolios of MSCI World Small Cap Index constituents, where stocks are ranked based on their past 36-month volatility. The sample period spans from January 2000 to April 2025.

Overfit vs. underfit

What's the 'right' amount of 'fit' in ML models? On the one hand, we don't want the model to overfit, meaning learning patterns that are specific to the training data instead of learning general patterns. For example, if we are training a model to recognize pictures of birds, we want the model to learn that birds typically have feathers, wings, beaks and can often fly (general patterns). But we do not want the model to learn that all birds are small, sit on tree branches, and are surrounded by green leaves, even if many training pictures depicted such scenes (trained patterns). This way, it may also categorize a baby monkey sitting on a tree branch, surrounded by green leaves, as a bird.

On the other hand, we also do not want the model to underfit: to miss relationships present in the data altogether. Obviously, it is not trivial to determine exactly when a model is over- or underfitting. However, many tools exist and many analyses can be done to help researchers in this assessment. The challenge of training ML models to avoid underfitting is illustrated in Figure 4 below, where the machine is tasked with separating the blue and red dots. In general, the linear line in the underfit, leftmost graph already correctly separates most dots, but some dots in the bottom right are misclassified.

The figure in the middle shows that the classification is improved a bit when allowing for a nonlinear separation. On the right, the model is overfit: all red and blue dots are now correctly grouped together, but the separating line is too specific for this data set. In general, the line on the right is not ideal to generally separate any given unseen set of blue dots and red dots.

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Figure 4: Illustration of training machine learning models
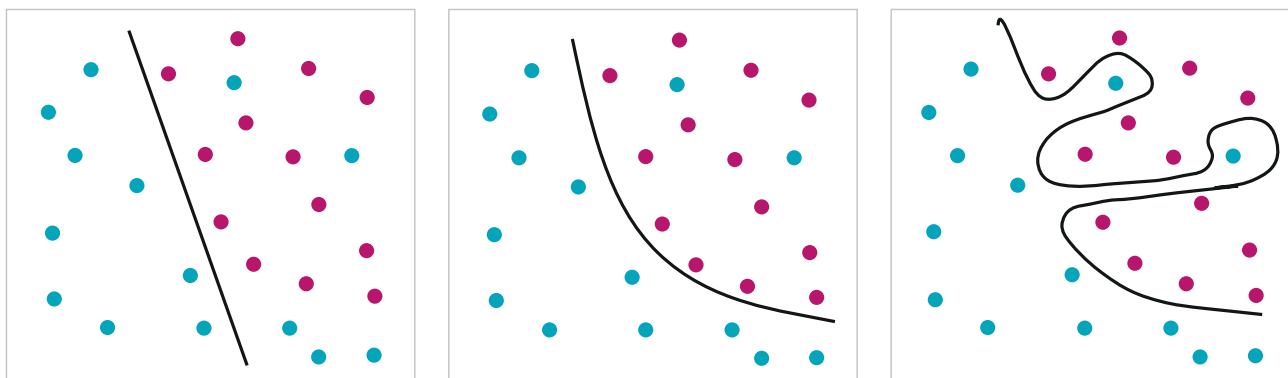
Source: Robeco, June 2025.

Performance of stock selection models

To assess the performance of ML models, we investigate whether they can accurately predict whether stocks will outperform or underperform. We conduct a historical simulation study classifying the top and bottom half of stocks' predicted returns. Then, we investigate to what extent the various models can correctly predict these two halves. If a model had no predictive power, about half of the stocks would be correctly predicted.

As illustrated in Figure 5, we find that both a generic factor model and an ML model outperform the 'no predictability' benchmark in terms of model accuracy. Furthermore, the ML model outperforms the generic value-quality-momentum factor model. Although stock-specific predictability of around 51-52% might seem low, small but consistent advantages can translate into long-term success. These stock-specific hit ratios translate into portfolio hit ratios of 68% and 78% for long-short quintile portfolios based on monthly returns, when sorted by generic and ML model predictions, respectively. These numbers highlight how even a slight improvement in predictive accuracy can lead to substantially better portfolio outcomes.[8]
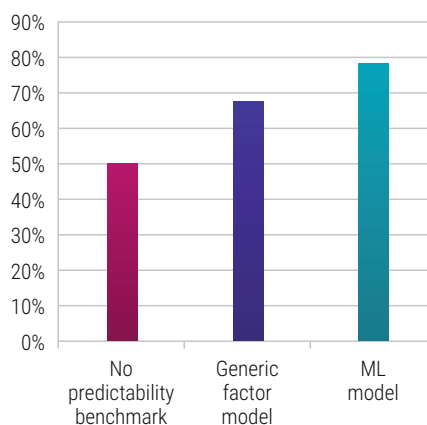
8. The performance shown is hypothetical, based on theoretical models and assumptions, and is no guarantee for future results.

Figure 5: Average percentage of stocks accurately classified
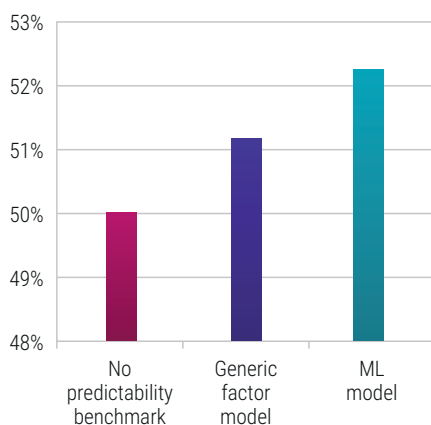
The performance shown is hypothetical, based on theoretical models and assumptions, and is no guarantee for future results. Source: Robeco. The figure on the left shows the time series' average percentage of stocks correctly classified as being in the top half or bottom half of stocks in terms of next month returns, in a historical simulation study. The figure on the right shows the hit ratio of monthly long-short quantile portfolio returns, sorted based on predicted returns. The considered universes are the constituents of the MSCI World Small Cap Index over the period December 2000 to April 2025. The generic factor model consists of generic Value (book/price and forward earnings/price), Quality (ROE and debt/assets) and Momentum (12-1m price momentum) factors.

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Understanding ML models

Understanding and interpretation are crucial in ML model selection and usage, and both simple and complex tools can assist with this process. One of the simplest metrics is correlation. Consider two ML models: the first model is trained to predict returns one week ahead, the second model one year ahead.

Because these models are given two very different objectives, we also expect them to be quite different (see also Blitz et al. (2023)). Specifically, we expect the one-week model to mostly pick up short-term dynamics. Therefore, we expect this model's predictions to be positively correlated with short-term factors, such as short-term news sentiment or short-term reversal. Conversely, the one-year model is likely much 'slower', where we expect higher correlation with known equity market anomalies such as value and quality variables.

There are also tools that dissect individual predictions.[9] These tools can break down the predictions for every individual stock into the contributions of every variable in the model. Figure 6 shows an example using an actual stock, where the model predicts a small value on average. However, for the specific stock considered, the predicted value is considerably higher, and we can attribute this difference to stock-specific characteristics. In this particular example, we identify six characteristics with a pronounced positive impact on the prediction, while one characteristic has a pronounced negative impact. Furthermore, the remaining characteristics also have a positive impact, resulting in a higher-than-average predicted value for this particular stock.

9. For more details on the explainability of machine learning models, their predictions, and their performance, we refer to Hoogteijling, Roersma, and Hanauer (2025).

Figure 6: Real example of the breakdown of an individual ML prediction
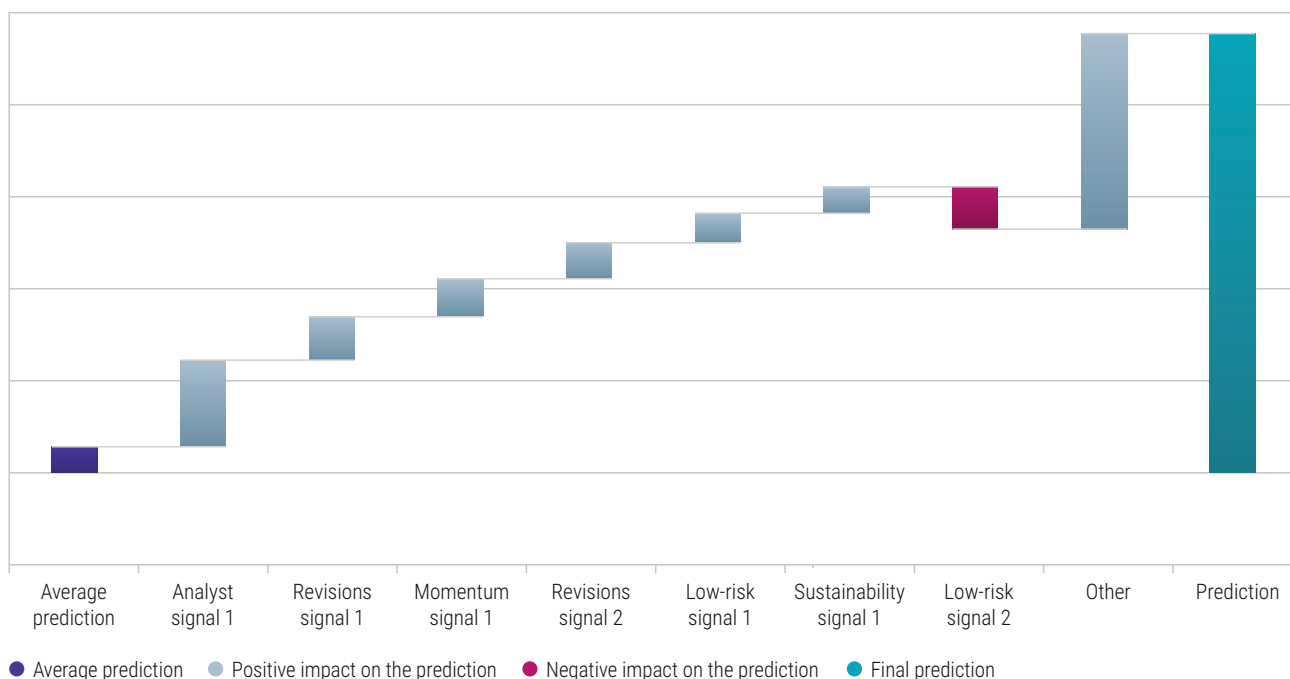
● Average prediction   ● Positive impact on the prediction   ● Negative impact on the prediction   ● Final prediction

The performance shown is hypothetical, based on theoretical models and assumptions, and is no guarantee for future results. Source: Robeco. This figure presents a real-world example illustrating the breakdown of a machine learning model prediction for a specific stock. It starts on the left with the average prediction of the machine learning model. In grey, it shows signals that have a positive impact on the prediction for this specific stock. In red, it shows signals that have a negative impact on the prediction for this stock. The final prediction is shown in blue.

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Conclusion

In recent years, AI has moved from the realm of buzzwords and science fiction to everyday use with the advent of large language models. With this change, a wide array of claims have emerged, ranging from frustrating interactions with AI chatbots to promises that AI will make all economic analysis irrelevant. As with most things, the truth lies somewhere in between. In this piece, we demonstrate that allowing for non-linearities and interactions, machine learning as a subcategory of AI can be a powerful tool for quantitative investors.

This holds particularly true for small-cap equities, a market segment characterized by substantial breadth and less investor attention, making it fertile ground for machine learning techniques. However, as with all powerful tools, in the hands of an unskilled practitioner, they can be hazardous. With a focus on explainability, interpretation, and robustness, Robeco has been researching AI/ML techniques for several years. Moreover, a wide variety of AI/ML signals have already been integrated into Robeco's quantitative strategies, both within existing strategies and as a cornerstone for our next-generation quant strategies. ●

What to do when safe havens turn into stormy waters?

A safe-haven asset is a type of investment that can retain or even gain value during market turbulence or downturns and is a good store of value in the long run. Safe-haven assets are easy to sell and widely accepted in financial transactions and trade, even during crisis periods. This requires them to be relatively insensitive to new information about whatever is causing the panic. In the long run, safe-haven assets keep their value in real terms, for example to facilitate postponing consumption to the future.

Government debt has long been seen as a natural safe haven. However, at certain times, market participants have begun to question governments' willingness or ability to pay back bondholders without causing high or hyperinflation, which reduces the safe-haven status of government debt.[1] At other times, central bank policies keep interest rates below inflation, reducing their long-term store of value.

1. See Nigro (2020) for a discussion on the time-varying characteristics of safe-haven asset classes.

To investigate government debt's safe-haven status, we set the scene by showing the historical performance of US Treasuries in equity market drawdowns. We then analyze the market reaction to the Liberation Day tariff announcement on 2 April and compare how other developed market government bonds performed. Next, we continue analyzing to what extent other asset classes (such as other bonds, equities, real estate, gold, fiat- and cryptocurrencies) can be safe havens. Finally, we draw conclusions from our analysis regarding our future outlook of government debt's continued status as a safe haven.

Government debt: Risky regime change

Several episodes in the past three years have cast doubts on the safe-haven status of developed market government bonds. The Covid pandemic prompted governments globally to take unprecedented fiscal measures to counter the economic impact of lockdowns, causing deficits and government debt levels to reach new highs, raising concerns on debt sustainability.

The role of government bonds as a hedge against equity market volatility was further challenged in 2022. Then, it posted large negative returns during that year's equity drawdown, offering little diversification benefits. The UK Gilt market experienced its own crisis in September 2022 when the government of Liz Truss updated her budget plans, triggering an LDI-driven sell-off. The event led to her resignation. More recently, French government bonds came under pressure after President Macron called for snap elections in June 2024. This surprised bond markets and caused French bonds (OATs) to widen significantly versus German Bunds.

The eroding safe-haven status of US Treasuries

To assess whether the safe-haven status of US Treasuries has truly been compromised, we begin by compiling an overview of historical equity corrections exceeding 15% over the past 60 years.[2] We then analyze the performance of 10-year Treasuries during these corrections. Figure 1 illustrates a total return of approximately 2.5% during the nearly 20% correction in the S&P 500 that began in February of this year and ended on 9 April.

This 2.5% return stands in stark contrast to the high returns seen after the dotcom bust (2000/2001) and the Global Financial Crisis (2008/2009), when the Federal Reserve significantly lowered short-term interest rates. However, it is notably better than the -16.7% return in 2022, when the Fed aggressively raised rates in response to high inflation, and better than the returns during the 1960s and 1970s, when high or rapidly rising inflation caused similar issues.

2. A stock market decline of 15% is often called a correction. The period is chosen because that is the maximum for which we have daily data.

Figure 1: Performance 10-year Treasuries during S&P 500 corrections of at least 15%
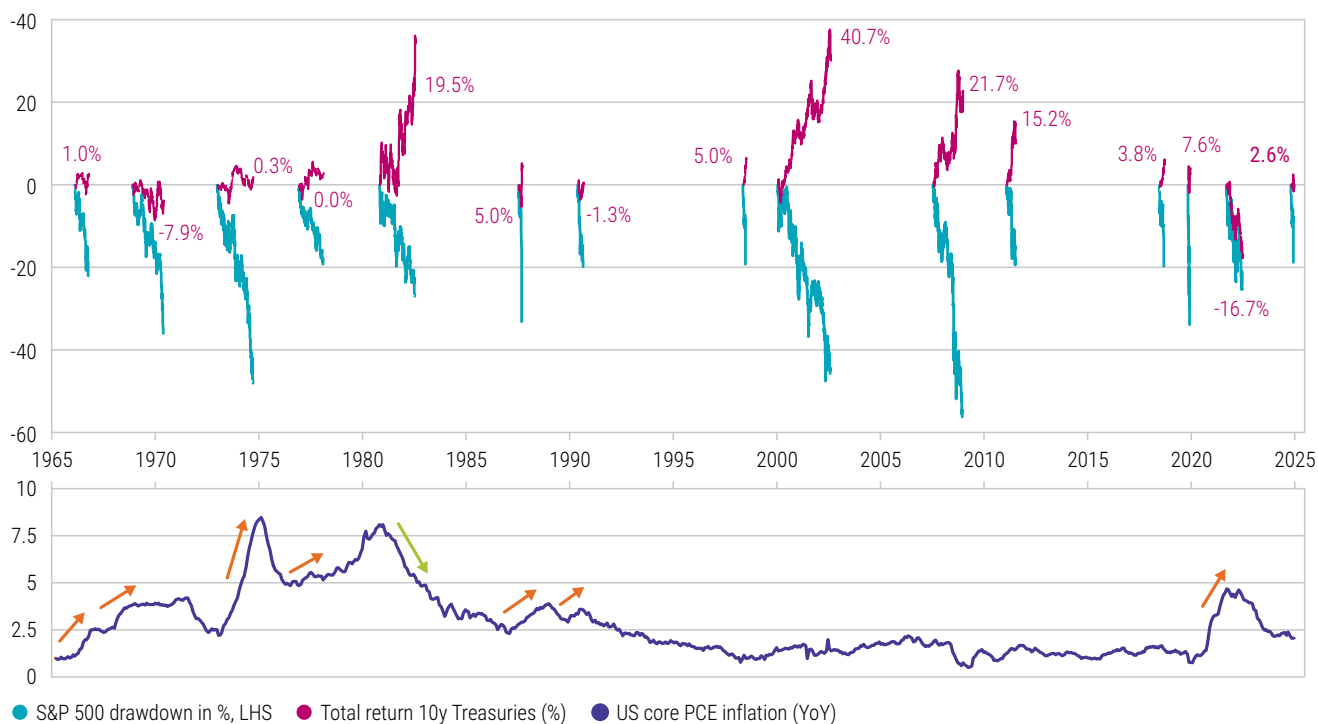
● S&P 500 drawdown in %, LHS   ● Total return 10y Treasuries (%)   ● US core PCE inflation (YoY)

Past performance is no guarantee for future returns. The value of your investment may fluctuate. Source: Robeco, June 2025
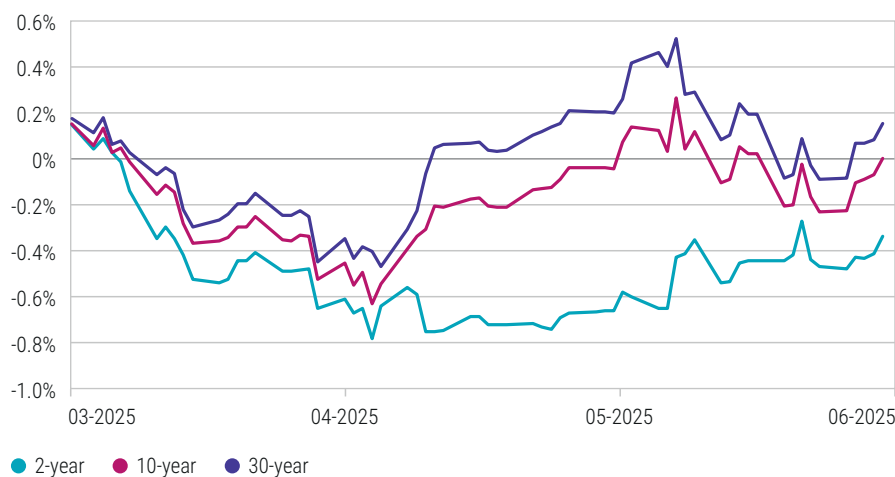
Past performance is no guarantee of future results. The value of your investments may fluctuate.

At first glance, 10-year Treasuries thus appear to have fulfilled their expected role: preserving capital or delivering a positive return during a significant equity market downturn. However, a closer look at the panic phase of the correction – late March to mid-April 2025 – reveals a different picture. During this period, 10- and 30-year bonds failed to perform their safe-haven function. In fact, the correlation between equity and bond returns turned from negative to positive. Interestingly, the equity/bond correlation for 2-year Treasuries remained negative (see Figure 2), indicating that short-term bonds continued to act as safe havens. This is somewhat surprising, given that the trade tariffs announced in early April – though temporarily inflationary – would have been expected to impact shorter maturities more severely.

The second step in our analysis was to examine whether government bonds in other markets also lost their safe-haven status in April. The findings show that while some did like the UK, others – particularly Germany and the Scandinavian countries – continued to function effectively as safe havens.

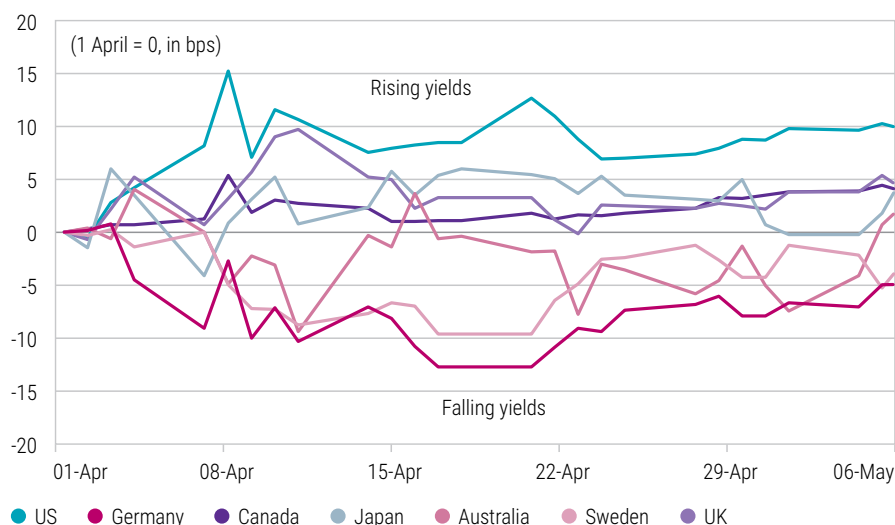**Figure 2: Correlation between US Treasuries and US equity markets**

Rolling 20-day equity/UST return correlation

● 2-year   ● 10-year   ● 30-year

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: Robeco, June 2025.

Figure 3: Difference between 10-year bonds and interest rate swap yield

● US   ● Germany   ● Canada   ● Japan   ● Australia   ● Sweden   ● UK

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: Robeco, June 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.
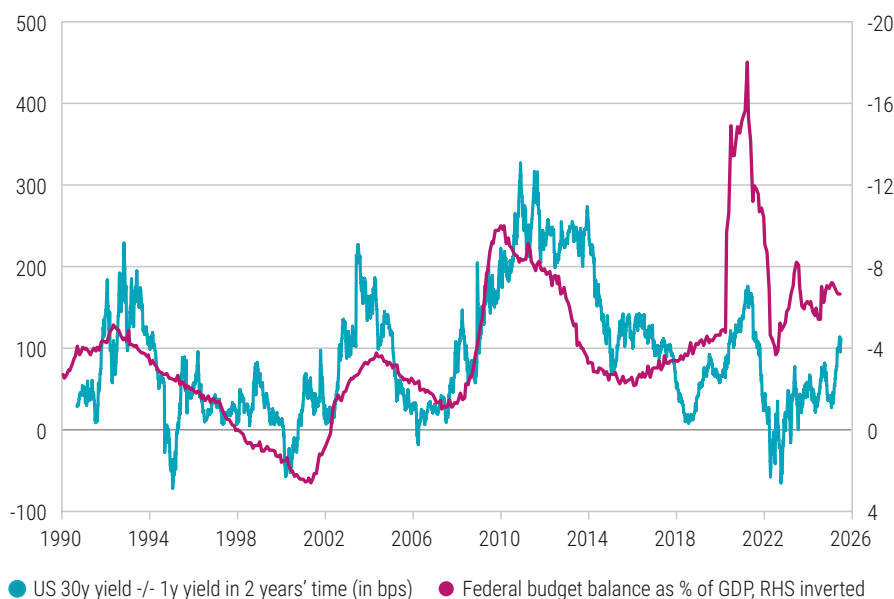
This is evident from the bond/equity correlations in Germany, which, like US 2-year Treasuries, remained negative. It is also reflected in the movement of yields relative to swap rates in those markets. As shown in Figure 3, 10-year government bond yields in the US, UK, and Japan rose relative to local swap rates of the same maturity, while yields in Germany declined. A plausible explanation is that concerns over unsustainable public finances are not present in Germany.

Our analysis reveals that long-term US Treasuries' safe-haven status ultimately depends on two factors. First, is the US Congress or government willing to address large, pro-cyclical budget deficits? Currently, there is little indication of this. According to the Congressional Budget Office's (CBO) latest projections based on current legislative proposals, federal budget deficits are expected to remain high – around 6% of GDP – in the coming years.

Second, it depends on the level of risk compensation embedded in long-term US Treasuries; ultimately, everything has a price. The so-called term premium[3] on long-term bonds rose significantly in April, as also evidenced by the performance of Treasuries versus swaps. However, the increase is not yet sufficient. Based on the historical relationship between deficits and the term premium (see Figure 4), we believe that only a further rise of at least 50 basis points would provide adequate compensation for fiscal risk, making long-term bonds attractive relative to short-term ones. We do not rule out the possibility that this repricing, potentially abrupt, could become a source of equity market volatility.

3. We use a simple methodology here; alternative more technical estimates, such as those from the NY Fed, show a similar trend.

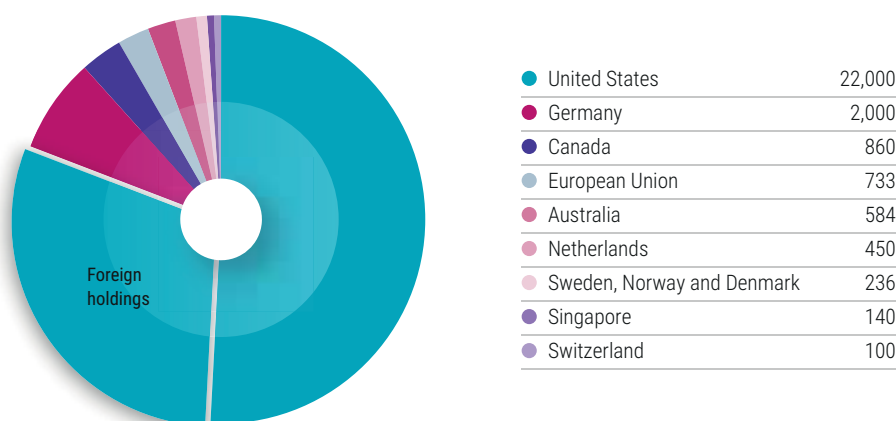**Figure 4: The US term spread and federal budget balance**

● US 30y yield -/- 1y yield in 2 years' time (in bps)   ● Federal budget balance as % of GDP, RHS inverted

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: Robeco, June 2025.

All you need is Europe

If the international community decided to exit its investments in US Treasuries and redirect toward other high-rated government bonds, it would immediately face a practical issue. The roughly USD 5 trillion of outstanding global AAA-rated government bonds simply is not large enough to accommodate such a reallocation; see Figure 5. Let alone the idea that all existing investors in these bonds would happily step aside to make room for the newcomers. The scarcity of AAA alternatives will probably invite bond investors to look more broadly.

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Figure 5: Outstanding AAA-rated government bonds

● United States	22,000
● Germany	2,000
● Canada	860
● European Union	733
● Australia	584
● Netherlands	450
● Sweden, Norway and Denmark	236
● Singapore	140
● Switzerland	100

Source: Robeco, June 2025.

Fortunately, regime changes are occurring beyond just the US Treasuries market. Within the Eurozone, spread volatility of government bonds versus German Bunds has come down since 2021. The decline in spread volatility has continued post-July 2023, so in an environment where the ECB has been reducing its government bond holdings. For most markets it also returned quickly after the shock of French snap elections in June 2024. This suggests that there is an inherent trend of diminishing spread volatility, with French OATs being a notable exception; see Figure 6.

Figure 6: Maximum weekly spread widenings versus 10-year Bunds since 2024 (%)
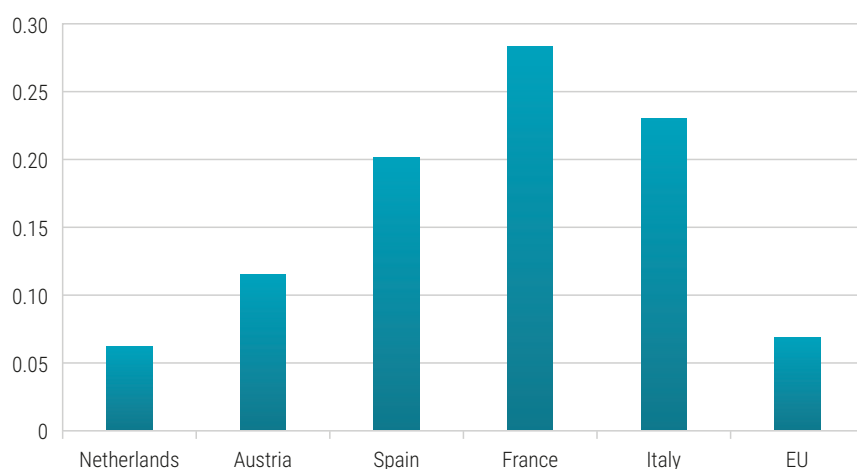
Source: Robeco, June 2025.

For now, the observed maximum weekly spread widening versus Bunds still exceeds 10 bps for most European government bond markets. This suggests many of these markets become safe havens but haven't arrived yet. Dutch State Loans (DSLs) may be very close, though, as their spreads hardly widened even during June 2024. EU bonds are interesting as well, rated A/AA+/AAA just like German Bunds and DSLs. While large issuance programs in this market are relatively new, the spread volatility in EU bonds has been modest. This newcomer might be another genuine candidate for the safe-haven group.

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Can other asset classes be reliable safe havens?

Table 1 shows when the returns of commodities, gold and fiat currencies have tended to be positive during equity drawdowns in excess of 15% in the past 50 years. This suggests some safe-haven potential, but how much of it is reliable?

Table 1: Asset class returns during equity market corrections

Start	End	S&P 500	Treasuries	Corporate bonds	Defensive equities	Real estate	Gold	Commodities	Bitcoin	USD	JPY	EUR
19-02-2025	08-04-2025	-18.9%	2.6%	-1.2%	-8.9%	-12.6%	2.5%	-11.4%	-21.1%	-3.9%	-2.7%	4.7%
03-01-2022	12-10-2022	-25.4%	-16.7%	-20.9%	-18.2%	-32.5%	-7.3%	29.1%	-58.7%	17.8%	27.4%	-14.1%
19-02-2020	23-03-2020	-33.9%	7.6%	-12.5%	-33.0%	-41.2%	-3.9%	-35.3%	-32.3%	2.8%	0.4%	-0.3%
01-10-2018	25-12-2018	-19.6%	3.8%	-1.1%	-12.7%	-9.5%	6.5%	-25.9%	-42.5%	1.3%	-3.0%	-1.5%
29-04-2011	04-10-2011	-17.6%	15.2%	0.9%	-11.1%	-18.7%	6.0%	-24.1%		9.1%	-5.5%	-10.5%
09-10-2007	06-03-2009	-56.3%	21.7%	-10.1%	-56.9%	-72.2%	27.7%	-48.0%		12.8%	-16.4%	-10.1%
24-03-2000	09-10-2002	-49.1%	40.7%	8.7%	6.3%	8.5%	12.0%	12.2%		2.1%	15.5%	1.6%
17-07-1998	31-08-1998	-19.3%	5.0%	-0.3%	-16.6%	-16.4%	-6.4%	-10.1%		-0,4%	1.1%	1.4%
10-07-1990	11-10-1990	-17.1%	-0.2%	-1.9%	-12.9%	-16.6%	10.1%	55.1%		-7.6%	-12.6%	0.9%
25-08-1987	19-10-1987	-33.2%	-5.0%	-4.9%	-22.1%	-4.3%	5.1%	6.2%		-2.6%	-1.3%	-0.3%
28-11-1980	12-08-1982	-27.1%	19.2%	-3.1%	4.5%	-13.4%	-46.1%	-19.5%		34.8%	21.5%	-0.5%
28-12-1976	28-02-1978	-18.5%	0.0%	-3.4%	-9.0%	18.1%	37.2%	15.5%		-9.6%	-19.4%	0.2%

Past performance is no guarantee for future returns. The value of your investment may fluctuate. Source: Robeco, LSEG Datastream, 2025.

Other bond types

When government debt becomes risky, could corporate bonds take over their role as a safe haven? High-rated corporate bonds can sometimes have lower interest rates than government bonds but are not reliable safe havens. This is caused by their small volume and sensitivity to changes in credit risk, which is in turn due to a changing macroeconomic landscape. Their liquidity tends to dry up during crisis periods, and given their nominal nature, they may not be good stores of long-term value during times of financial repression. Table 1 shows that investment grade corporate bonds perform in between government bonds and equities during equity corrections and are therefore not good safe havens.

Nominal debt is exposed to inflation risk, making it less ideal for long-term value storage. Inflation-linked bonds protect against inflation but tend to become less liquid during crises due to limited supply, clientele effects, and investor habits. However, inflation-linked bonds are a relatively new asset class, and future scenarios with increased inflation risk may increase their safe-haven status, especially due to their long-term store of real value. Emerging market governments are generally less indebted than developed governments, but their debt is typically considered riskier due to institutional weaknesses and reduced liquidity during stress periods.

Equities

Safe havens are typically defined relative to equity market crashes. While this is often justified, as adverse economic conditions such as stagflation often coincide with equity bear markets, it is not the ultimate criterion. For example, during changes of the political system, wars, or hyperinflation periods, owning companies was a safer investment because they did not default when government debt became (virtually) worthless.

It is not easy to say which companies will survive in such dramatic circumstances, but ex-ante, defensive stocks seem the most likely. Companies that supply essential goods such as food, utilities, and healthcare are examples. In addition, companies with lower

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risk, for example measured by the volatility of their stock prices, outperform the equity market during economic downturns.[4]

While unlikely to preserve short-term value in most crisis situations, defensive stocks are relative safe havens within the equity market, and in some extreme cases even a safe haven compared to government debt. Table 1 illustrates that defensive equities indeed outperform the general equity market during large drawdowns most of the time, and on average more than 10%. Although risky in the short run, defensive equities are less prone to long-term real value erosion than government debt or cash, especially during periods of financial repression with interest rates below inflation rates. In such cases, they may be a better store of value than conventional safe assets like government debt.

Gold
Gold has historically been used as a foundation for paper currency systems due to its rarity, durability, and ease of transaction. It has maintained its value over millennia, with an ancient Roman soldier's wage paid in gold being comparable to that of a modern US soldier.[5] Banks recognize gold as Tier 1 capital under Basel regulations. However, gold can be stolen and does not generate income, incurring storage costs instead. Its value can also decline during crises with stock market-like volatility.[6] Investors turn to gold during global financial instability or the prospect of other severe disasters. Table 1 shows that for example during the Global Financial Crisis gold outperformed all other asset classes. Table 1 also shows that commodities, which are dominated by energy commodities, tend to perform well during crash periods with high inflation, such as the 2022 equity market drawdown.

Cryptocurrencies
Bitcoin, sometimes called 'digital gold', shares many characteristics with gold but lacks a physical presence and a long history as a reliable store of value. Despite its monetary value, bitcoin's lack of intrinsic value could make it worthless if confidence drops, while gold's industrial use supports a non-zero price. Critics argue that bitcoin's high volatility and imperfect inflation correlation undermine its store-of-value potential, but the same can be said about physical gold, hinting at possible potential for bitcoin. At this moment, however, the high energy use is certainly a disadvantage for sustainability-minded investors. Table 1 reveals that during the four equity market drawdowns since the introduction of bitcoin, it has performed poorly, and therefore cannot, or at least not yet, be seen as a short-term safe asset.

Fiat currencies
Traditional currency markets have offered more credible safe assets. Table 1 outlines that the US dollar and Japanese yen perform well during equity drawdowns. Since its introduction, the euro has not been such a good safe haven as the other two currencies, but it outperformed in the last drawdown caused by the Trump tariffs. Are we starting to see shifting tectonic plates on the currency front? A stealth erosion of international USD reserve holdings has already been ongoing for the last decade.

Summary
In conclusion, the status of government debt as a safe-haven asset has come under scrutiny, encouraging multi-asset investors to reassess which asset classes fall under this category. While historically seen as a reliable store of value, recent events have highlighted vulnerabilities, particularly in long-term US Treasuries, which have recently become less safe than German Bunds.

Investors who are not able to predict the nature of the next crisis may need to take a diversified approach toward safe-haven assets. Since US Treasuries have gone from safe haven to stormy waters, German Bunds, defensive equities, gold, commodities, and fiat currencies may offer better protection during the next episode of market turbulence. ●

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4. See Van Vliet and Lohre (2024) for a more detailed analysis on the combination of defensive low volatility stocks and gold.

5. Source: Erb and Harvey (2013).

6. See Baur and McDermott (2016) for a more detailed discussion on gold as a safe-haven asset.

A liquid alternative to private equity investments

Over the past ten years, global private equity assets under management increased more than fourfold, from a total of USD 2 trillion in 2014 to above USD 9 trillion halfway around 2024.[1] An average large US pension fund now invests about 14% of its assets into private market vehicles.[2] Following the successful and widely popularized 'Yale model', university endowments even invest on average a staggering 29% of their assets into venture capital, buyout, and private real estate.[3]

But what is driving this increased interest in an asset class traditionally known to be expensive and illiquid? Is its revival bound to last? And how does Robeco cater to that demand? In this special topic, we look at the different types of private equity funds, their advantages and challenges for investors with longer investment horizons, and explore Robeco's research into a potential liquid alternative that captures the benefits of private equity without the disadvantages. We conclude that private equity returns can be largely captured via investing in public equities, significantly improving liquidity and lowering costs, while integrating sustainability objectives.

1. See McKinsey (2025) for more details.

2. See Wall Street Journal (2024).

3. See TIAA-NACUBO (2020) Study of Endowments Report.

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Main types of private equity funds

Leveraged buyouts (LBOs) and venture capital are the two main types of private capital equity strategies. The relatively largest of the three, LBOs, are acquisitions which are financed with borrowed funds, and the acquired firm's assets serve as collateral to these debts. Buyout funds tend to acquire smaller firms at attractive valuations which are often highly levered and struggling profitability-wise.[4] Net share issues are typically lower for these firms and might even be buying back their own shares.

Venture capital is investments which seek to provide funding to promising start-ups in return for equity stakes. These investments are typically tilted toward younger firms, with high revenue growth and low profitability – often due to high R&D expenditures – at much higher valuations.[5]

Private market investors are mainly characterized by their involvement with management. In buyouts and venture capital, managers hold relatively large ownership stakes which align their interests with that of shareholders. Moreover, private equity investors hold close ties with managers, helping them in monitoring and advisory roles. In contrast, ownership is fragmented in public firms, with a controlling shareholder only rarely on board and managers holding only relatively minor ownership stakes. When corporate governance mechanisms are undermined, investors ultimately lose out. The agency costs that occur from managers sub-optimally serving investor interest can manifest in the form of corporate entrenchment,[6] excessive pay or 'perks', empire building, and other expropriation of shareholders' wealth. Such agency costs can be reduced with strong active ownership policies.

The added value of private equity

Private market vehicles offer several attractive investment propositions, the main advantage being of course higher returns. Private equity has delivered returns of around 15%[7] annualized since 1991. This is a return premium of approximately 6% relative to public markets, as measured by MSCI World. Ang et al. (2014) decompose private equity returns into a passive component that tracks public equity returns and an 'active' component that is the result of PE outperformance. They document the highest private equity premium for the late 1990s. The buyout premium peaked in 1996 and in 2006 at about 8% annually, while the venture capital premium was highest at 25% annually just before the eruption of the dotcom bubble in 2000.

Besides high returns, private equity also offers significant diversification benefits. Due to its strategic use of leverage, barriers to entry, and potential for corporate restructures and operational improvements, returns might be less correlated to other asset classes. Furthermore, as mentioned earlier, in contrast to public market investors, private equity firms often hold controlling stakes in the firms in which they invest, providing them with the freedom to appoint executives and board members, engage in M&A strategies, and undertake corporate restructurings.

Challenges to consider

Traditionally, private equity strategies come with their own set of challenges, especially when large asset owners target significant allocations. One of the main challenges with private equity investments is how to cope with the so-called 'dry powder'. This is the uninvested capital in anticipation of new deals. Capital committed to private equity investment is only partially deployed in stages as investment opportunities arise. Hence, GPs oftentimes leave 'dry powder' available in the form of capital committed to private equity funds but not yet deployed in investments. Private equity investors have to pay management fees on this capital without it being actively used in the process of providing returns.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

4. See Stafford (2020).

5. See Cochrane (2005).

6. See Schleifer and Vishny (1989).

7. Source: Robeco, based on MSCI Burgiss data quarterly private equity returns in USD, Developed Markets. Sample period is Q1 1991-Q3 2024.

Another disadvantage of private equity vehicles is their relatively high prices. The management fee is typically close to 2% and is charged on all committed capital. It acts as a compensation from the limited partner to the general partner for the effort of sourcing deals. The carried interest (or 'carry') is a performance-based fee charged over the 'profits' of an investment that oversteps a hurdle rate of typically 8%. Most PE funds charge a carry of 20%.

Investing in private firms may offer a significant premium over public markets but often comes with liquidity challenges. Selling such investments typically requires a carefully prepared exit strategy, such as an initial public offering (IPO) or sale to another private buyer. Both approaches require significant time and effort and might come with high variation in the exit price. This is measured as high liquidity costs and affects investors negatively. Finally, even though private markets might be an excellent platform to make impact, high-quality sustainability data is often missing. This makes tracking the overall portfolio level sustainability progress a daunting task to investors with specific sustainability targets.

Can public markets replicate private equity returns?

A vast academic literature discusses whether private equity returns stand out from their public counterparts, and which characteristics define these returns. A common benchmarking approach is to construct a public equity portfolio that reflects similar risk exposure as private equity returns, and to then evaluate private equity returns against the public market equivalent (PME), as pioneered by Kaplan and Shoar (2005). Returns of buyout funds are characterized by relatively large exposures to market returns (high beta), mixed exposures to size factors, and positive exposure to the Fama-French value factor.[8] For example, Ang et al. (2014) conduct a review of this literature and report average market, size, and value betas. Venture capital exhibits even higher market exposure, negative size tilts, and a strong growth tilt. Targeting these factor exposures within a public equity strategy oftentimes leads to returns close to those of private equity funds.

8. See Driessen, Lin, and Phalippou (2012).

Figure 1: Exposures of private equity
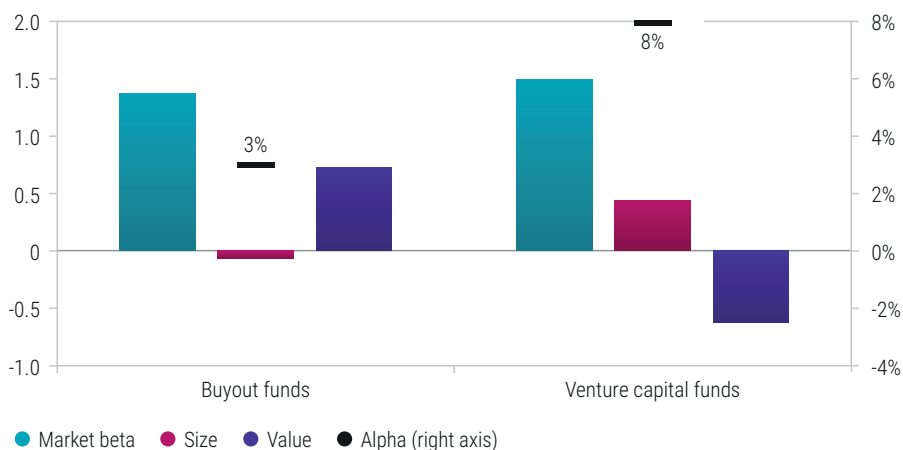
● Market beta   ● Size   ● Value   ● Alpha (right axis)

Past performance is no guarantee for future returns. The value of your investment may fluctuate.
Source: Robeco (June 2025), Ang et al (2014)

Figure 1 shows that even after controlling for factor exposures, the remaining alpha[9] of private equity strategies is around 3% for buyout funds and 8% for venture capital funds. Such a factor attribution is a powerful tool in explaining the variation in returns, however falls short in capturing the source of private equity premium, driven by the distinct features (such as management involvement) of private firms when compared to their public counterparts.

9. Alpha refers to the excess return of an investment relative to a benchmark index and is a measure of performance.
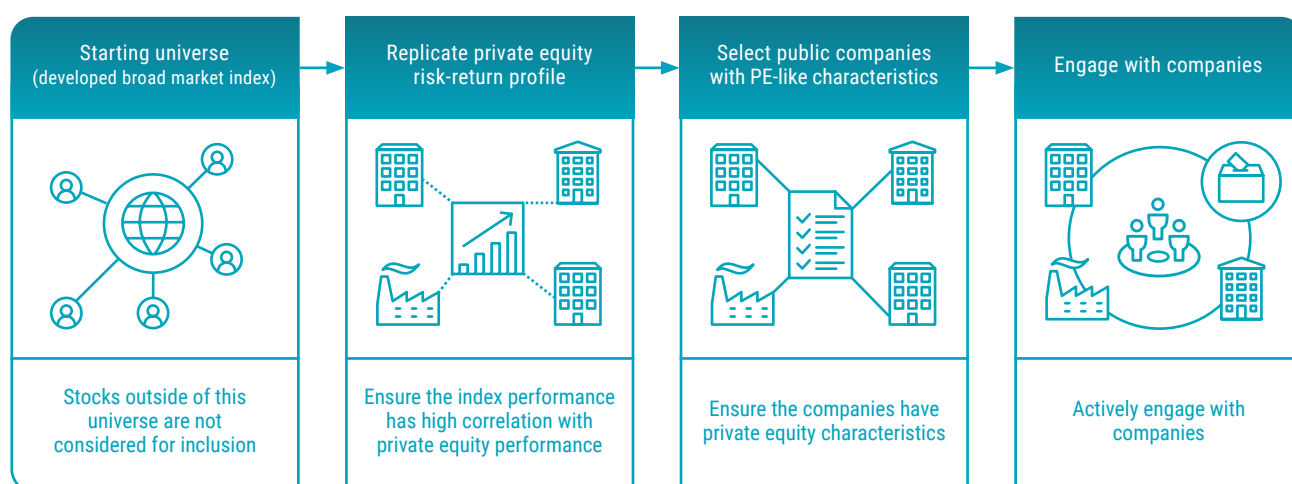
Past performance is no guarantee of future results. The value of your investments may fluctuate.

Robeco's liquid alternative to private equity investments

With a strong background in systematic strategies and a leading active ownership team, Robeco is well positioned to provide compelling alternatives to private equity returns. The process begins with a broad investment universe of more than 10,000 public companies, which is refined using a liquidity screen to minimize high trading costs. In the next step, Robeco applies its factor expertise by selecting companies that resemble private equity targets. For instance, we select companies with high leverage and share buy-backs in our buyout strategy and high earnings growth and R&D expenditures in our venture capital strategy.

After company selection, Robeco uses portfolio construction techniques to assign specific weights to each company and optimize the portfolio so it mimics the high-level exposures of private equity funds, such as a high value tilt for buyouts and a high growth tilt for venture capital. The strategy also incorporates proprietary voting and engagement data to select public companies with aligned and engaged shareholders while further improving their governance and sustainability profiles. Finally, Robeco leverages the wide availability of sustainability data to overlay climate and sustainability metrics as an additional added value.
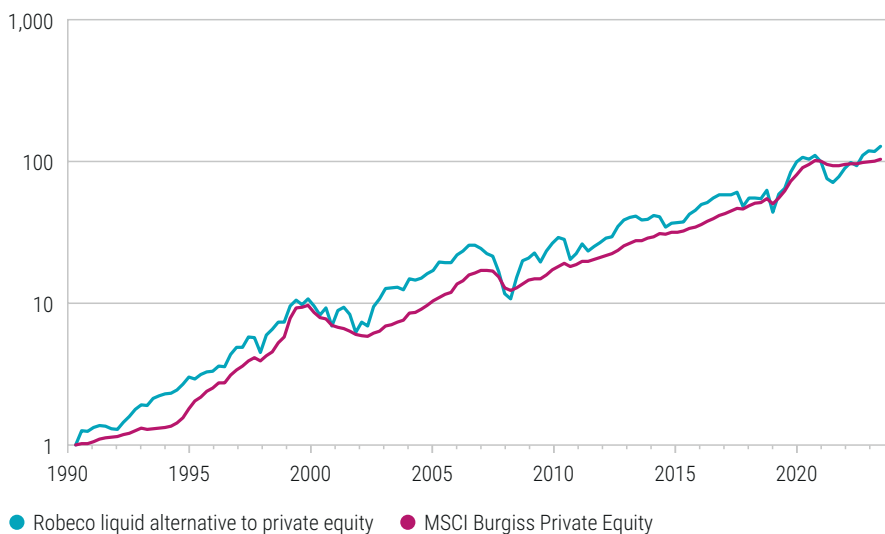
Figure 2: Robeco's investment process

Starting universe (developed broad market index)	Replicate private equity risk-return profile	Select public companies with PE-like characteristics	Engage with companies
Stocks outside of this universe are not considered for inclusion	Ensure the index performance has high correlation with private equity performance	Ensure the companies have private equity characteristics	Actively engage with companies

Source: Robeco, June 2025.

Figure 3 below shows the simulated performance of Robeco's strategy compared to the MSCI Burgiss benchmark. The index combines a 70% weight in a replicating strategy for buyout funds with a 30% weight in a replicating strategy for venture capital funds, which approximately reflects the relative weighting of both categories in the benchmark index. The figure shows that both over long-term and intermediate time periods, the strategy is successfully able to keep up with a private markets benchmark. It also shows that while long-term return performance between the benchmark and the replicating strategy is on par, the shorter-term returns of the benchmark appear much smoother. This is a known feature of reported private equity returns, and arises due to the infrequent reporting of net asset values.[10] Brown et al. (2023) investigate a novel approach to 'unsmooth' private equity returns, and document annual volatilities much closer to those observed in Robeco's replicating strategy.

10. Brown, Ghysels, and Gredil (2023) "Nowcasting Net Asset Values: The Case of Private Equity". *The Review of Financial Studies*.
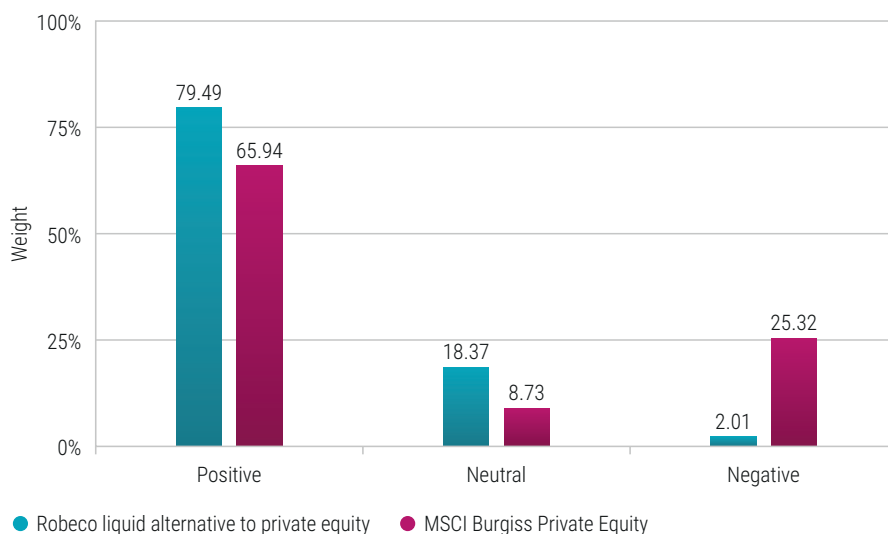
Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 3: Cumulative returns in portfolio simulations

● Robeco liquid alternative to private equity   ● MSCI Burgiss Private Equity

Simulated past performance is no guarantee of future results. For illustration purposes only.
Source: Robeco, based on portfolio simulation, cumulative return in USD, gross dividends reinvested,
Developed markets, Q1 1991-Q3 2024, logarithmic scale. MSCI Burgiss returns are based on MSCI Global
Private Equity Closed-End Fund Index (Unfrozen; USD). The performance shown is based on a simulated
and hypothetical (back-tested) data and may suffer from the benefit of hindsight. Although Robeco is
prudent in its assumptions for simulations, no representation is made that the index will achieve results
similar to those shown and actual performance results may deviate significantly.

Figures 4 and 5 illustrate the sustainability integration within the private equity liquid
alternative strategy. Due to the large investment pool of eligible companies and availability
of high-quality sustainability data, such as Robeco SDG scores[11], the final portfolio can
benefit from a significant sustainability filter next to meeting all other private equity
replication objectives. The simulated Robeco liquid private equity alternative strategy
significantly underweights companies with negative SDG alignment while overweighting
positively scored ones as seen in the figure. Most of the top five sustainability holdings
score well on innovation which aligns well with both the sustainability and the underlying
private equity characteristics, especially regarding venture capital.

11. Robeco's proprietary SDG Framework
assesses the contributions that a
company can make to one or more of the
17 Sustainable Development Goals. Such
contributions are then scored from -3
(highly negative) through 0 (neutral) to +3
(highly positive). Companies will negative
scores are then often excluded from
sustainably orientated portfolios (apart
from those using engagement) while those
with positive scores can be included.

Figure 4: Corporate SDG impact alignment

● Robeco liquid alternative to private equity   ● MSCI Burgiss Private Equity

Source: Robeco, ESGenius, June 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 5: Corporate SDG impact alignment with the top five SDG holdings

Holding	Portfolio weight	Total SDG score	Individual SDG score	Impact area
Nvidia Corp.	6.35%	⯅⯅	08. Decent work and economic growth 09. Industry, innovation and infrastructure	Sustainable society Sustainable society
United Rentals Inc	1.67%	⯅	09. Industry, innovation and infrastructure	Sustainable society
Apple Inc	3.20%	△	08. Decent work and economic growth 09. Industry, innovation and infrastructure	Sustainable society Sustainable society
Cadence Design Systems Inc	1.00%	⯅⯅⯅	08. Decent work and economic growth 09. Industry, innovation and infrastructure	Sustainable society Sustainable society
Novo Nordisk A/S	1.51%	⯅⯅	03. Good health and well-being	Basic needs

Source: Robeco, ESGenius, June 2025. The companies/securities shown on this slide are for illustrative purposes only in order to demonstrate the investment strategy on the date stated. The companies/securities are not necessarily held by a strategy/fund nor is future inclusion guaranteed. No inference can be made on the future development of the company. This is not a buy, sell, or hold recommendation.

Finally, Figure 6 displays how we engage with the companies in the portfolio and help management in improving strategic objectives. This active ownership feature ensures that despite investing in public companies, management and shareholders maintain close ties, approximating the dynamics within the private equity space. Robeco's discussions with the management cover a wide range of themes, such as sustainability, human resources, and corporate governance.

Robeco focuses its engagement efforts based on an analysis of financial materiality. Robeco selects one to two new engagement themes every year, and for any given engagement theme, a number of companies are selected that have the most exposure to the engagement topic. These companies are not necessarily part of this portfolio and the impact of engagement is limited on fund level. Information with regard to Robeco's Stewardship approach and guidelines can be found at https://www.robeco.com/files//docm/docu-stewardship-approach-and-guidelines.pdf.

Figure 6: Engagement with companies in the simulated Robeco liquid private equity alternative strategy, engagement progress per theme

Theme	# companies	Progress
Biodiversity	3	→ ✓ ↗
Climate and nature transition of financial institutions	3	↗
Natural resource managment	2	→ ↗
Nature Action 100	1	↗
Net-zero carbon emissions	5	→ ↗
Human capital management	1	↗
Sound social management	1	✓
Corporate governance standards in Asia	1	↗
Good governance	8	→ ✓ ↗
Tax transparancy	1	→

Source: Robeco, ESGenius, June 2025.

Conclusion

Private equity is an attractive asset class characterized with high returns, but also illiquidity and high costs. Replicating private equity returns with public equities has been a topic of multiple academic studies but, despite their best efforts, a significant alpha still remains. Robeco's innovative research captures the full alpha by combining academic knowledge, portfolio construction expertise, and proprietary voting and engagement data. Our results indicate that we can deliver private equity-like returns but with the benefits of public equity – high liquidity, lower costs, and sustainability integration. ●

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Staying the course:
A long-term view on
sustainable investing

Over the past two decades, sustainable investing has undergone continuous evolution. While change has always been a defining feature of this space, today's geopolitical landscape has placed sustainable investing in a state of greater flux than ever before.

At the same time, the narrative surrounding sustainable investing is shifting rapidly. Terms such as 'ESG' and 'net zero' – once widely embraced – are increasingly met with resistance by some investors. Sustainable investing is, at times, mischaracterized as an obstacle to financial performance or as a distraction in times of geopolitical conflict. Moreover, active ownership, once seen as a pillar of responsible investment, is now challenged by some who view it as a box-ticking exercise with limited impact.

These misconceptions shouldn't sway investors. Instead, we must look beyond the noise of short-term narratives and focus on the deeper and longer-term forces at play.

In today's volatile environment, we need informed dialog grounded in facts and guided by long-term thinking. In this special topic, we explore four hotly debated topics shaping the sustainable investing discourse:

• The relationship between sustainable investing and financial performance
• The rationale for remaining committed to the net-zero transition
• The intersection of sustainable and defense-related investing
• The investment case for safeguarding stewardship and active ownership

We will delve into each of these areas by analyzing current dynamics, offering our forward-looking perspectives, and focusing on the long-term view that transcends short-term turbulence.

Rethinking the link: Sustainable investing and performance

The long-standing debate around sustainable investing and financial performance has resurfaced due to the underperformance of many sustainable investment strategies over the past three years.

But a rigid focus on performance misses two critical points: firstly, there is no single definition of sustainable investing. It encompasses a wide spectrum of strategies – from environmental, social, and governance (ESG) integration to impact investing – each with different objectives and outcomes. And secondly (and equally important) is that short-term performance is not a predictor of long-term results. Three years of trailing data tell us little about future returns, particularly in the context of systemic transitions like climate change.

Targeting impact, performance, or both?

Sustainable investing doesn't follow a one-size-fits-all model, so aligning expectations with strategies is essential to building effective and resilient portfolios. Some strategies are designed to generate market-competitive returns, while others prioritize impact alignment. Often, the two are blended which can create trade-offs. That's why it's critical for investors to be clear about their objectives: Are you aiming for financial performance, measurable impact, or a combination of both?

Different return patterns

Sustainable portfolios typically exhibit a quality and growth tilt and tend to be structurally underweight in sectors such as fossil fuels, defense, and tobacco. As a result, their performance may diverge from broader benchmarks – sometimes outperforming, sometimes lagging.

This variability isn't a flaw. It's a reflection of a different risk-return profile – just as with any other investment style. Sustainable investing is not inherently better or worse than traditional investing – it's just different. Understanding those distinctions in both purpose and construction, and aligning investment strategy with client goals, is the key to navigating this evolving space.

Figure 1 – Like any stock, ESG valuations shift over time

Valuation premium/discount MSCI selection vs. DM indices   Clean Energy vs. ACWI Energy equities – Forward PE
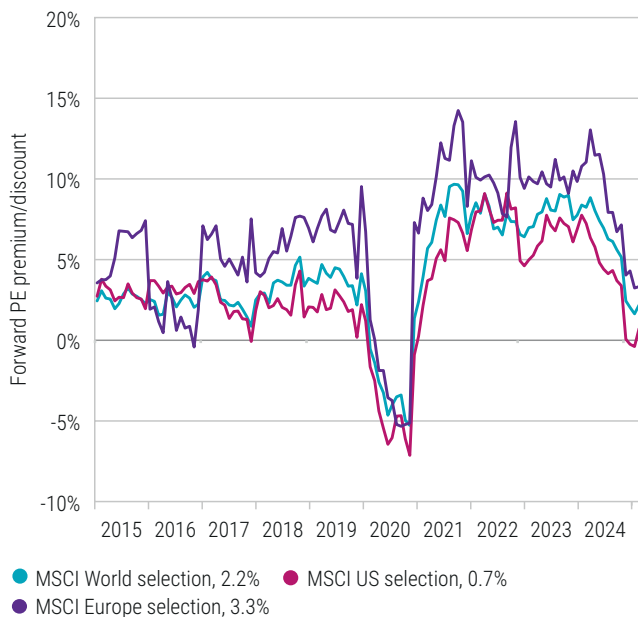
- MSCI World selection, 2.2%   - MSCI US selection, 0.7%   - S&P Global Clean Energy Transition Index   - MSCI ACWI Energy
- MSCI Europe selection, 3.3%

Source: Bloomberg, Robeco, May 2025.

The graphs show how ESG valuations have evolved over the last decade. Prior to 2021, ESG equities demanded a higher valuation premium (here measured as the forward-price-to-earnings ratio) relative to conventional ones. The effect is even more pronounced for clean energy indices. At present, it is still unclear how shorter-term performance will evolve. Future market conditions and investor preferences will be key to determine appreciably varying price. What is clear is that currently low valuations create more interesting entry points compared to 2021 when ESG flows were at their highest.
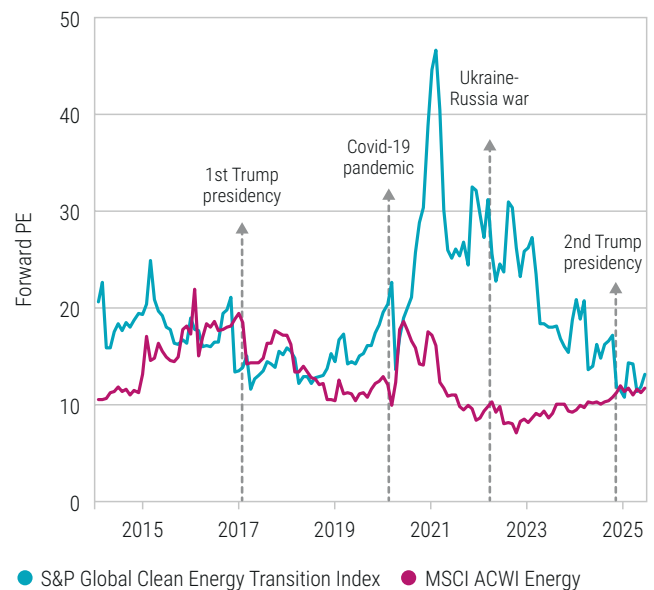
Pricing climate risk

Climate change plays a role in our five-year capital market return assumptions. It's not simply a background factor, but a material driver of economic costs. Those costs may stem from transition risks (e.g., rising carbon prices, tighter regulations) or physical risks (e.g., asset or demand destruction from extreme weather, supply chain disruptions).

The extent and timing of these risks will depend on consumer behavior and government policy. More aggressive regulation may increase transition costs; less action may increase the costs of physical threats as they begin to surface. Either way, the pricing of climate risk is still evolving, and investors who can accurately assess these dynamics should be better positioned to outperform over the long term (all else equal).

Institutional investors polled in Robeco's fifth annual Global Climate Investing Survey[1] found that nearly half (49%) believed society is doing 'much too little and much too late'. There was even a slight increase in investors concerned that lacking policy action was pushing us toward a 'hot house world' (from 8% to 11% since 2024).

These results don't imply investors have abandoned their commitment to sustainable investing, but they are resetting their expectations on the speed of policy action and re-considering their investment options. For Robeco that means leaning more into 'transition leaders': high-emitting companies that are rapidly decarbonizing relative to sector peers and credibly transitioning toward a lower-carbon economy.

1. 2025 Global Climate Investing Survey, Robeco, June 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

That's important as it shows that climate leaders can emerge from unlikely sources – and they can do it while boosting portfolio performance. As discussed in the next section, that makes them key nodes on the net-zero adoption curve – helping scale decarbonization across the broader economy so we can reach net-zero goals faster.

Net zero is not a linear transition

This year's Global Climate Investing Survey also revealed that a majority of investors feel weakening momentum for global climate action is slowing progress, but only temporarily. We share this outlook and expect that increased volatility and policy uncertainty will postpone investment in next-generation clean technologies. However, we also believe that energy- and carbon-efficiency are powerful long-term trends that will ultimately push countries to 'peak' emissions.

Inflated expectations

Net-zero investor initiatives got off to a rocky start. Their launch at COP26 in Glasgow in 2021 was understandably celebrated as a watershed moment, with USD 130 trillion of private capital waiting to be deployed for the net-zero transition. In hindsight, however, it vastly oversimplified the net-zero challenge and inflated investor expectations on the speed of transition because they failed to consider the critical role of government in the process. Climate change is a high-stakes global challenge that is just too big for private sector actors to solve alone. Effective mitigation needs the backing of mission-driven governments working in concert toward a common goal.[2]

2. For more on the entrepreneurial state see Mazzucato (2021).

In fact, great transformations of the past were often based on public sector investment. Modern examples include the internet and digitalization (not to mention the success of the Magnificent Seven) which are directly based on innovations that were bankrolled by the US Department of Defense. More recently, China deployed state entrepreneurship to develop global dominance in clean power and electric vehicles.

Adopting and adapting

Looking ahead, we believe that net-zero initiatives will follow the same learning curve as other important trends: from their breakthrough birth to the peak of inflated expectations, followed by disappointment/disillusionment, before progressing to the slope of enlightenment, productivity gains and scaled adoption.[3]

3. The Gartner Cycle describes the hype-adoption cycle of innovative trends in business and society.

Figure 2 – Innovation-adoption curve
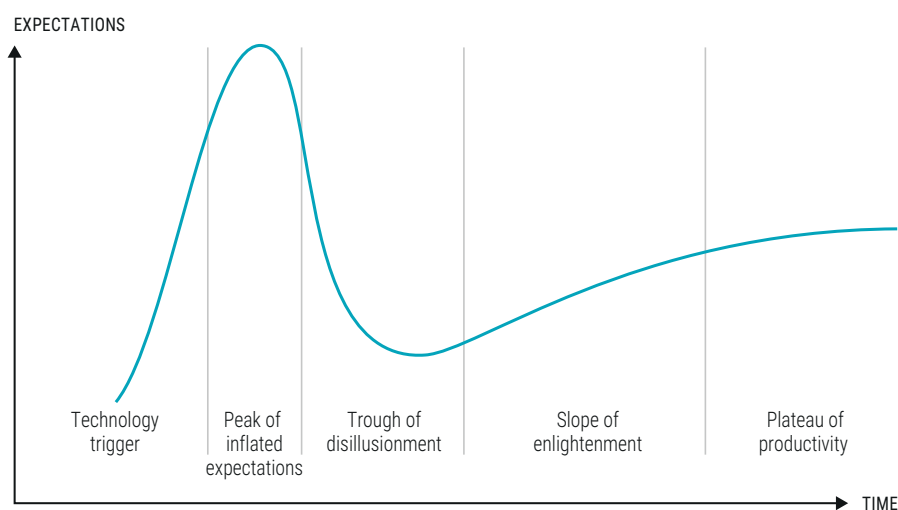
Source: Gartner Research, Robeco.

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Our global climate survey shows that net-zero-committed investors take a long-term perspective and remain steadfast. The science hasn't changed, so they stay on course. What does change are the tactics and tools enabling adoption: this is the slope of enlightenment. For example, the singular focus on portfolio decarbonization has demonstrated clear limitations that are limiting uptake by firms and investors. However, flagging net-zero initiatives are finding newfound momentum via transition finance based on forward-looking emission analytics. The narrative has evolved from 'reducing financed emissions' toward 'financing the reduction of emissions'.

Staying on course

The renewable energy boom shows that net zero can work. More and more countries are decoupling from the traditional correlation between economic growth and increased emissions, bringing peak emissions within reach.[4] Unfortunately, this long-term trend is unlikely to accelerate in the current geopolitical landscape marked by fragmentism and nationalism.

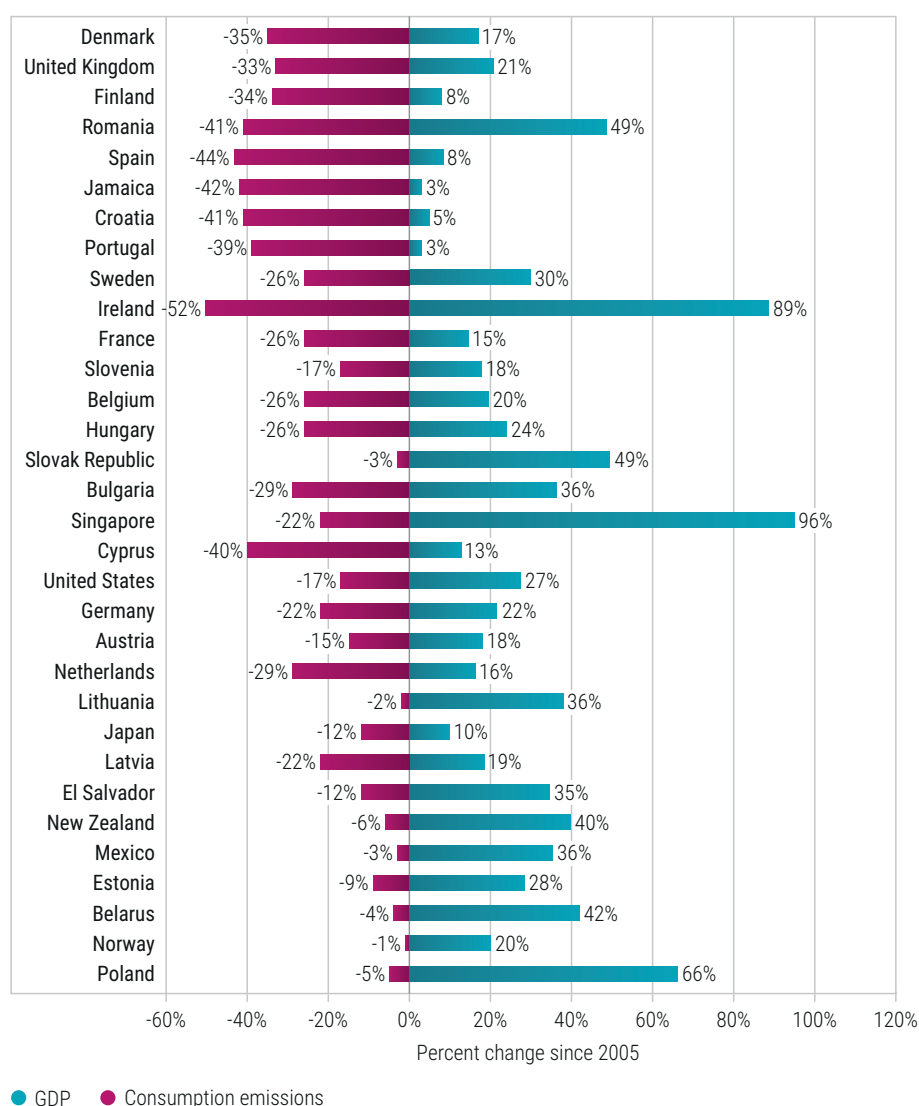4. From Our World in Data using data from Eurostat, OECD, World Bank, and Global Carbon Budget, accessed June 2025.

Figure 3 – Decoupling of consumption emissions and country GDP (2005-2019)

Country	Consumption emissions	GDP
Denmark	-35%	17%
United Kingdom	-33%	21%
Finland	-34%	8%
Romania	-41%	49%
Spain	-44%	8%
Jamaica	-42%	3%
Croatia	-41%	5%
Portugal	-39%	3%
Sweden	-26%	30%
Ireland	-52%	89%
France	-26%	15%
Slovenia	-17%	18%
Belgium	-26%	20%
Hungary	-26%	24%
Slovak Republic	-3%	49%
Bulgaria	-29%	36%
Singapore	-22%	96%
Cyprus	-40%	13%
United States	-17%	27%
Germany	-22%	22%
Austria	-15%	18%
Netherlands	-29%	16%
Lithuania	-2%	36%
Japan	-12%	10%
Latvia	-22%	19%
El Salvador	-12%	35%
New Zealand	-6%	40%
Mexico	-3%	36%
Estonia	-9%	28%
Belarus	-4%	42%
Norway	-1%	20%
Poland	-5%	66%

Percent change since 2005

● GDP   ● Consumption emissions

Source: Breakthrough Institute, April 2021.

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Despite stalling policies, the imperative for climate action is only increasing. Global warming has already reached 1.3 °C, and more communities are visibly suffering the physical impacts of climate change. Understanding and integrating near-term physical risks will be an important focus area for many investors as they seek to build resilient portfolios.

Defense investing: A delicate dilemma

Besides net zero, another major topic of debate has been investing in defense, with regional conflicts intensifying and war in Ukraine and the Middle East.

At the NATO summit in June, NATO members agreed to raise defense spending to 5% of their respective national GDP. In addition, Europe will take more responsibility for its own security. At an earlier emergency summit in Brussels, EU leaders already agreed on an EUR 800 billion 'ReArm Europe' plan to significantly boost defense spending. This has led aerospace and defense stocks, which directly benefit from government contracts, to outperform most other sectors.

As countries ramp up spending to counter emerging threats, the defense sector is poised for structural growth. This includes not only traditional defense contractors but also companies involved in aerospace, logistics, and non-lethal support systems.

While controversial weapons are exclusions that are categorically forbidden in our entire investment range, conventional defense and non-lethal support industries have always been eligible for investment within our mainstream strategies.[5]

In addition to controversial weapons, additional exclusions are used by Robeco's bespoke sustainable portfolios and go further, specifically barring companies with activities that are classified as unsustainable. Here, from a defense perspective, military contractors are excluded above certain revenue thresholds. Our most sustainable investment strategy range does not invest in defense because we do not consider weapons as sustainable investments. In other words, investing in defense can be responsible, but does not contribute to sustainability impact.

5. Robeco deems controversial weapons to be cluster munitions, anti-personnel mines, white phosphorus and depleted uranium ammunition, along with chemical, biological and nuclear weapons. Nearly all are banned under international treaties. These are part of Level 1 exclusions and apply across our entire investment range, making the companies ineligible for investment.

Table 1: Robeco's defense and weapons exclusions

Two levels of exclusion to capture different approaches

	Level 1 (Mainstream funds, ~75% AuM) Exclusions based on international treaties	Level 2 (Sustainable funds) Exclusions based on sustainability principles
Controversial weapons Anti-personnel mines, cluster munitions, chemical weapons, biological weapons, white phosphorus, depleted uranium	Excluded	Excluded
Nuclear weapons	Companies domiciled in countries outside the Non-Proliferation Treaty of Nuclear Weapons are excluded	All nuclear weapons regardless of country of domicile are excluded
Military contracting	Allowed	Excluded >5% revenues
Firearms (production)	Allowed	Excluded >5% revenues
# of excluded companies	25 (Controversial weapons)	327 (Controversial weapons 56, Military contracting 259, Firearms 12)

Source: Robeco, June 2025.

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Looking ahead, we expect defense to remain a relevant component of diversified portfolios. The evolving geopolitical landscape demands flexibility in investment strategies, and sustainable investors must be prepared to engage with sectors that contribute to societal resilience. In this sense, we also hope that governments will use their powers of procurement to push the defense sector to be more transparent and proactive in managing ESG risks in their operations.

Stewardship: A critical instrument to amplify voices and votes

A spate of accounting scandals and financial crises over the last few decades have helped underscore the importance of institutional investors holding their investee companies to account. With naturally long-term investment horizons and the wider public as their beneficiaries (e.g., pensioners, retail clients), institutional investors are deemed well suited to effectively advocate for long-term value creation, including a more sustainable economy.

This has led to significant improvements in shareholder rights, including, for example, the Shareholder Rights Directive II and the introduction of 'Say-on-pay' votes in the US. Moreover, the establishment of stewardship codes has also fostered a favorable environment for responsible stewardship to flourish.

Challenges to stewardship

And yet, stewardship has come under pressure. Firstly, the debate has become more polarized and politicized, creating dissonance among shareholder voices. Secondly, the US Securities and Exchange Commission is likely to provide companies with more options to dismiss shareholder resolutions which will complicate filing shareholder resolutions at US companies. Finally, engagement on climate change has been branded as collusion against the US public and the country's businesses by some politicians, resulting in a 'cooling' effect on institutional investors' willingness to work collaboratively.

The affront on stewardship is not just the result of a change of US leadership. In Europe too, regulators are looking to make corporate law more 'business friendly'. Moreover, several markets have even begun to allow dual share-class systems which can dilute the voting power of regular shareholders. It also remains unclear what the EU Omnibus package will bring in terms of CSRD, and what type of ESG disclosures will be available for investors.[6]

The business case for stewardship

These deteriorating conditions are already impacting the effectiveness of stewardship efforts. Fewer environmental and social resolutions are being filed, as investors are much more cautious to engage collectively, let alone take a public stance on these topics. Shareholders should take a critical view of these trends, as stewardship amplifies the voice of the average investor and is a key instrument investment managers use to help clients achieve their investment goals.

Institutional investors can take action to protect their influence in two ways. Firstly, they can stand up for their rights, including: putting more effort into engaging regulators and in developing industry standards; refining guidance on safe-harbor provisions and checks and balances for dual share classes; and establishing fair rules for failing shareholder resolutions.

Critiques without action don't drive progress, which is why Robeco aims to step up its public policy efforts concerning shareholder rights in the second half of this year. Investors and governments alike should understand that active ownership is about value creation and risk management, both of which protect companies and shareholders.

6. EU Omnibus Package aims to streamline sustainability reporting for companies including the Corporate Sustainability Reporting Directive (CSRD) and as well as other ESG-related filings.

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Secondly, investors should move stewardship practices sufficiently closer to their investment thesis, explaining why both impact and ESG integration are in the best interest of their clients. With concerted action, stewardship can re-assert its powerful influence for steering corporate behavior.

Conclusion

As investment pioneers, we recognize that crises aren't just obstacles – they're catalysts for innovation. In times of disruption, we don't stick to outdated norms: we adapt, evolve, and forge new paths forward. While the landscape may shift, the underlying science remains unchanged, and so does our commitment to sustainable investing. Managing ESG remains key for effective risk management and value creation. Our role is to support clients on their sustainability journey, whatever stage they may be at, with pragmatic solutions grounded in real-world outcomes.

This means broadening our perspective. We look beyond conventional investment frameworks to identify transitioning companies – those that, while not yet fully aligned with end-state sustainability goals, are essential to enabling the shift from today's complex realities to tomorrow's net-zero economy. We also recognize the importance of preserving stakeholder engagement as a force for positive corporate behavior. That's why we proactively engage with regulators and policymakers to ensure that investor voices remain a meaningful lever for change, serving the interests of all shareholders.

Ultimately, our focus remains clear: navigating the path to a sustainable, net-zero future. Anchored by robust research, advanced analytics, and a deep understanding of market dynamics, we equip our clients to navigate this journey. ●

4. Macro

Our core expectation for the global economy over the next five years is that it will undergo what we refer to as a Stale Renaissance.

As techno optimists, we agree AI is actually being underhyped rather than overhyped. The quantum leap that most people will have access to a digital genius by 2030 is nothing short of a renaissance in our view; it will create another productivity boom.

Our central thesis is an oxymoron: this is the Stale Renaissance. Our scepticism about US exceptionalism to endure has increased.[1] Despite its leadership in AI we believe that recent US economic policy incoherence will exert a gravitational pull on the US economy, with the result that it reverts to its long-term trend growth level over the next five years. We see a shortened runway for continued US outperformance from a cyclical point of view. In our base case we have lowered our US GDP growth forecast from 2.4% over the next five years to 2.1%. We have not lowered our 1.7% GDP growth forecast for the Eurozone, however, as we expect this region to close the GDP growth gap with the US by more than half over the next five years.

We have become more optimistic about the prospects of emerging markets. China has moved closer to an inflection point in its housing market cycle and we believe a modest revival in global manufacturing might enable emerging markets to overcome persisting challenges from lower technology spillovers.[2]

We describe below the four different drivers, each apparent contradictions in their own right, which underpin this Stale Renaissance: conflicted supremacy, contained escalation, constrained normalization and conditional sustainability. Our bull and bear cases are presented at the end of this chapter.

4.1 The four drivers

Conflicted supremacy

In our base case the US remains the world's major power over the next five years. The US consumer experiences a positive wealth effect, with real income growth remaining around trend. At the same time, the US increasingly risks becoming a dispensable nation.[3] Self-defeating policies like constraining migration and the weaponizing of tariffs, alongside the rise of populism, leave an increasingly divided country and the US looking less exceptional to the outside world. US policy results in slowing growth, while increasing doubts about US debt sustainability threaten the US's exorbitant privilege – the benefits from the dollar acting as the world's reserve currency. We expect the foreign share of US Treasury holdings to fall faster over the next five years, resulting in higher US Treasury funding costs and a weaker dollar. Ferguson's law, which states that any major power that pays more on its debt servicing costs than its military risks ceasing to be a great power, is likely to draw more attention from international investors. Other countries, like China and Germany, will step into the void, leaving a conflicted US supremacy. At some point the US administration realizes that it has overreached with respect to its trade policy but it is likely to be too late; toward 2030 a decisive move toward a managed multilateral global trade environment in which the US is increasingly sidelined is already likely to have occurred.

1. See Expected Returns 2025-2029, page 76.

2. Technology spillover refers to the unintended transfer of technological knowledge or innovation from one organization, industry, or country to another, often leading to broader economic or productivity benefits. See Jinji, N., Zhang, X., & Haruna, S. (2015).

3. 'Dispensable nation' is the title of Kori Schake's essay in the July/August 2025 edition of Foreign Affairs illustrating the US might no longer take responsibility for the security and prosperity of countries that agreed to play by rules that Washington established.

Contained escalation

Shifting tectonic plates of power, one of our subthemes in last year's outlook, continue to reshape macroeconomic dynamics. However, the risk of a geopolitical earthquake remains contained. Fragmented growth, fiscal assertiveness and industrial policy revive state influence. Labor-capital imbalances persist, with subsequent potential for increased inflation. Populism in the West sets a reverse brain drain in motion, benefiting emerging economies. Geopolitical tensions and policy drift unfold to a limited extent. Taiwan is important for both the US and China, but not important enough to risk a war between the two superpowers. All this results in a world of strategic restraint and volatility without systemic rupture.

Constrained normalization

In the world of central banks we expect 'converging divergence' over the coming years. Whereas emerging market central banks have increasingly started to move in sync in terms of rate setting, developed market central banks are increasingly diverging.

One aspect of continued synchronicity in emerging markets, in our view, is that a dollar bear market will reduce imported inflation as emerging market currencies strengthen. We agree with the IMF that inflation differentials between emerging and developed markets will decline over the next five years, giving central banks in emerging markets more scope to cut rates.

In developed markets, we expect consumer price inflation to move around 2.5% over the next five years. We have raised our US inflation forecast by 15 bps to 2.75% as immigration looks set to fall, and will therefore no longer suppress wage growth. New tariffs and a depreciating dollar will exacerbate inflationary pressures in the US, meaning there is less leeway for the Fed to cut interest rates. We expect a second tightening cycle to start in 2027. The eurozone has more room for non-inflationary growth, contributing to monetary policy divergence within developed markets.

China no longer exports deflation as the first signs of domestic reflation emerge, while the development of a global bond glut shows central banks that neutral policy rates in developed markets are higher than previously anticipated. This all results in a higher-for-longer environment, constraining policy normalization.

Figure 4.1: Rate setting decisions among developed central banks are increasingly asynchronous
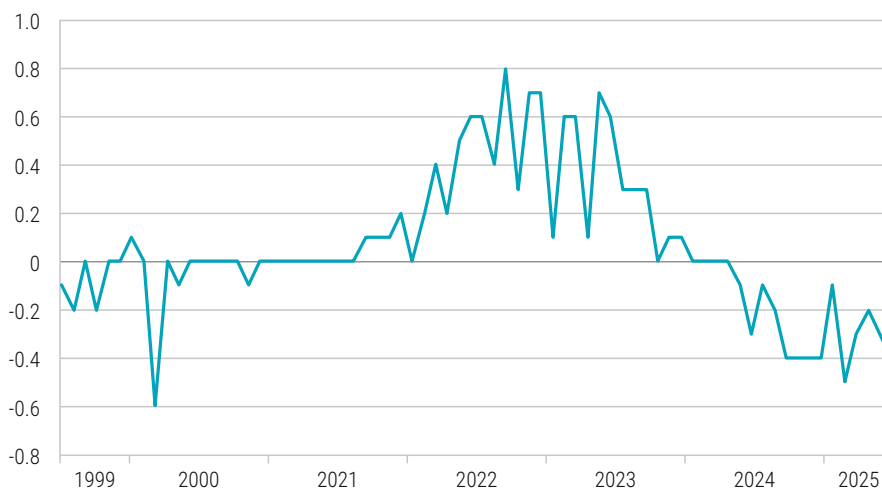
Source: LSEG Datastream, Robeco, July 2025. The chart shows the degree in which monthly policy rate setting decisions of G7 central banks move in tandem (1 = perfect alignment in rate setting).

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Conditional sustainability

We expect increased skepticism about whether the Paris 2050 goal of the world achieving carbon neutrality can be realized. Our view of conditional sustainability reflects a shift in climate finance: sustainability is no longer a default virtue but a conditional strategy. Investors will demand credible transition plans, measurable decarbonization and policy alignment. As green premiums fade and climate risks reprice, capital flows become increasingly contingent on evidence of real-world climate impact rather than ideals.

## 4.2 Reinforcing the Age of Confusion

One of the risks to the base case is that US exceptionalism might fade more slowly than expected, and then actually happen much faster than anticipated. As it stands there are multiple possible pathways to what would be very different economic states of world, reinforcing our premise that we are in what we refer to as an Age of Confusion.[4]

As the world's largest economy, the US has expanded for 53 consecutive months since the Covid-induced recession ended – its seventh-longest period of growth since the National Bureau of Economic Research began taking records in 1854. During this recent period of growth, the global economy has been characterized by continued disinflation, geopolitical turmoil and momentous economic policy change. The shift in China's monetary policy stance from 'prudent' to 'moderately loose' after 15 years, the amendment to the German constitution to allow increased defense spending and the US administration's almost relentless policy initiatives, epitomized by Liberation Day on 2 April 2025, stand out in this respect.

Official institutions' pessimism has increased since last year's outlook. The International Monetary Fund (IMF) referred to the global set of risks as "broadly balanced" in 2024, but is now highlighting intensified downside risks due to protectionist trade policies, geopolitical instability and economic policy uncertainty. In its April 2025 World Economic Outlook, the IMF saw the global economy at a "critical juncture". This sentiment is echoed by global economic policy uncertainty, which is at an all-time high.

4. The theme of our Expected Returns 2023-2027 publication.

Figure 4.2: Global Economic Policy Uncertainty Index
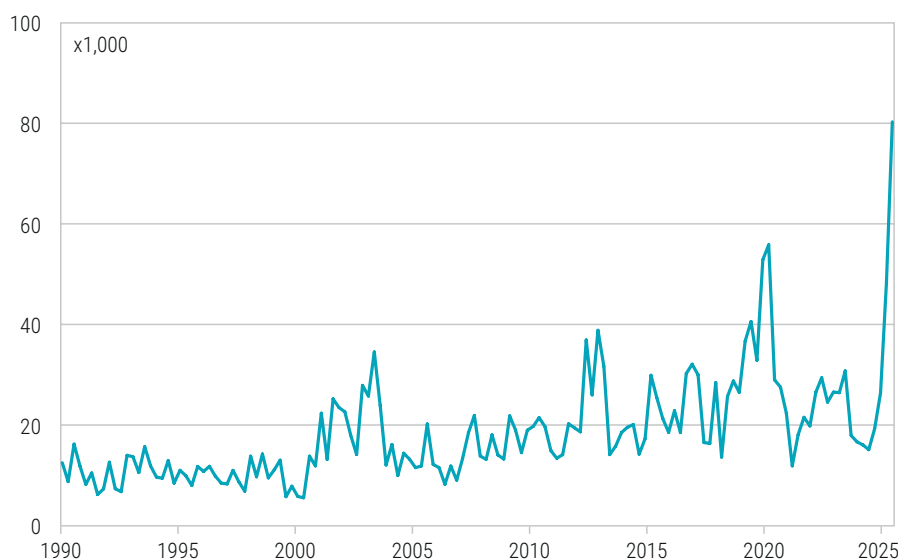
● World policy uncertainty – GDP weighted average: Global World International

Source: LSEG Datastream, "The World Uncertainty Index" by Hites Ahir, Nicholas Bloom and Davide Furceri at www.policyuncertainty.com/. June 2025.

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Triumph of the optimists

But professional economic forecasters have continued to climb the macroeconomic wall of worry, remaining more sanguine than the IMF. This may simply be a case of fatigue setting in among forecasters as they react to the latest twists and turns on US tariffs. Their reluctance to place too much importance on rising uncertainty or the latest headlines is also understandable because of the notable divergence between 'hard' and 'soft' data; in recent years, sentiment indicators have generally failed to accurately predict subsequent macroeconomic outcomes.

It is here where Heisenberg's insight comes into play.[5] The divergence of hard and soft data remains a hot topic among economists, and is probably the result of several factors. First, some observers suggest that it is partly due to growing media bias and political polarization at the household level, especially among lower-income households.[6] Second, privacy-preserving survey techniques may increasingly introduce statistical noise, affecting sentiment indicators more than hard data.[7] Third, increased policy-induced frontloading of economic activity could also be a factor. The most striking recent example of this was the record plunge in the University of Michigan Consumer Sentiment Index around Liberation Day, which was not followed by a proportionate drop in actual US consumption growth in the second quarter.

So far, bets on economic resilience have been paying off. The costs of rising policy uncertainty have not been presented at large yet. In expectation of persisting defiance of uncertainty we became more optimistic last year about the prospect of an 'Atlas Lifted' type of world that could weather a more rugged policy landscape. Key elements in this story were sustained supply-side improvements (such as increased adoption of AI and capital deepening), a robust US labor market and other advanced economies cyclically catching up the US economy. Europe has indeed regained some momentum, with Germany emerging from a stubborn recession under the new leadership of Friedrich Merz in the first half of 2025. When it comes to AI adoption, 85% of Fortune 500 companies are now using Copilot in their offices,[8] and US physical capex is predominantly led by investments in data centers. The US labor market has fully rebalanced and remains around a solid 4% unemployment rate. So far, so good.

There is no pre-determined duration for a US expansion. Periods of economic expansion have lengthened over the past 171 years, with their average duration since 1980 stretching to 80 months. The big question is whether the costs of rising trade protectionism, geopolitical instability and economic policy uncertainty can be ignored forever, with economists and financial market participants continuing to look through the noise, climbing the macroeconomic wall of worry.

4.3 Revisiting our macro framework

Last year we extended our triple power play framework[9] by analyzing in greater depth the secular forces that influence macroeconomic outcomes over a five-year horizon. We are sticking to last year's approach in this section, revisiting the six pillars of our macroeconomic framework and updating them with our latest analysis and industry insights. These pillars have their own internal dynamics but also impact each other in today's complex global economy. The pillars serve as the building blocks of the various states of world that we deem most likely to occur, culminating in our five-year macroeconomic scenarios.

5. "What we observe is not nature itself, but nature exposed to our method of questioning". Quote from Heisenberg's "Physics and Philosophy: The Revolution in Modern Science" from 1958. The uncertainty principle developed by Werner Heisenberg in physics also applies in economics.

6. See Brookings, October 2024. The paradox between the macroeconomy and household sentiment | Brookings

7. See Friedman and Chetty (2019).

8. AI-powered success—with more than 1,000 stories of customer transformation and innovation | The Microsoft Cloud Blog

9. The main title of our Expected Returns 2024-2028 publication.

Figure 4.3: Our six-pillar macroeconomic scenario framework
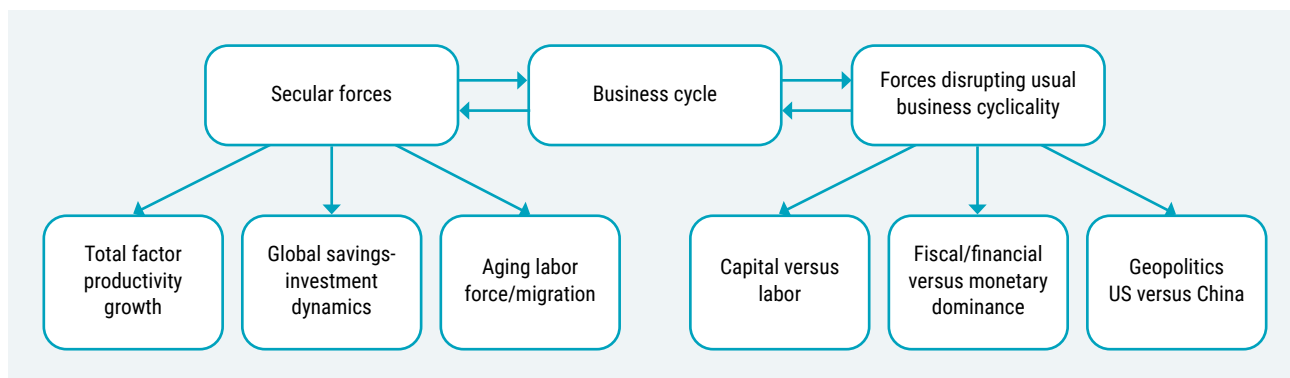
Source: Robeco, July 2025.

4.4 Pillar 1: An aging labor force

Changes in the age structure of developed economies have been supportive of global economic expansion over recent decades, with the 20-64 age cohort steadily growing in developed economies. But according to UN estimates, we are about to arrive at a major inflection point, with the labor force in developed economies set to start to shrink before 2030. This will inhibit potential output growth, especially as the most productive age cohort, the 35-39-year-olds, will start to shrink after 2027.

Figure 4.4: The most productive age cohort is about to roll over before 2030

● Total population, age group (35-39): Global World International
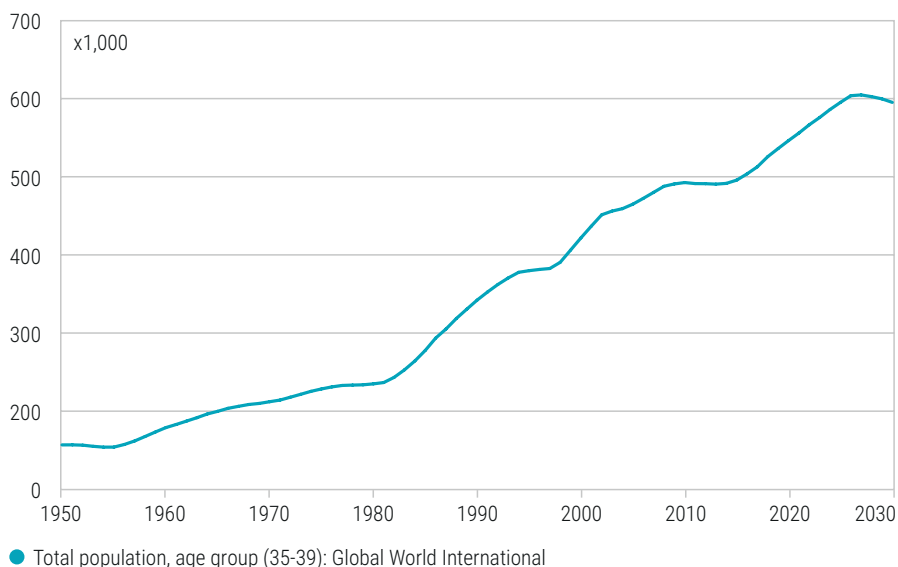
Source: LSEG Datastream, July 2025.

It is important to consider that aging economies face a quality as well as a quantity problem. The Bureau of Labor Statistics estimates that by 2032, the median age of the US labor force will have increased to 43.2 years. Analysis by Lee and Shin (2021) shows that economic growth falls as populations age, primarily because aging results in a decline in total factor productivity growth. They estimate that for OECD countries, each 1% increase in the over-65s age cohort of the population reduces total factor productivity growth by 0.38% per year over the subsequent 10 years. Given that the UN expects the over-65s age cohort in G10 economies to increase by 2.5% between 2024 and 2034, this would amount to total factor productivity growth dropping by 0.95% per year.

Demographics may not be destiny in the 21st century

What we discuss above might suggest that secular stagnation is just around the corner as current total factor productivity growth levels will be fully offset by the impact of aging, all else being equal. Luckily, all else is not equal. For example, Aksoy (2019) acknowledges the gradual increase in the median age at which great inventions are made, which may suggest productivity is becoming less age-dependent. We agree with this more optimistic take and would go as far as to suggest that the coefficients reported by empirical studies are not good predictors of future coefficients at the dawn of AI.[10] While there is still an AI adoption gap between older and younger age cohorts, older workers are more likely than their younger counterparts to work in occupations in which AI acts as a complementary technology, helping them to stay productive. Pizzinelli and Tavares (2025) suggest that high complementarity may also encourage longer careers and higher labor force participation among the over-55s. Bonfigliolo et al. (2024) find that AI adoption in the US is leading to increased job polarization, with increasing AI adoption proportionally resulting in reduced employment in lower-wage cohorts, whereas it has resulted in increased employment in the highest wage quintile (which are characterized by a higher median age). This might offset some of the negative impact on output per capita growth of the growth of the over-65s age cohort. What's more, higher pay for older, tech-savvy workers might entice them to stay in the workforce for longer.

Figure 4.5: Percentage-point increase in proportion of the over-65s age cohort between 2024 and 2034
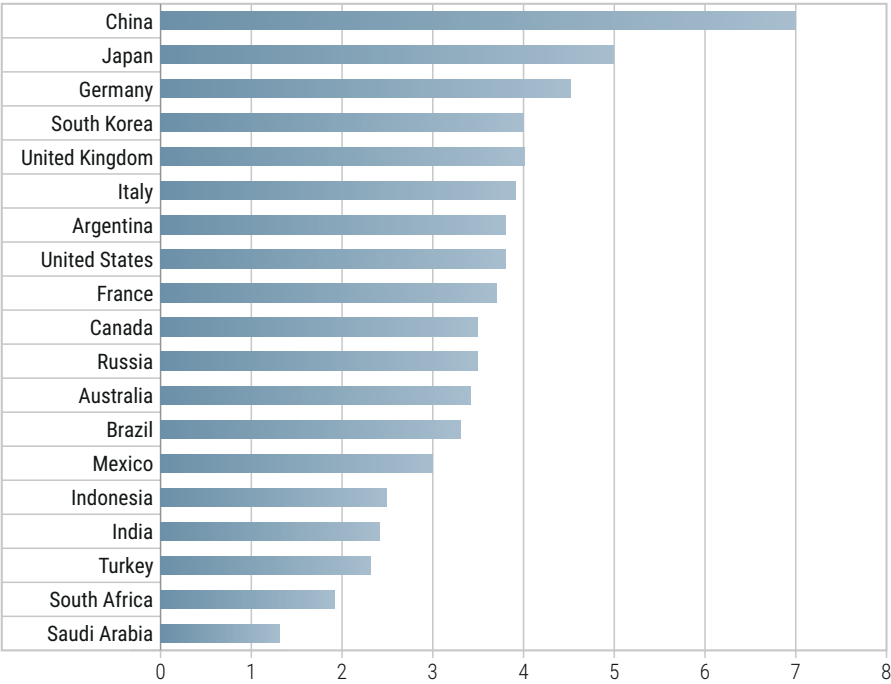
Source: United Nations, July 2025.

Migration: Providing less of an offset for aging in the US

It is well known that net migration flows could be complementary for aging countries as they are facing increasing labor shortages. This is likely to be a particularly hot topic in the US in the coming years if President Trump lives up to his campaign promise to launch the "largest deportation operation in American history."[11] The IMF reports that a 1% tightening of migration flows relative to baseline levels reduces GDP per capita by 0.6%, whereas destination countries experience a positive impact.[12] Assuming 1.5 million migrants leave the US labor force over the next five years[13] due to a combination of enforced deportation and voluntary migration, our calculations suggest that this would take 20 bps per year off

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labor force growth and potential GDP. While there will probably be a negative impact on the US, the other side of the coin is that recipient countries are likely to receive a boost, especially if highly skilled people are moving.

Working-age population approaching a structural inflection point as cyclical tailwinds ease

Countries' demographic profiles are not carved in stone: policy will continue to influence labor force growth. In addition to migration policy, higher pay, more flexible working arrangements and reskilling programs have spurred a cyclical rebound in labor force growth in recent years. However, the cyclical increase in five-year annualized labor force growth in OECD countries has reversed last year (turquoise line). In light of an approaching inflection point in working-age population growth, a backlash against migration in the US and ongoing wage moderation, we have lowered our annual labor force growth projection for OECD economies from 0.7% to 0.4%.

Figure 4.6: OECD labor force growth expecting to slow further as cyclical component rolls over

● HPC* of 5Y growth rate (first - last values) of labor force, total: OECD All
● HPT* of 5Y growth rate (first - last values) of labor force, total: OECD All
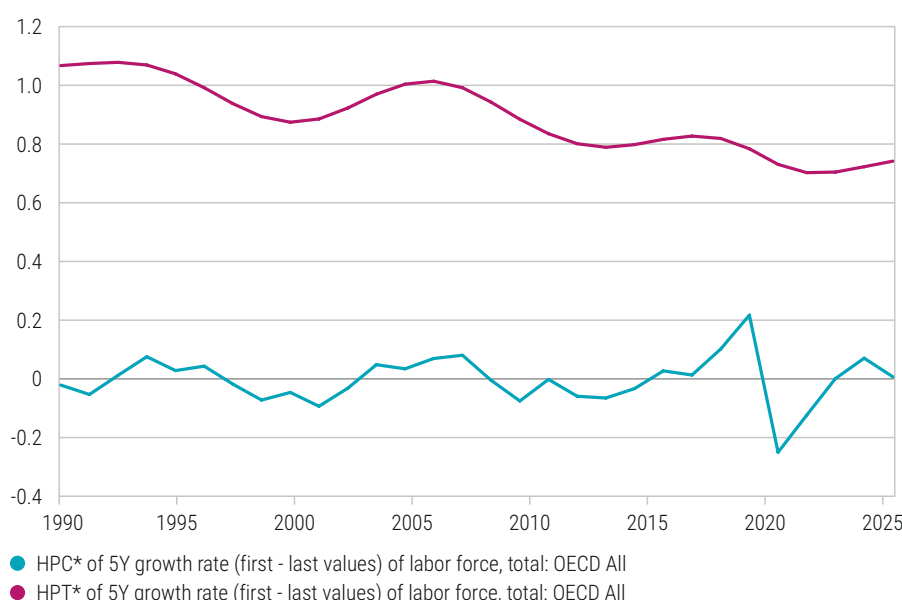
Source: LSEG Datastream, Robeco, July 2025.

*   HPC = Hodrick-Prescott filter of cyclical component of OECD labor force

HPT = Hodrick-Prescott filter of trend component of OECD labor force

4.5 Pillar 2: Total factor productivity (TFP) growth at the dawn of artificial general intelligence (AGI)

It is hard to overstate the relevance of AI over the next five years. Industry experts are suggesting the AI revolution is actually being underhyped. As former Google CEO Eric Schmidt put it, "We are entering a period where AI systems will be able to do things that only Da Vinci could do: paint, invent, design and imagine. Except they do it at scale and in seconds."[14] This sounds like a new renaissance awaits us.

The 2023 Expert Survey on Progress in AI showed that experts in the field expect artificial general intelligence (AGI, which accomplishes every task better and more cheaply than human workers) to appear in 2047. Only two years later, AI researchers expect AGI could arrive before 2040.[15] We are already moving from GPT models to GPT agents – autonomous AI systems that interact with their environment using GPT models that are proactive instead of reactive. This is an important stepping stone toward AGI. From 2026 onward we expect to see these agents integrated in operating systems and enterprise platforms.

14. Eric Schmidt, TED2025, 11 April 2025.

15. See: When Will AGI/Singularity Happen? 8,590 Predictions Analyzed

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The dawn of AGI and progress in AI in general are likely to have major consequences for global productivity growth and could lead to a Goldilocks scenario for central banks.[16] Productivity growth increases from AI can arise from various sources. First, automation could reduce the costs of certain tasks like data classification and summarizing texts. For instance, a lawyer can now perform some tasks that used to take 16 hours in just three to four minutes.[17] Second, AI could be complementary and increase labor productivity by enabling workers to specialize and outsource certain tasks to AI. Third, AI could create new tasks that boost real activity. Fourth, AI could make existing technologies more productive – for instance, by enhancing the algorithms involved. Estimates of the degree to which AI will boost productivity vary widely, suggesting there is still a lot of uncertainty about how things will pan out.

Table 4.1: Productivity growth estimates from AI

Source	Estimate	Time horizon	Notes
Korinek & Suh (2024)	+100% GDP growth	Next 10 years	Assumes AGI arrival; highly optimistic scenario
Acemoglu (2024)	+0.07% TFP growth annually	Next 10 years	Very conservative estimate; skeptical of broad AI impact
Cerutti et al. (2025)	+0.08% to +0.24% TFP growth	Next 10 years	Range based on low vs. high TFP scenarios
McKinsey (2023)	+0.5 to +3.4% GDP per capita	Next 10 years	Depends on AI adoption and automation synergy
Robeco (internal)	+0.40% productivity growth	Next 15 years	Matches historical long-wave innovation cycle growth in the US

Source: Robeco, August 2025.

AI powering ahead? Mind the gap

As we pointed out last year, the Jevons paradox could cap the productivity gains resulting from AI. The more energy-efficient that data centers become, the more demand for these centers there will be, resulting in a net increase in electricity demand – not a net fall.

According to the International Energy Agency (IEA) in 2025, data centers used about 415 TWh of electricity in 2024, amounting to around 1.5% of total global electricity consumption. The IEA projects that global data center electricity demand will more than double to 945 TWh by 2030. Meeting this demand would require the equivalent of 108 nuclear plants or other energy sources with similar production capacity. Thus, computing power could become a constraint for advancements in AI. Higher electricity prices would raise the marginal cost of AI adoption, capping the productivity growth benefits of AI.

Litigation risk could be another factor inhibiting AI adoption in certain industries, especially among smaller companies. This leads us to a third obstacle, which the IMF paper (Cerutti et al., 2025) we referred to described as "mind the gap": increasing divergence in AI adoption at the country and industry levels. Laggards in AI adoption are starting to lag even further behind only a few leaders. At its core, AI is all about how to get the data, so countries and firms lacking access to high-quality datasets are at disadvantage.

While we agree that this divergence is real, we believe that Cerutti et al. (2025) might be too bearish about the implications for emerging economies. It is debatable whether the greater importance of manufacturing in emerging markets than in developed markets is really a disadvantage. As Doerr et al. (2024) show, if AI is used primarily in manufacturing, the long-run effect on output could be over a third larger than if it is adopted uniformly across sectors. This suggests a tilt toward manufacturing could help reap the rewards of AI adoption.

4.6 Pillar 3: Global savings-investment dynamics and the rise of the bond glut

In February 2025, ECB board member Isabel Schnabel suggested that "we are transitioning from a global 'savings glut' toward a global 'bond glut'."[18] The savings glut, a term coined by former Fed president Ben Bernanke in 2005, refers to a significant rise in the supply of global savings, which explains both the increase in the US current account deficit and the decline in real interest rate since the late 1990s.

In last year's outlook we provided six arguments why the global savings glut could disappear in the coming years, with the main implication being a higher level of the natural real rate of interest, r*. We cited higher domestic savings absorption and a lower contribution to global growth from China, the need to step up defense and climate spending, geopolitical fragmentation, aging and how high stock market valuations increase the incentive for companies to invest in underlying capital goods rather than pay a high earnings multiple to acquire these assets indirectly via a takeover (the rise in Tobin's Q).

Schnabel added a new angle to the savings glut debate as she sees the rise in the natural real interest rate as being caused by a decline in the convenience yield – the yield that investors are willing to forgo for holding safe and liquid assets. Szoke et al. (2024) find that the error term in the Laubach-Williams model (the change in r* not explained by changes in trend GDP growth) can be largely explained by the convenience yield, supporting this thesis.[19] The recent drop in the convenience yield is linked to the increasing net supply of safe assets – bonds, which were previously more scarce – to the point that it could be said that we are transitioning toward a 'bond glut'.

Various studies estimate that a vanishing scarcity of safe assets could increase the natural real rate of interest by 50-70 bps.[20] One reason for the growing net supply of safe assets is higher budget deficits (which are rising due to higher spending on the likes of defense and climate measures). The IMF estimates that the amount of global sovereign debt will increase from 95.1% of GDP today to 99.6% by 2030. Rising net sovereign bond issuance will absorb a declining supply of savings for the foreseeable future, raising the natural rate of interest.

Figure 4.7: Declining current account surpluses implies higher domestic savings absorption

● EM economies   ● G7 countries (aggregate)
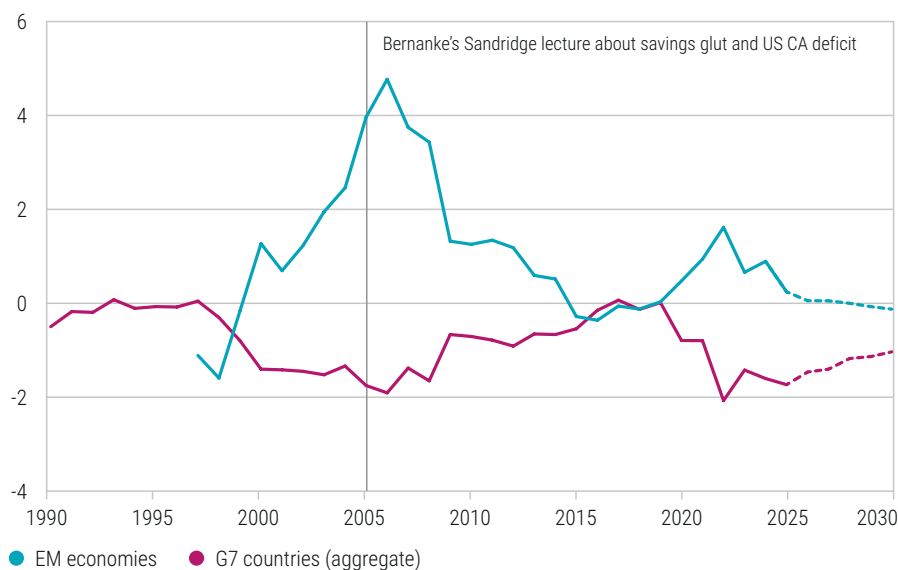
Source: LSEG Datastream, Robeco, July 2025. Dotted line segments are IMF projections.

As we warned last year, "great power competition lowers external investment supply",[21] contributing to a lower savings glut. Therefore, another reason rightly mentioned by Schnabel in this context is that the US administration's attempt to reduce the current account deficit is "bound to further depress foreign holdings of US Treasuries."[22] As we explain in the next section, there might be two-way causality here: reduced foreign holdings of US Treasuries might reinforce the US administration's push to reduce the current account deficit.

Three myths about the US trade deficit and the US trade policy reaction

Obstfeld (2025) dispels three currently circulating 'myths' about the US trade deficit: first, the mistaken view that US deficits originate mostly from trade liberalization and unfair trade practices; second, the world's desire to hold the dollar as its safe-haven currency is the key driver of US foreign deficits; third, that US deficits result entirely from the global savings glut – excessive saving by the rest of the world has forced the US to borrow from other countries and spend more on imports.

These three myths have led the US administration to adopt a clear "protectionist offensive", pursuing tariffs under various legal umbrellas. The prevailing consensus view is that we will end up with a 15-18% trade-weighted average US tariff rate going into 2026. This would be at least six times the prevailing tariff rate under the Biden administration and a level not seen since in the 1930s.

Figure 4.8: Back to the 1930s' protectionism

● US tariffs since 1821
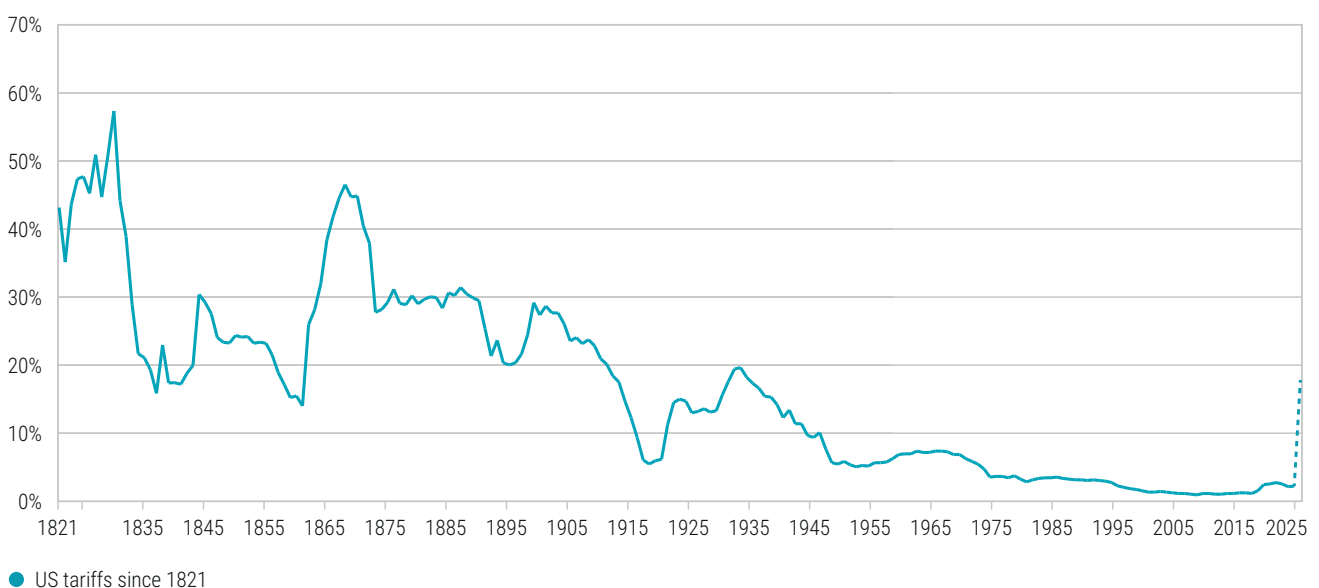
Source: Tax Foundation, Robeco, July 2025.

It remains doubtful whether these tariffs will help the US reduce its deficit. First, the fact that the US economy is near full employment will probably blunt tariffs' effectiveness. Lerner, a prominent British economist, showed as far back as 1936 that a tariff raises domestic demand for import substitutes (as the Trump administration wishes). However, import substitution also raises demand for domestic non-traded goods, and at full employment this increased demand can only be met if resources are drawn away from the export sector. This means that exports fall in tandem with imports, so there is no improvement in the trade balance.

Second, even though the US dollar has not appreciated since Liberation Day, tariffs drive real appreciation of the domestic currency while having little impact on trade balances.[23] The unusual observation that the dollar has fallen significantly since Liberation Day

21. Expected Returns 2025-2029, p. 84.

22. No longer convenient? Safe asset abundance and r*

23. See Mundell (1961) or Furceri et al. (2022).

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suggests that portfolio flows have had a bigger impact on the dollar than trade, with investors reducing their exposure to US equities.[24] This shows that trade policy can have unintended side effects.

24. See Hartley and Rebucci (2025).

Third, the US has a twin deficit problem. Maintaining a fiscal deficit of around 6% probably means US demand for foreign goods remains high, especially when unemployment is low. Our research finds that since the post-pandemic expansion, US consumption has become less sensitive to import tariffs. The most likely explanation is that the huge Covid fiscal stimulus made US demand for foreign goods less elastic, driving up the trade deficit.

Figure 4.9: US demand for foreign goods has become less elastic in the last couple of years

● Tariff beta (10Y rolling) of US global imports
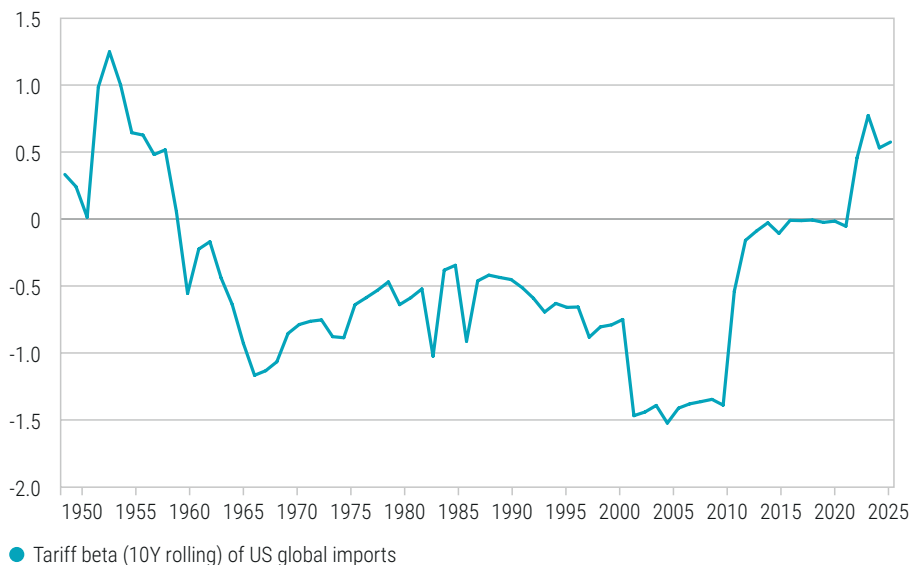
Source: LSEG Datastream Robeco, July 2025. The tariff beta is the regression coefficient of the logarithmic change in US imports regressed on the logarithmic change in US trade weighted tariff rate.

US policy incoherence threatens its exorbitant privilege

Finally, the US administration has to face trade-offs between its goals of weakening the dollar and become more competitive (as advocated by former US Trade Representative Robert Lighthizer) and engineering an improvement in the current account through trade protectionism. Running sizable fiscal deficits while maintaining the US dollar's safe-haven status is another.

US Treasury Secretary Scott Bessent recently declared that "the dollar's recent declines do not raise concerns about its status as the world's key currency".[25] It is understandable that Bessent defended the dollar as its safe-haven status has enabled the US to earn more on its foreign assets than it pays on its liabilities.[26] This has in turn enabled the US to sustain a negative net international investment position without needing large trade surpluses to service it, and hence reducing the pressure to improve the trade balance. However, if the US's overseas earnings were equal to the returns received by foreigners holding US assets (in other words, if the exorbitant privilege were to disappear), the US would be forced to run net export surpluses for it to be able to repay its foreign debts.

25. See BI Weekend, July 3, 2025.

26. This benefit is known as the 'exorbitant privilege'.

The question is how long the US is allowed to borrow from the future before its perceived riskiness increases enough for the exorbitant privilege to be lost. As a former hedge fund manager, Scott Bessent knows that the kind of leveraged position the US is running is vulnerable to even marginal swings in risk perception. Small swings in foreign ownership of US Treasuries can have big effects.

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The most crucial equation over the next five years?

The US faces an intertemporal budget constraint, as shown by Obstfeld (2025).

$$L_t - A_t = \mathrm{E}_t \left\{ \sum_{i=0}^{\infty} \left[\prod_{j=1}^{i} \left(1 \Big/ \tilde{R}^L_{t+j} \right) \right] \left[NX_{t+i} + \left(\tilde{R}^A_{t+i} - \tilde{R}^L_{t+i} \right) A_{t+i} \right] \right\}.$$

- L_t : Gross external liabilities at time t
- A_t : Gross external assets at time t
- E_t : Expectation conditional on information available at time t
- NX_{t+i} : Net exports at time $t + i$
- R^A_{t+i} : Gross return on external assets at time $t + i$
- R^L_{t+i} : Gross return on external liabilities at time $t + i$
- A_{t+i} : External assets held at time $t + i$
- $\prod_{j=1}^{i} \frac{1}{R^L_{t+j}}$: Discount factor applied to future values, based on compounded returns on liabilities

This equation shows that the difference between a country's liabilities and assets today must equal the expected present value of its future net exports plus the excess return on its assets over its liabilities. It captures the idea that a country can sustain a negative net international investment position (NIIP) if it earns more on its assets than it pays on its liabilities – the so-called exorbitant privilege the US still benefits from. So, in terms of the formula, whenever $R^L_{t+i} = R^A_{t+i}$, given that $L_t > A_t$ (the net international investment position is negative), the US needs to start to run a positive trade balance (NX_{t+i}) in order to be able to service its debts in the future. Therefore, the US administration needs to keep the risk premium on Treasuries in check if it wishes to keep the return on its liabilities below the return on its assets. Keeping the fiscal house in order is vital.

We have calculated that every 1% decline in foreign holdings of US Treasuries results in 10-year US Treasury yields increasing by 8 bps. However, regardless of whether the US remains willing and able to pay, a global bond glut might raise the global cost of funding nonetheless. This rising rates tide will lift all boats, including those floating in safe havens. This could result in a global bond portfolio rebalancing that means that not only the US's fiscal finances are forced to become more disciplined, but also those of other advanced economies running persistent twin deficits like the UK. Other regions like Europe could step into the void. Blanchard and Ubide (2025) see a "historical opportunity to reduce the cost of funding European public debt" and strengthen Europe's financial autonomy by creating a deep and liquid Eurobond market that represents a credible alternative to US Treasuries.

4.7 Pillar 4: Fiscal versus monetary dominance

"The US fiscal outlook and threats to central bank independence are among the key forces that could undermine dollar dominance", according to US economist Kenneth Rogoff in June 2025.[27] The move from monetary dominance to fiscal dominance has been featuring in our work since 2019, when central banks were confronted with the problem of the zero lower bound for interest rates and economists like Olivier Blanchard posited that the fiscal side had to move the pendulum, especially when Covid hit.

Nearly six years on and it seems the pendulum has swung too far. In last year's outlook, we wrote: "Cognizant of the impact of a strong (and still overvalued!) dollar on the US economy, policymakers could put more pressure on the Fed to ease policy." Listening to President Trump's statements about replacing Jerome Powell in 2025, pressure is mounting on the Fed chair to cut rates. Powell's term ends by law in May 2026. Given the pressure being exerted by the president, the risk has increased that the next Fed chair will be more willing to give in to the White House's demands. The most infamous historical precedent was in the early 1970s, when President Nixon pressured Fed Chair Burns to cut rates ahead of the 1972 election to stimulate the economy. Burns complied, resulting in an inflationary boom and compromised Fed independence.

27. Dollar Dominance | Hoover Institution
Dollar Dominance

Three reasons for the break from countercyclical fiscal policy
Consistent with countercyclical fiscal policy, our analysis shows that over the past 25 years there has been a positive correlation between economic misery (loosely defined as the sum of inflation and unemployment) and the magnitude of the fiscal deficit in major developed economies. When misery levels were low, the average budget deficit was low (and vice versa). But in recent years this relationship has weakened, providing evidence of the rise of fiscal dominance.

There are several reasons why more expansionary fiscal policy has emerged. First, the rise of fiscal dominance after the Covid pandemic can be explained by the belief among some leading economists that debt was almost a free lunch in a low-interest-rate environment.[28] Second, we believe that the rise in populism has been a factor.[29] Third, in an increasingly geopolitically fragmented world, policy trade-offs have become more pressing and national security concerns have been taking precedence over fiscal prudence.

Ferguson's Law and fading US exceptionalism
The recently signed One Big Beautiful Bill Act in the US is another indication that fiscal policy has become profligate as it is the most expensive budget reconciliation bill in history. According to the Congressional Budget Office, the bill is likely to result in US sovereign debt increasing by an estimated USD 4.1 trillion over the next decade, with deficits averaging 7% of GDP. Permanent 15% trade-weighted tariffs could act as an offsetting factor, reducing the deficits to 5-6%. Estimates of tariff revenues over the next decade vary from USD 1.5 trillion (Peterson Institute) to USD 2.9 trillion (Tax Foundation). Factoring in substitution effects and the likelihood of further trade deals, we believe the Peterson Institute's lower estimate is likely to be closer to the mark, and we expect tariffs to reduce the overall fiscal deficit by only 0.6% of GDP over the coming years.

In our view, tariffs will not be enough to pay for the recently enacted tax cuts in the US, so large budget deficits are likely to persist. Worryingly, an increasingly large proportion of the budget deficit will be taken up by interest costs, which will hit 4% of GDP by 2030. This means they will further surpass expenditure on defense. As economic historian Sir Niall Ferguson put it, "Any great power that spends more on debt servicing than on defense risks ceasing to be a great power."[30] If there is no political willingness to rein in spending (because voters are not aware of the threat that high sovereign debt represents), history suggests an effort to inflate away the debt will be the preferred option to ensure default is averted. That is why we see the power play between fiscal and monetary authorities becoming more intense in the coming years.[31]

Another escape route would be to force insurers, banks, savers and other financial institutions to significantly increase their US Treasury holdings, as Japan did with its government bonds in the 2000s. This would amount to financial repression, with US savers effectively being taxed as actual returns will be below equilibrium.

Fiscal profligacy requires strong central bank independence
In Cochrane's 2009 fiscal theory of inflation, the price level adjusts so that the real value of government debt equals the present value of budget surpluses. So, in an era of fiscal dominance, when the government does not intend to cut spending and/or raise taxes in the future, inflation will rise to equilibrate the lower real value of government debt. With central banks approaching their terminal policy rates for this cycle, the move to fiscal dominance could intensify when they declare victory over inflation. This could lay the foundation for another wave of inflation in the second half of the 2020s. As Banerjee et al. (2023) show, profligate fiscal policy in conjunction with low monetary policy independence typically results in the highest subsequent inflationary impulse. By contrast, a strong independent central bank is able to act as a counterbalance to even a profligate fiscal

28. See the AEA Presidential Address by Olivier Blanchard in 2019.

29. See also the discussion on populism in Pillar 5 below; see Cao, Dabla-Norris and Di Gregorio (2024).

30. Ferguson's Law: Debt Service, Military Spending, and the Fiscal Limits of Power | Hoover Institution Ferguson's Law: Debt Service, Military Spending, and the Fiscal Limits of Power

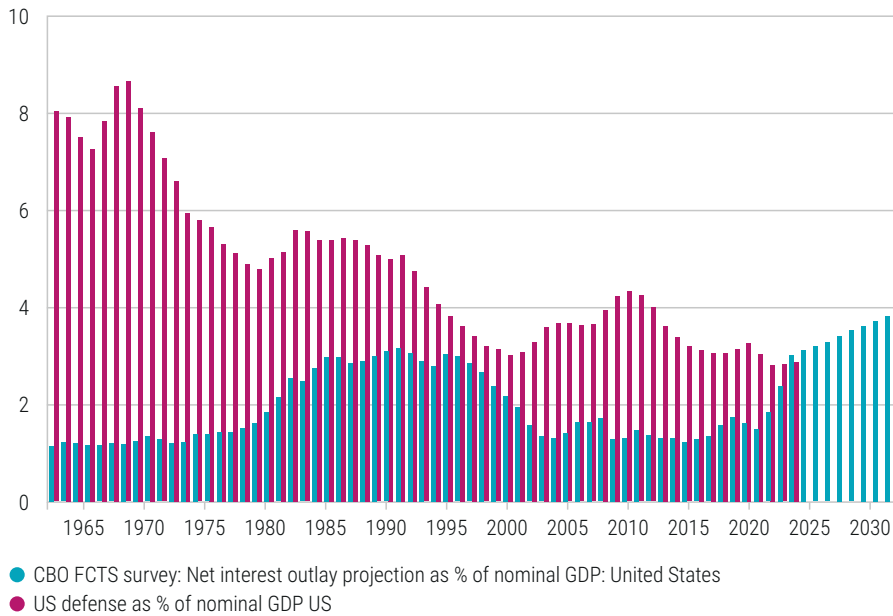31. See our Expected Returns 2024-2028 edition 'Triple Power Play'.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

authority, with the result that there should only be marginal upward pressure on prices. This study explains why the legacy of former Fed Chair Arthur F. Burns has become tainted and why Jerome Powell and his successor should stand firm in the face of pressure from the US administration.

Figure 4.10: Ferguson's law kicks in – US interest rate costs starting to exceed military expenditures as % of GDP

- CBO FCTS survey: Net interest outlay projection as % of nominal GDP: United States
- US defense as % of nominal GDP US

Source: LSEG Datastream, Robeco, July 2025.

4.8 Pillar 5: Capital versus labor

Figure 4.11: Global profit margins – It's starting to look like a non-stationary time series

- Global net profit margins   - Trend global net profit margin   - Recession

Source: LSEG Datastream, Robeco, July 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.
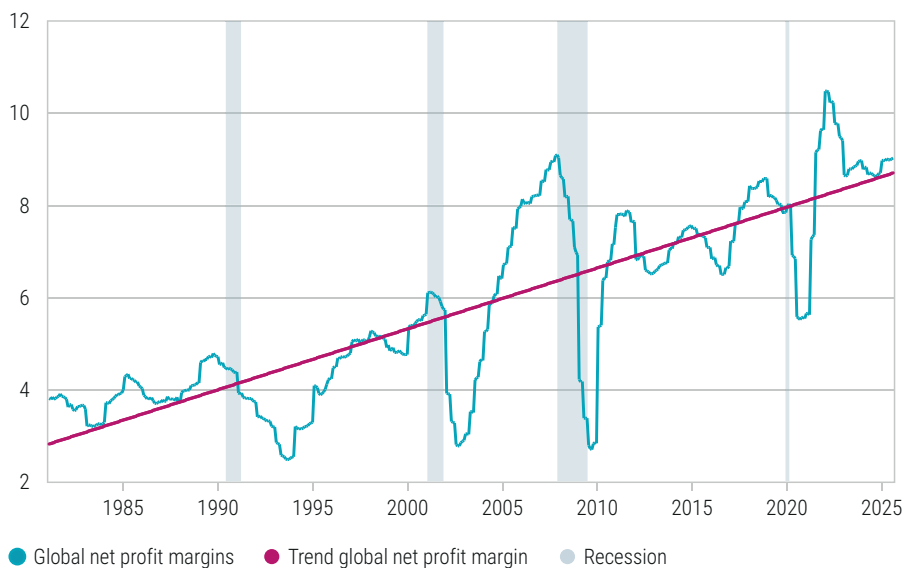
The Great Gatsby Curve and the rise of populism

Libertarian US economist Milton Friedman once stated that "A society that puts equality before freedom will get neither. A society that puts freedom before equality will get a high degree of both."[32] His ideas were adopted amid a wave of liberal economic policy in the early 1980s under Margaret Thatcher in the UK and Ronald Reagan in the US, but have started to cede ground as economic equality did not rise in proportion to economic opportunity. The Great Gatsby Curve[33] shows that increased inequality is positively correlated with lower intergenerational mobility in socioeconomic status.

Nobel Prize winner Daron Acemoglu et al. (2013) argue that higher inequality and lower social mobility can create fertile ground for populist movements. Similarly, Rodrik's (2018) work finds that globalization and growing inequality have contributed to the rise in populism. Rodrik uses a fascinating simulation to show how ongoing trade liberalization has come at a progressively increasing cost for low-skilled labor. Table 4.2 shows that the losses incurred by adversely affected groups per dollar of efficiency gain are progressively higher, the lower the tariff barrier that is removed. As such, the removal of tariffs to the 2% levels of the pre-Trump era can be seen as picking up dimes in front of an approaching populist steamroller.

32. See Milton (2002).

33. See Krueger and Mueller (2012).

Table 4.2: Distributive and efficiency consequences of trade liberalization: Illustrative calculations

Initial tariff being removed	Change in low-skill wages (A)	Increase in real income of economy (B)	Absolute value of ratio (A)/(B)
40%	-19.44%	4.00%	4.9
30%	-15.22%	2.25%	6.8
20%	-10.61%	1.00%	10.6
10%	-5.56%	0.25%	22.2
5%	-2.85%	0.06%	45.5
3%	-1.72%	0.02%	76.6

Notes: Column (B) is computed using the standard formula for the gains from trade (e.g. Feenstra 2016, p. 220), assuming an import-GDP ratio of 25% and an import demand elasticity of -2. Column (A) is generated using a model with two factors (low- and high-skilled labor) and two goods with mobile factors, assuming the import-competing sector is low-skill-intensive.
Source: Rodrik (2018).

Globalization, trade liberalization, the rise of winner-takes-all markets, rapid technological change and fading labor market unionization have all played their part in creating a populist backlash.

The distinct economic signature of populism

Populism has a distinct economic signature. When it emerges as a reaction to the developments described in the previous section, it is marked by rising nationalism and economic protectionism. A study by Funke (2023) shows that economies with a populist in power experience 60 bps lower growth than an economy without a populist in charge over the subsequent five years. What's more, they lag the global economic growth trajectory by one percentage point per year in the 15 years following a populist coming to power. The current US administration has a populist streak, which Liberation Day provides clear evidence of.

One of the reasons why a populist government may result in subdued economic activity is because its policy is erratic. This leads to frequent shocks related to economic policy uncertainty, as we have seen in the US so far this year. Increased uncertainty on the back of more frequent (small) policy shocks has been shown to have significant macroeconomic consequences in the medium term.[34]

Our research focusing on the impact of policy uncertainty on US consumption shows that a single standard deviation increase in US policy uncertainty shaves around 60 bps off cyclical US consumption growth. It is striking that the correlation between policy uncertainty shocks and consumption growth is becoming increasingly negative prior to a one-standard-deviation shock. Apparently, consumers have rational expectations about event risk and brace themselves for any potential impact. This is corroborated by Coibion et al. (2024), who also find that higher perceived macroeconomic uncertainty leads US households to respond pre-emptively.

The future of populism

"Pay attention, I'm telling you something important, this is a game change, this is not business as usual, this is a highly aggrieved world." We have been citing the Edelman Trust survey in this publication for several years for its ability to signal the erosion of trust in institutions, but never have we heard such an alarmist tone from its CEO, Richard Edelman, as in his statement above at Davos 2025.[35]
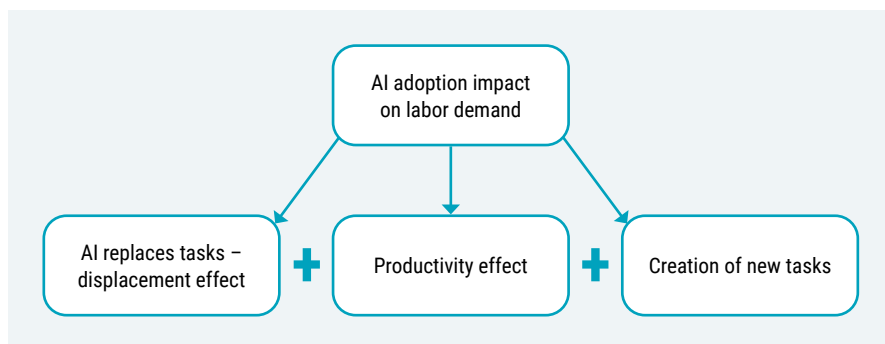
This year's survey shows that 61% of global respondents say they feel a sense of grievance because business and government only serve a select few, with 'the system' favoring the rich. This kind of sentiment probably represents fertile ground for populist leaders to exploit. Populism is unlikely to be just a passing phase but a structural force over the next five years, despite its flattening momentum.

How AI adoption is influencing the capital-labor balance

In 1930, British economist John Maynard Keynes wrote a remarkable essay entitled 'On the economic possibilities of our grandchildren'. In it he described the rapid productivity gains made in manufacturing in the early 1920s resulting from electrification, stating that: "We are being afflicted with a new disease of which some readers may not have heard the name, but of which they will hear a great deal in the years to come – namely, technological unemployment." Nearly a hundred years later his words still resonate thanks to the proliferation of AI. The Edelman Trust Monitor 2025 conveys a bleak perception of AI among the general public. Even among respondents reporting low grievance, only 50% are comfortable with the use of AI in business. This underlines our view that if AI-related job displacement were to materialize, the backlash against tech hegemony and rising inequality could intensify.

Anxiety about job displacement due to technological progress is not without grounds, as Keynes highlighted almost a century ago. Figure 4.13 shows how the share of agriculture workers in the workforce slumped by more than 75% in a lifetime, entirely as predicted by Keynes in his 1930 essay. We highlighted three ways that AI adoption could potentially influence the job market: substitution, augmentation or creation of new jobs.

34 See: https://www.federalreserve.gov/
econres/notes/feds-notes/costs-of-
rising-uncertainty-20250424.html

35. 2025 Edelman Trust Barometer | Edelman

Figure 4.12: Possible job market influence from AI adoption

Source: Robeco, July 2025.

Deming, Ong and Summers (2025) draw historical parallels with past technological disruptions in the US labor market. While they find that the pace of labor market change has slowed in recent decades compared with the early 20th century, more recently labor market churn has picked up, suggesting AI is already changing the structure of the jobs market.

Figure 4.13: Changes in the occupation structure of the US labor market, 1880-2024
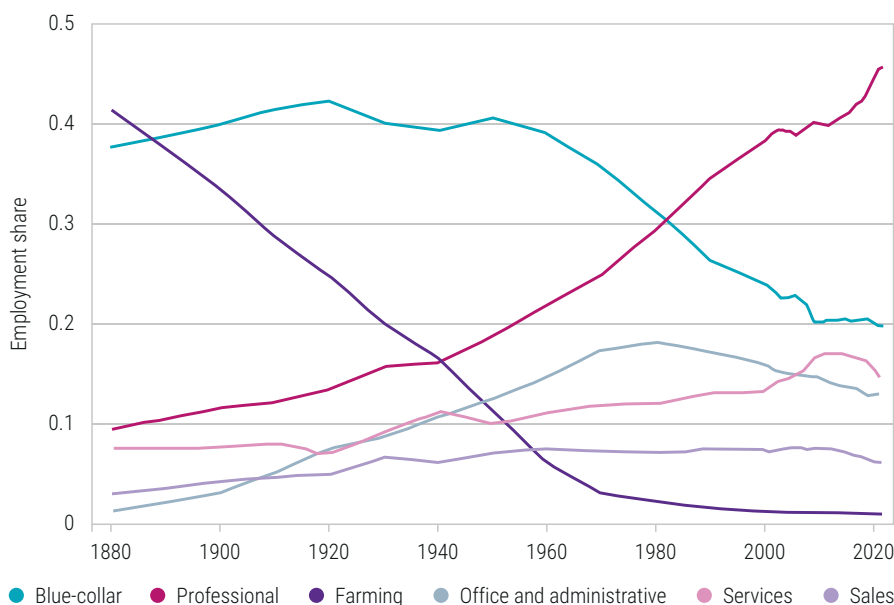
Notes: Calculations are based on decadal US census data from 1880-2000 (except for 1890) and 2021-2022 American Community Survey (ACS) samples (except for 2020), sourced via the Integrated Public Use Microdata Series (IPUMS; Ruggles et al. 2024). Occupations are harmonized across decades to two-digit SOC codes using the IPUMS occ1950 encoding and methodology used in Autor and Dorn 2013; a detailed methodology is described in the data appendix. Samples are restricted to workers aged 18 to 64 in non-institutional quarters who provide non-military occupational responses. See the appendix for exhaustive definitions of each category.
Source: Deming, Ong and Summers, 2025.

The EPOCH of AI

Other academics sound more sanguine about the potential for future job losses as a result of increasing AI adoption, do not believe in technological determinism, and see a path for policy to complement rather than substitute labor in an age of AI. One prominent study in this vein is that of Loaiza and Rigobon (2024), who focus on instances when human capabilities are needed to compensate for AI's shortcomings. They show that jobs with

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high reliance on Empathy, Presence, Opinion, Creativity and Hope (EPOCH) are at low risk of being substituted by AI. In fact, they find that there are more jobs that involve EPOCH elements being created,[36] noting that in recent years there has been a notable shift toward work that involves these characteristics. In our view, this suggests that the age of AI will create new tasks. Partial automation may increase productivity and involve workers focusing on higher-value activities, especially those with strong digital skills. But the study also shows that jobs in which AI complements workers experienced negative employment growth (albeit less negative than jobs that could be automated).

36. Examples are new roles in mental health, coaching and education.

Figure 4.14: Occupational task variability and automation score show a hump-shaped relation

Jobs' level of exposure to artificial intelligence

- ● Highest exposure, low task variability (gradient 4)
- ● Significant exposure, high task variability (gradient 3)
- ● Moderate exposure, mixed task variability (gradient 2)
- ● Low exposure, high task variability (gradient 1)
- ● Minimal exposure
- ● Not exposed
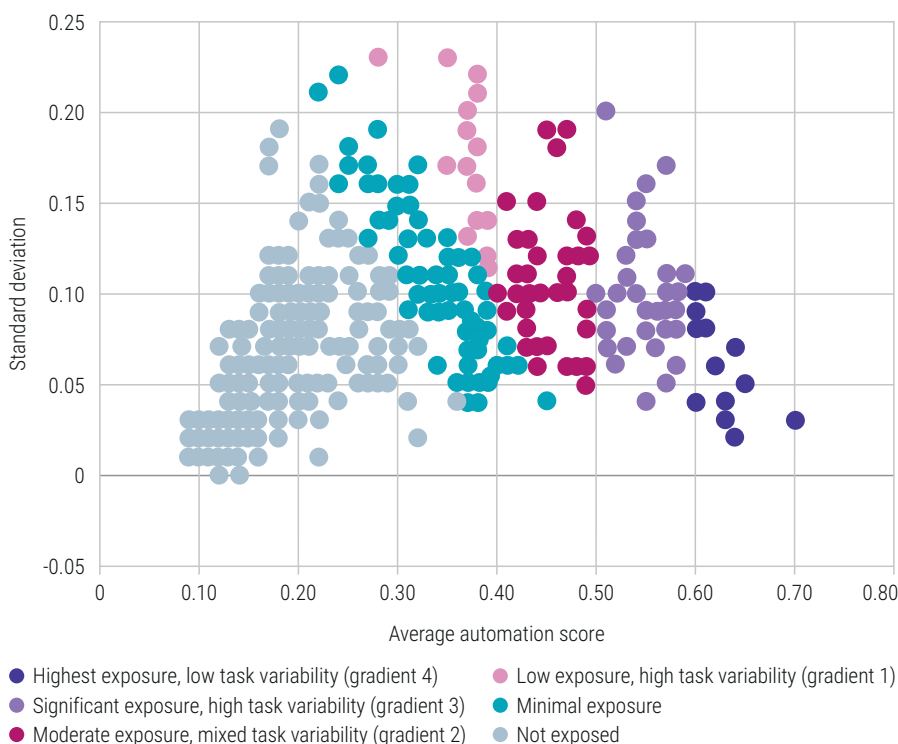
Source: ILO working paper 140, May 2025. Job-level exposure to artificial intelligence. Standard deviation represents the dispersion of task-level automation scores within an occupation. Average score represents the mean automation score for all tasks within an occupation.

Elasticity of substitution for AI-intensive industries is increasing

Whether the negative impacts of automation of labor will outweigh the positive impact of AI in terms of creation of new tasks or labor complementarity is a key question. Like in our outlook last year, here we restate the importance of the elasticity of substitution between labor and capital. This ratio helps us understand how the proportions of capital and labor change in response to changes in their relative productivity.

$$\text{Elasticity of substitution} = \frac{\partial \ln (K/L)}{\partial \ln (MPL/MPK)}$$

- · (K/L): represents the capital-to-labor ratio.
- · (MPL/MPK): the ratio of the marginal product of labor to the marginal product of capital.
- · $\partial \ln$: the partial derivative of the natural logarithm.

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While most economists and macroeconometric models assume the ratio is close to 1 (in which case capital is a perfect substitute for labor), Cuadrado, Long and Poschke (2018) find that the elasticity of substitution of capital-labor is higher in manufacturing than in services, leading to a larger decline in the labor share in manufacturing. Gechert et al. (2022) find that the elasticity of substitution between labor and capital is much lower than 121 studies previously found when correcting for biases like publication bias. The conditional elasticity is only 0.3, which implies automation is much less able to replace labor. However, as we move closer toward AI agents and artificial general intelligence, it is likely that capital and labor become more interchangeable. A recent IMF paper (Cerutti et al., 2025) uses an elasticity of 0.6 for AI-intensive industries.

Our baseline view remains that for the median worker, the complementary effect of adopting AI is likely to outweigh the displacement effect over the coming years. Artificial general intelligence, which looks set to become more commonplace in the 2030s, will probably result in a rising elasticity of substitution between capital and labor. This would mean further AI adoption would become increasingly disinflationary as it raises technology-induced unemployment. Keynes could be correct once more.

4.9 Pillar 6: The US versus China

The great trade hack
The power play between China and the US remains the defining feature of the geopolitical landscape. Donald Trump became president campaigning that the US had been "ripped off" and taken advantage of by other countries, not only by China but also by allies. His 'art of the deal' mantra holds that unilateral action can force others to capitulate and submit to his demands. This belief has transpired into a series of policy actions, most clearly epitomized by Liberation Day. Baldwin (2025) refers to the sweeping tariff offensive by the Trump administration that aims to bypass the rules of global trade as "the great trade hack".

With the prospect of the US tariff rate probably ending up between 15-20% by 2026 for the average trading partner, many countries have capitulated to US demands. Negotiations have spurred an exceptional V-shaped equity market recovery since April, even though the average US tariff rate remains at its highest level since the 1930s. This can be claimed as a victory for the US administration, which could incentivize another round of tariffs in the future. The endgame seems to be a world that faces much higher tariffs going forward.

A liberation that could backfire
Liberation Day launched a tariff war, with the US administration aiming to achieve five policy goals: first, reduced US dependence on China due to national security and supply chain vulnerabilities; second, increased tax revenues; third, a lower US trade deficit; fourth, a revival in US manufacturing; last, creating leverage in broader negotiations on border security, drug trafficking and defense spending.

In a further sign of victory for the US administration, at the NATO summit in June European members agreed to a 5% of GDP defense-spending target by 2035, with 3.5% on core defense and 1.5% on resilience investments such as cybersecurity, infrastructure and civil preparedness. The US under President Trump has made it clear that it is no longer willing to underwrite security and defense for its allies, and other NATO members have taken notice.

While tariff revenues and improved burden-sharing within NATO can be seen as victories for the US administration, increased protectionism and isolationism could come at a future cost. First, the US has been losing soft power. Surveys show the US is increasingly disliked by other nations.[37] While the US retained the number-one spot in the Global Soft Power Index 2025, the US's reputation has suffered, as has its perceived governance quality.

37. US Seen As an Ally, Threat Around the World | Pew Research Center

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Second, recent US policy actions could also undermine a US manufacturing renaissance. Around 10% of US manufacturing output is linked to the defense industry. In response to US protectionism, Europe is also turning more inward. For instance, European countries drawing from the EU's new defense procurement loan pool can only spend the funds on products and services from European defense companies. Tariffs on European imports could also hurt the US defense industry.

Third, the US strategy of bullying other countries into submission may backfire in the coming years. The world economy is not a static system and it would be naive of US policymakers to assume that other countries cannot opt out of a US-led order. Reflexivity abounds since President Trump delivered the biggest shock to trade policy in decades.[38] While longstanding US allies will not align themselves with China, they are clearly hedging their bets, especially countries that were already much more in the Chinese sphere of influence.

38. Reflexivity is the idea that a two-way feedback loop exists in which perceptions affect that environment, which in turn changes perceptions.

The aftermath of the great trade hack: Three future responses to the rise in protectionism

Countries have three main options in how they respond to US trade tariffs. First, they may impose retaliatory tariffs. Second, they can promote their domestic industries with new subsidies or trade barriers. Third, they may look to divert trade – conducting more trade with other partners, signing new trade agreements and entering new markets.

Figure 4.15: Europe has been able to gain US import market share conditioned for its tariff sensitivity
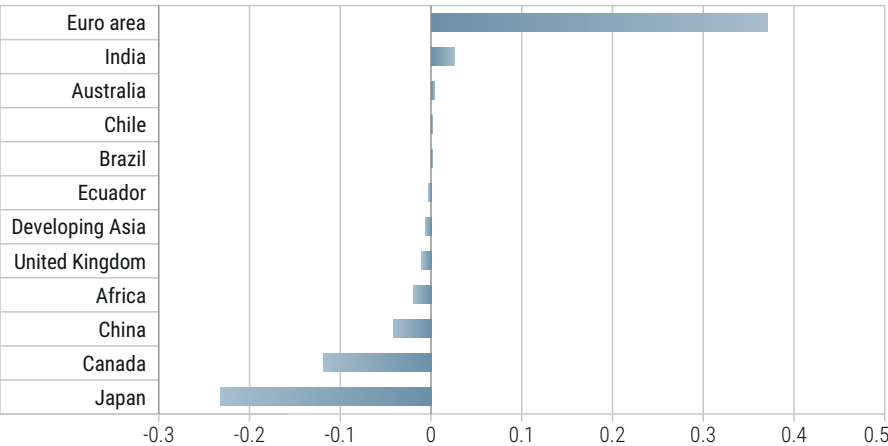
Source: LSEG Datastream, Robeco, July 2025. Our trade competitiveness metric is calculated as the change in market share of US imports divided by the tariff beta (which is the regression coefficient of the logarithmic change in US imports regressed on the logarithmic change in US trade weighted tariff rate).

The rise of managed multilateral drift

Of the three potential responses to US trade policy, trade diversion seems the most efficient option. Retaliation may provoke further tariff increases. Changing industrial policy is generally inefficient as doing so lowers the global price of the subsidized goods and may lead to countermeasures such as tariffs. Rotunno and Ruta (2025) find that trade diversion is of mutual benefit for two countries that are targeted by tariffs from a large trading partner.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 4.16: How managed multilateral drift could boost real income
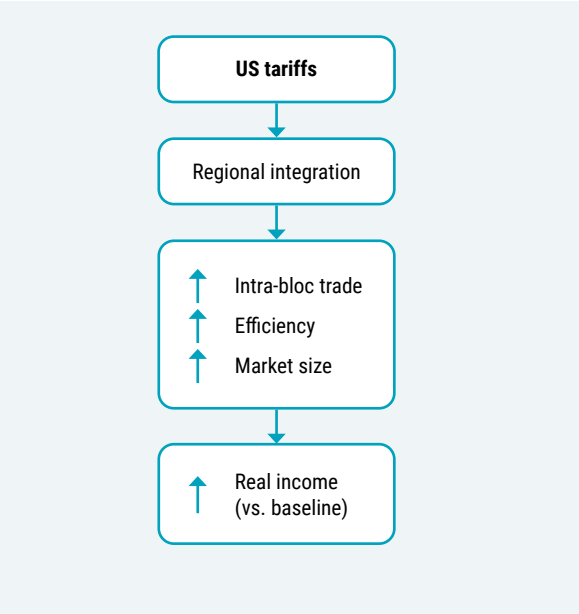
Source: Robeco, July 2025. Following Rotunno and Ruta (2025).

Strikingly, their simulations find that the real income from countries that seek deeper integration increases more in a situation with US tariffs than in a scenario without tariffs. We see Baldwin's 'Managed Multilateral Drift' scenario as the most likely development, with new trade agreements resulting in the US being increasingly sidelined, and trading partners that impose implicit barriers for US exporters receiving preferential treatment.

Table 4.3: Trade scenarios

Scenario	Stability	Role of US	WTO status
Chaos, 1930-style	Low	Perpetuator	Destroyed
Managed multilateral drift	Moderate	Marginal	Survives, diminished
Fighting trade blocs	Low	Defensive	Sidelined
Reglobalization without the US	High	Minor	Possible revival

Source: Baldwin (2025).

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Tariffs and inflation

Whether tariffs ignite inflation depends on a myriad of factors, which we have summarized in the flowchart below.

Figure 4.17: How tariffs impact inflation
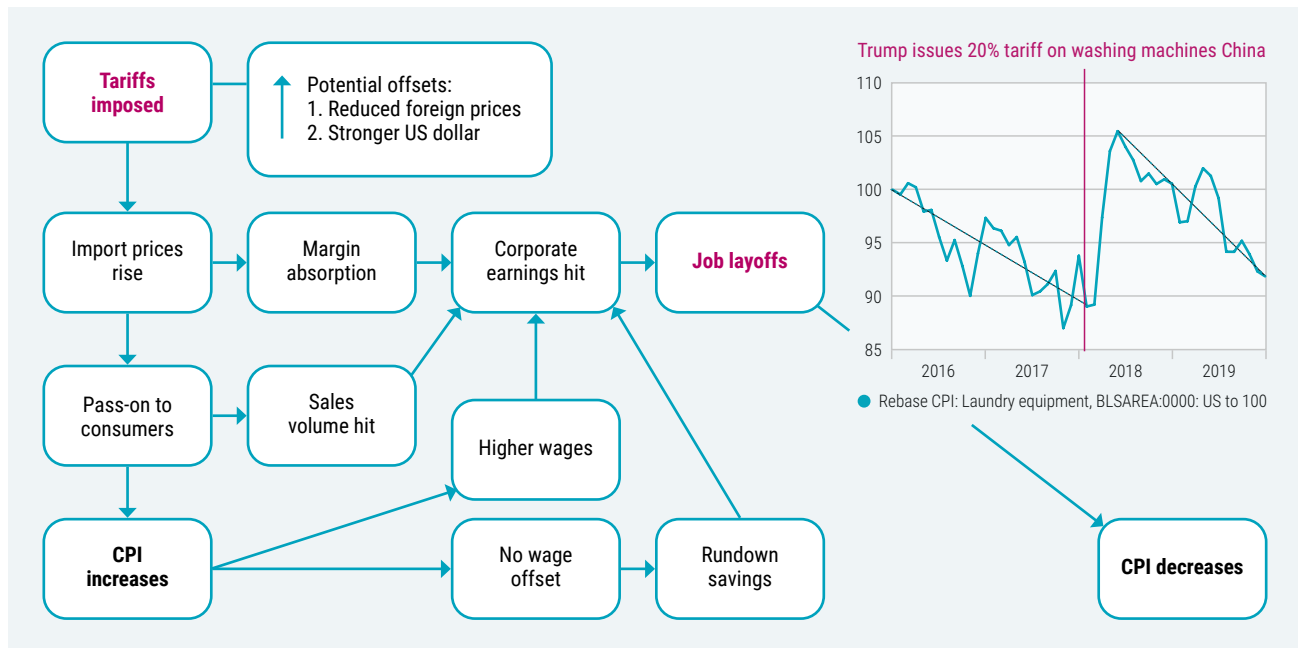
Source: Robeco, April 2025.

Unlike the 1930s, today's tariff war is increasing the likelihood of stagflation occurring. Back then, the Smoot-Hawley tariffs made what was a deflationary depression worse. Now, with flexible exchange rates, fiat money, and central banks much more willing to use policy space and the rise of fiscal dominance, inflation is more likely to result. What's more, unlike the 1930s, the current tariff war started with the US economy running much closer to capacity constraints. Meanwhile, commodity prices may be more likely to hold up today due to intense competition for critical inputs for AI and green tech. While stagflation is an unstable equilibrium and will probably be followed by disinflation, we believe these factors will offset the disinflationary impulse typically associated with global recessions. Overall, today's tariffs are more likely to fuel inflation than suppress it, especially if they are combined with fiscal expansion or tax substitution.

4.10 Policy by other means

In his seminal work On War, published in 1832, Prussian military theorist Carl von Clausewitz stated that "war is merely the continuation of policy by other means." In 2024 there were 23 wars and high-intensity conflicts going on around the world, according to the Stockholm International Peace Research Institute database. Hybrid conflicts are also on the rise, with states using disinformation, cyberattacks and economic coercion to achieve their aims. Tariffs can be categorized under this umbrella, with President Trump claiming that "the days of economic surrender are over."[39]

As we highlighted above, economic grievance is widespread. The rise of hybrid conflicts suggests the line between peace and war is becoming increasingly blurred, and last year we referred to a "peace that is no peace."[40] Von Clausewitz's insight explains why a world that increasingly sees war as instrumental to achieve policy goals is re-arming itself. The NATO summit in The Hague in June 2025 was widely seen as a turning point for

39. President Trump's Bold Trade Action Draws Praise – The White House

40. In a 1945 essay, George Orwell wrote about a "peace that is no peace" as he saw the dawn of the nuclear age and the potential for mutual assured destruction.

European defense, with leaders stepping up efforts to re-arm the continent in recognition that the peace dividend has vanished by agreeing to spend 5% of GDP on defense by 2035. Of this, 3.5% of GDP is earmarked for core defense purposes such as military equipment and personnel, and the other 1.5% for resilience investments such as cybersecurity, infrastructure and energy security.

Reverting to historical levels of defense spending

The peace dividend is gone and we are reverting to the long-run trend in defense spending. Average military expenditure has been 2.5% of GDP for 190 countries, with averages for both the UK and Germany since 1816 of 3.5% of GDP.

Figure 4.18: Out of sight, out of mind

Geographical proximity to Russia versus defense expenditures as % of GDP for European countries
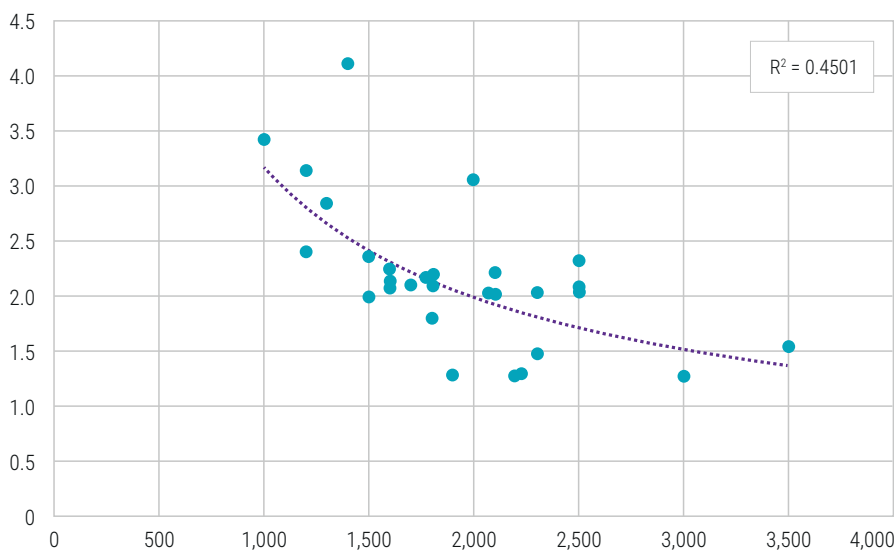
Source: NATO, Robeco, July 2025.

Economic impact of defense spending on the European economy

Last year we were cautious about the overall economic impact of defense spending, where research showed that each additional euro going toward defense spending only increases real activity by 60-80 eurocents.[41] However, more recent studies, such as Ilzetzki (2025), have shown higher fiscal multipliers from defense spending, with 0.6 as a lower bound.

41. See Gemert, Lieb, & Treibich (2022).

Fiscal multipliers are typically higher when there is slack, spending is financed by debt instead of taxes, and central banks ease monetary policy. Especially in the first half of our projection period, Europe ticks these boxes. A conservative estimate is that defense spending increasing from 2.0% to 3.5% of GDP would add 0.9% to 1.5% to European GDP. Every 1 percentage point increase in military expenditure as a percentage of GDP could result in productivity growth increasing by 0.25%.

The possibility of a monumental increase in defense spending triggering another bout of inflation is certainly there if it is not offset by spending cuts or higher taxation elsewhere. However, we also need to take into account two mitigating factors. First, German industry is currently slacking, with capacity utilization far below trend, which should keep a lid on inflation in the near term. Second, potential positive supply-side effects resulting from innovations emerging from high defense spending could act as a disinflationary force, as potential output is raised versus actual output and resources being relocated from less productive areas of the economy to more productive ones.

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Bull case: The Luminous Renaissance

Figure 4.19: Our bull case framework
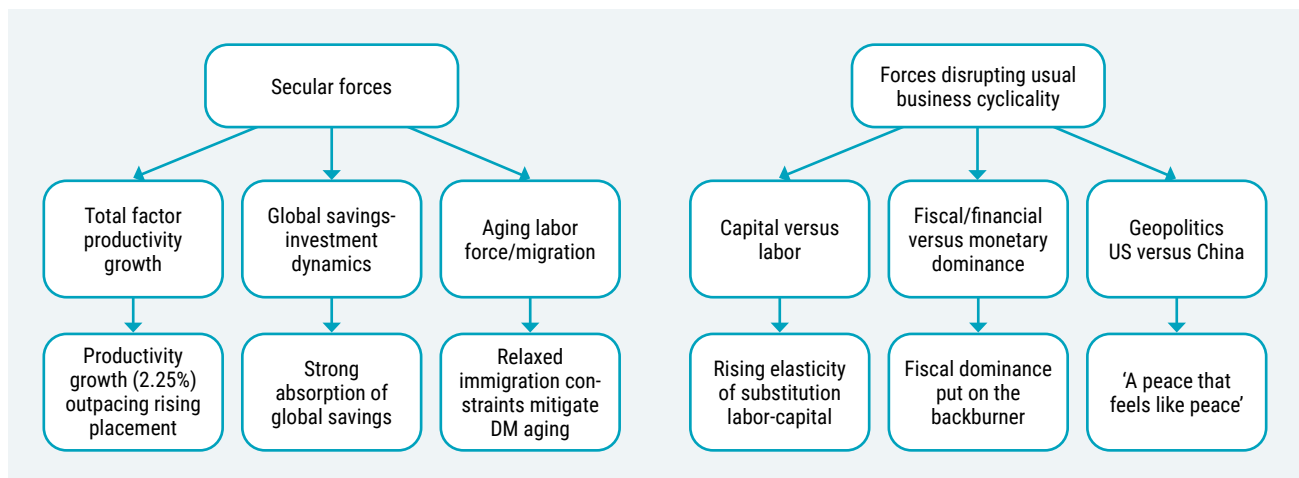
Source: Robeco, July 2025.

In our bull case, the world enters an innovative period marked by a global synchronized cyclical upswing powered by steady diffusion of AI. Our six macro pillars align to facilitate a renaissance that is not stale, but luminous. Whereas in our base case laggards in AI adoption continue to lag, in this scenario they catch up.

Geopolitical fragmentation moderates and there could even be a resumption of globalization, albeit without the US's participation in the first half of our projection period. The US-China rivalry remains intense but avoids crisis, while Europe asserts greater strategic autonomy. The forces disrupting business cyclicality ease, with fiscal authorities escaping from their central banks' crosshairs thanks to a major positive supply shock. In our bull case, US economist Richard Solow's much-cited quip from the late 1990s that "I can see computers everywhere except in the productivity statistics" will be transposed into "we can see GPUs everywhere and even more so in the productivity statistics". Innovations in energy efficiency and increases in energy capacity mean Jevon's paradox becomes less binding, and the subsequent decline in marginal costs for AI applications spur the technology's widespread adoption, leading to a disinflationary boost for the global economy.

In our bull case we expect productivity growth to be 50 bps higher than in our base case, with productivity growth matching the 2.25-2.50% GDP per capita growth achieved by major economies since World War II. Productivity growth is spurred by more rapid dispersion and adoption of AI, with AI-related hardware becoming cheaper due to increased competition and accessibility thanks to government regulation and targeted technology education efforts. The global investment climate also improves as geopolitical turmoil subsides and societies' trust levels jump, creating improved visibility for corporate CFOs to invest.

On the back of capital deepening, small- and medium-sized companies also increasingly adopt AI. As AI's capabilities increase, so does technological unemployment, resulting in reduced wage demands. Companies, especially those at the technological frontier, therefore benefit from an increase in profitability as unit labor cost growth remains balanced. The power play between capital and labor is convincingly won by capital. The result is a triumph of the optimists as there is a Goldilocks scenario for central banks in which economies are running neither too hot nor too cold. An economic scenario akin to that of the US in the late 1950s emerges: close to 3% real GDP growth per year, with inflation cycling around 2%.

Bear case: The Exorbitant Decay

Figure 4.20: Our bear case framework
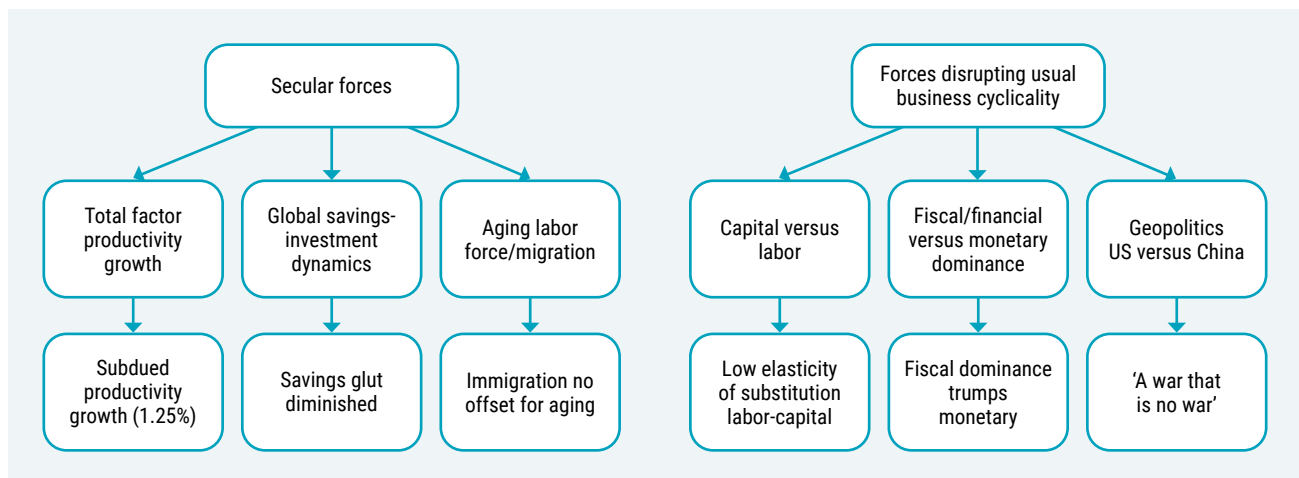
Source: Robeco, July 2025.

In our bear case scenario we see a further unraveling of the global economic order. Institutions and principles that still have relevance in our base case, like the World Trade Organization and central bank independence, are sidelined and experience genuine decay. And it is an exorbitant decay – a preventable, self-inflicted decay rooted in persisting US policy incoherency, which ultimately undermines the US's exorbitant privilege. The peace dividend morphs into a security premium. The supply side is squeezed by low labor force growth, and AI does not offset the demographic drag. While hailed as likely to have revolutionary effects on productivity, the diffusion of AI is uneven and its impact ambiguous. Instead of lifting all boats, it risks deepening divides between tech leaders and laggards, amplifying inequality and geopolitical tensions. Governments, emboldened by populist mandates and geopolitical urgency, increasingly sideline central banks.

In our bear case, the Fed gives way to pressure from the US administration and adopts a low-rate regime. This ushers in another wave of inflation. US funding costs rise sharply as foreign investors diversify away from the US. Faced with a deteriorating net international investment position, the US administration pursues an even more protectionist trade policy to reduce the trade deficit, reinforcing the inflationary impulse and fueling risk aversion toward US assets. The US dollar enters a bear market.

In this scenario inflation peaks above 4% again in developed economies in the next five years, with growth in advanced economies averaging around 0.8% per year. It is not only the legacy of persistent fiscal deficits that creates a second inflation wave and a higher US term premium; the geopolitical environment remains turbulent, with the emergence of fighting trading blocs and the WTO sidelined. As tariffs target technology goods which exhibit relatively inelastic demand, an inflationary rather than deflationary impulse results, unlike in the 1930s. Wage pressures and unionization increase at the same time as firms face tighter capital conditions and geopolitical headwinds.

Ultimately, this stagflationary environment is a precursor to a short-lived global recession that takes the sting out of inflation as the US consumer ramps up their precautionary savings. Higher US domestic savings gradually compensate for foreign investors' departure, reducing the term premium on US Treasuries toward 2030. ●

5. Expected returns

Neither economic expansions nor bull markets come with pre-determined expiration dates. So could the current bull market persist over the coming years? In this chapter we discuss our expected returns for the various asset classes over the next five years. We show that we expect some risky asset classes to provide above their historical average risk premiums, but not all.

In Table 5.1, we show our expected returns in four major currencies. There are some notable changes from last year, the most prominent of which is our expected return for US Treasuries. Last year, we expected long-term rates to gradually fall, resulting in a 6% annualized return for Treasuries over the subsequent five years. However, as we have argued in this outlook, the impact of US policies may undermine this asset class's safe-haven status over the coming period, with the fading of US exceptionalism possibly resulting in long-term interest rates increasing slightly. As a result, our expected return for Treasuries is now just 3.5% per year – a substantial decline. This also impacts asset classes that trade relative to US Treasuries, such as corporate bonds and hard-currency emerging markets debt. Despite their current lower yield, we expect that returns on German bonds will only be 75 bps below that of Treasuries.

We expect declining inflation differentials between emerging markets and developed markets over the coming period. This will enable central banks in emerging markets to cut rates, which should be positive for local-currency emerging debt. Combined with further US dollar weakness, it should also be good for emerging markets equities. As such, we forecast a relatively high return for local-currency emerging markets debt within fixed income asset classes, and have increased our expected return projection for emerging market equities by 25 bps since last year.

The growth in the emerging markets debt asset class over the past decade has motivated us to expand our coverage in this report. We now include hard-currency emerging markets government debt as a separate asset class. Historically, the returns of this asset class have been highly correlated with those of US high yield corporate bonds, even though half of the universe is rated investment grade. Given the higher yield for similarly rated segments, we expect the hard-currency emerging debt market to outperform high yield corporate bonds over the coming five years by 50 bps per year (3.75% versus 3.25%).

Table 5.1: Five-year return forecast for the main asset classes

	Long-term	Medium-term influences				Forecast in EUR			USD	JPY	GBP
	Returns	Valuation	Macro	Climate		2026-30	2025-29		2026-30	2026-30	2026-30
Fixed income											
Domestic cash	3.50%		-0.50%		↓	3.00%	3.50%		3.75%	1.00%	4.00%
Domestic bonds	4.00%	-1.00%	-0.25%	0.00%	↑	2.75%	2.25%		3.50%	1.25%	4.50%
Developed	4.25%	-0.75%	-0.50%	0.00%	↓	3.00%	4.00%		3.75%	1.00%	4.00%
Emerging debt (local)	5.75%	-0.25%	-0.25%	-0.25%	↓	5.50%	6.00%		6.25%	3.25%	6.00%
Emerging debt (hard)	6.00%	-2.25%	0.25%	-0.25%	↓	3.75%	5.50%		4.50%	1.75%	4.75%
Corporate inv grade	5.00%	-1.75%	-0.25%	0.00%	↓	3.00%	5.25%		3.75%	1.00%	4.00%
Corporate high yield	6.00%	-2.75%	0.00%	0.00%	↓	3.25%	5.50%		4.00%	1.25%	4.25%
Equity											
Developed	7.00%	-1.75%	0.75%	0.00%	↓	6.00%	6.50%		6.75%	3.75%	6.50%
Emerging	7.50%	-0.25%	0.25%	0.00%	↑	7.50%	7.25%		8.25%	5.25%	8.00%
Real estate	6.00%	-0.25%	-0.25%	0.00%	≈	5.50%	5.50%		6.25%	3.25%	6.00%
Commodities	4.00%	-1.00%	1.75%	0.50%	↑	5.25%	4.75%		6.00%	3.00%	5.75%
CPI											
Inflation	3.00%					2.50%	2.50%		2.75%	1.50%	2.75%

Capital at risk: Returns are geometric and annualized. The scenarios presented are not an exact indicator. They are an estimate of future performance based on current market conditions and evidence from the past on how the value of this investment varies. Expected returns will vary dependent on market performance. Source: Robeco. September 2025. The medium-term influences represent our assessments of the valuation, climate and macro influences discussed in Chapters 2, 3 and 4. The expected returns we show are geometric and annualized. Bond returns are euro-hedged, except for local-currency emerging markets debt. The value of your investments may fluctuate, and estimated performance is no guarantee of future results.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 5.1 plots these expected returns against long-term volatility estimates for each asset class. Whereas the returns represent our projections for the next five years, the volatility figures are long-term estimates and are close to their actual long-term historical averages.

Although it might be tempting to plot a mean-variance efficient frontier, doing so would be unwise because we have not considered correlations in our analysis. Even assets with low expected returns and high expected volatility could still form part of a mean-variance efficient portfolio if they have a low correlation with other asset classes.

Figure 5.1: Five-year return forecast versus expected volatility
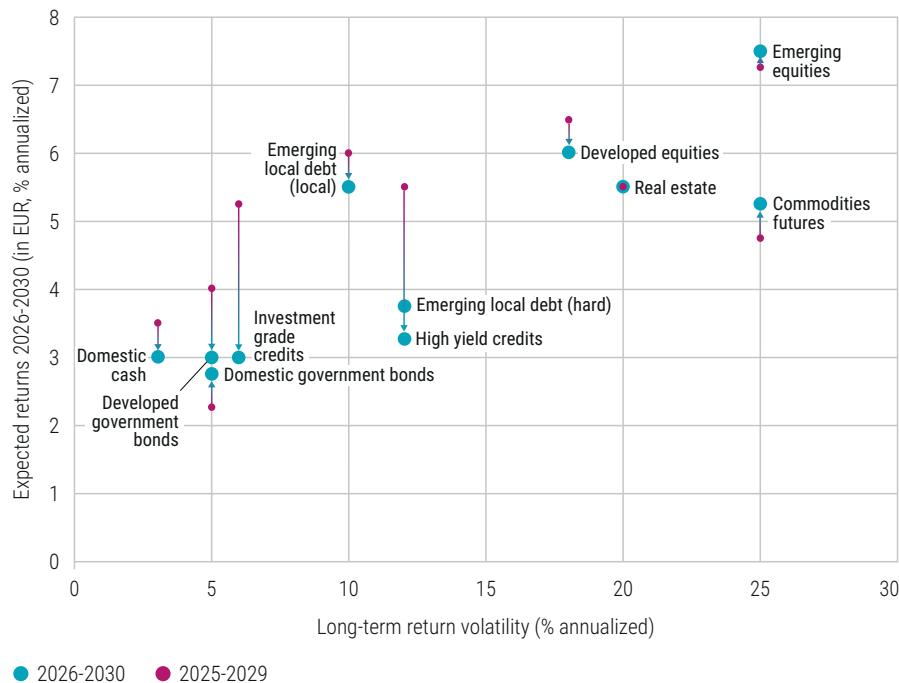

● 2026-2030   ● 2025-2029

Capital at risk: Returns are geometric and annualized. The scenarios presented are not an exact indicator. They are an estimate of future performance based on current market conditions and evidence from the past on how the value of this investment varies. Expected returns will vary dependent on market performance. Source: Robeco. September 2025. Vertical axis shows the expected geometric annualized returns for a euro investor over 2026-2030 and 2025-2029. The horizontal axis is a proxy for the long-term volatility of each asset class.

Predicting future volatility

Over the past year, we conducted analysis to determine whether it is useful to attempt to predict five-year volatility in addition to returns. Figure 5.2 shows our findings for the US equity (left) and US bond (right) market, but in our research we examined many more asset classes.

Our analysis used historical volatility figures to predict future volatility over various timeframes – three months, one year and five years, and the 'long-term' average as used in our first 2013-2017 Expected Returns outlook. The higher the bars in Figure 5.2, the worse the volatility prediction is.

Looking at US equity over the next three months, we see that the difference between the predicted and realized volatility, the so-called 'prediction errors', is low at 2.5%. Using a longer historical timeframe makes the three-month predictions worse, with the long-term volatility figure resulting in the highest prediction error of 5.9%. In the one-year volatility figures, we see it is still better to use short-term historical estimators, but the differences between the prediction errors from using short- and long-term historical datasets become smaller.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

In terms of estimated five-year volatility – the timeframe our outlook covers – we see that the long-term historical dataset produces the lowest prediction error. The three-month historical estimator involves a prediction error of 4.8%, whereas that of the long-term estimator is only 3.6%. This is the main reason that we use long-term volatilities, instead of time-varying estimators in Figure 5.1.

Note, however, that many investors consider shorter-term volatility than five years when they are making their asset allocation decisions. For such investors, it makes sense to use recent historical volatility estimators. Studies that focus on longer horizons typically find that long lookback periods have better predictive ability for longer horizons.[1]

1. See, for example, Cardinale, Naik, and Sharma (2021).

Figure 5.2: Prediction error for US stock and bond volatility estimators over four horizons
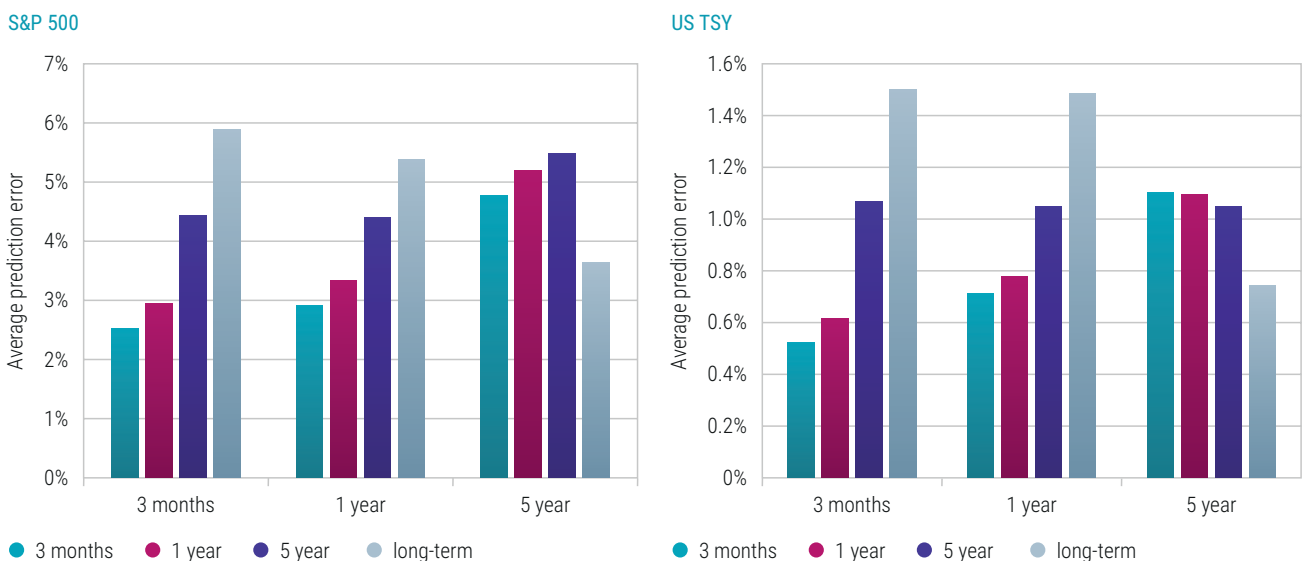
Source: Robeco, Bloomberg. Data period for the S&P 500 is 1964-2024 and for the Bloomberg US Treasury index 1994-2024. Average prediction error is the median absolute deviation. The different colors represent different volatility estimators, using an exponentially weighted smoothed average of three months, one year, five years, and the long-term average from our first Expected Returns 2013-2017 report. The different sets of columns represent the prediction horizons of three months, one year and five years.

A stagflationary twist to correlations and asset returns

Our Stale Renaissance base case does not herald a golden age for risky assets even though equity risk premiums have historically been above steady-state levels when inflation has remained between 2%-4% (see Table 5.2). A geopolitically fragmenting world creates a tail risk of stagflation, which would result in downside risk to what would otherwise be healthy returns.

Table 5.2: Real returns 1875-2021

Asset class	Inflation <0%	0%-2%	2%-4%	Inflation >4%
Equities	5.5	9.8	8.2	-1.7
Bonds	8.4	3.4	1.6	-4.6
Cash	5.9	1.5	0.5	-4.3

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: Baltussen, Swinkels, Van Vliet, and Van Vliet (2023).

To reduce its trade deficit, the US has adopted a protectionist stance, which is likely to have varying consequences for asset returns and risk premiums in the medium term.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 5.3: US Treasury returns have historically been positively correlated with higher US trade deficits

	Historical beta of 1Y returns to 1Y change in US trade balance
US Dollar Index (DXY)	-0.07
JPMorgan GBI-EM Global Diversified Composite	-0.01
Crude Oil BFO M1 Europe FOB $/bbl	0.07
Nikkei 225 Stock Average	0.08
Euro Stoxx	0.21
MSCI Emerging Markets (USD)	0.36
Hang Seng Index	0.38
MSCI World Equity REITs (USD)	0.40
S&P 500	0.49
Gold, USD FX Composite ($/troy oz)	0.51
ICE BofA Global High Yield Index	0.51
ICE BofA Global Corporate Index	0.61
US Dollar Benchmark 10Y Government Bond Index	0.83
iShares MSCI EM ex-China UCITS ETF USD Acc (EUR)	0.85

● Historical beta of 1Y returns to 1Y change in US trade balance
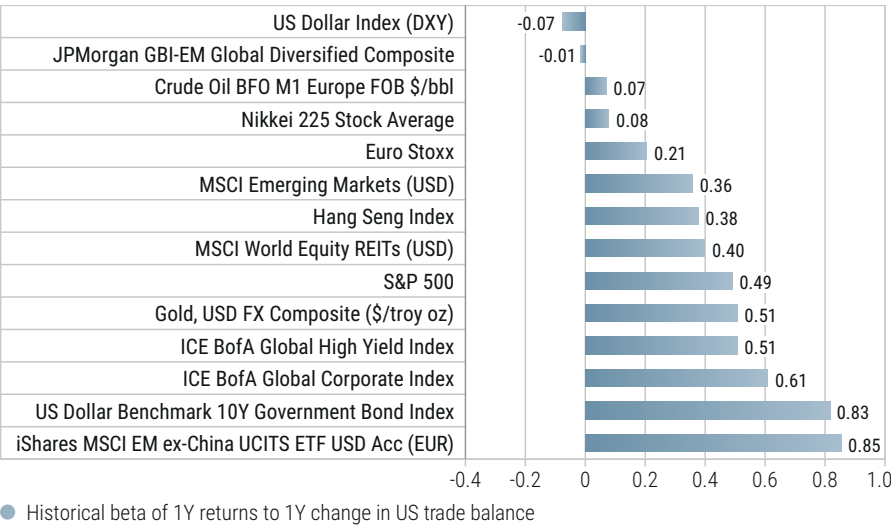
Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: LSEG Datastream, Robeco, July 2025.

5.1 Cash

Cash serves as the cornerstone of any portfolio, providing essential liquidity while acting as a buffer against long-term inflation and short-term market volatility. Its returns are ultimately shaped by the structural dynamics of the economy and the strategic decisions central banks make throughout the business cycle.

Constrained policy normalization

Our rates theme for the next five years is one of constrained policy normalization in the central bank landscape, with segmented convergence and divergence. On the one hand we expect to see increasing divergence in interest rates in the developed world, but more convergence in emerging markets. This emerging market convergence will be facilitated by a weakening dollar, which should provide a broad-based disinflationary impulse across emerging markets.

Diverging central bank landscape

Developed market central banks have made further progress with their easing cycles since last year, with the policy rate in our PPP-weighted G7 policy rate tracker having fallen from 4.4% to 3.2%. We expect the G7 policy rate to average around 3% over the next five years, hinting at constrained policy normalization.

Figure 5.4: G7 policy rates have fallen, but we expect constrained normalization
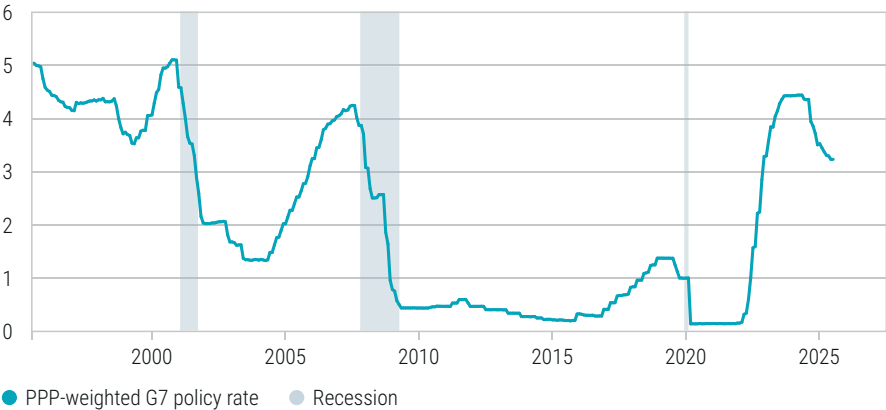
● PPP-weighted G7 policy rate   ● Recession

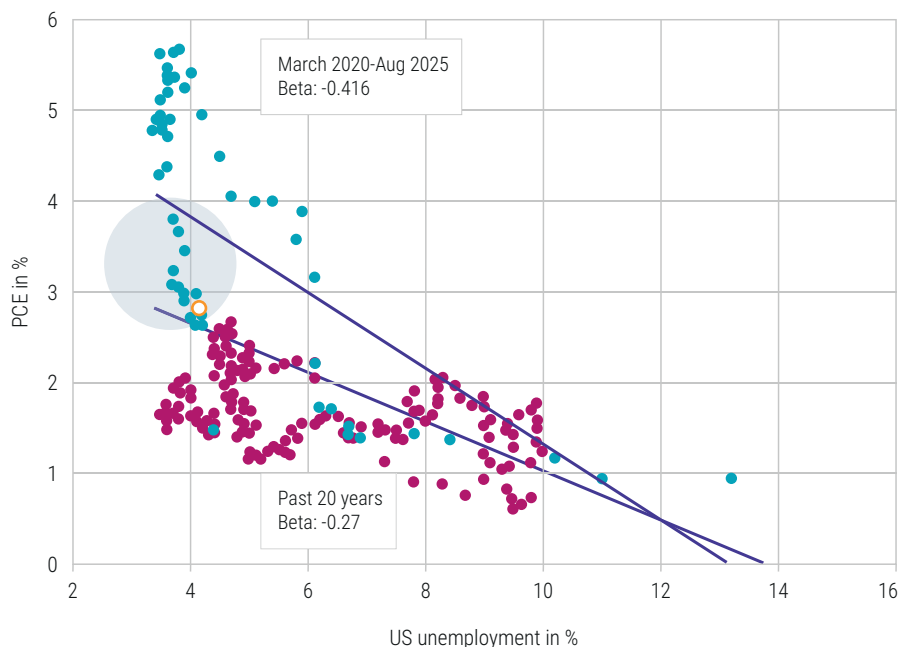Source: LSEG Datastream, Robeco, July 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

At the time of writing, the Fed has been facing mounting pressure from the Trump administration to cut. Its July 2025 meeting, at which it kept rates unchanged, included two dissenters – an unusual occurrence not seen in over a decade, underscoring that we are in a complex macroeconomic environment with an intensifying power play between the White House and the Fed. There have been similar internal divisions appearing at other central banks, such as the Bank of England, with labor markets showing signs of weakness at a time that central banks are expecting to see a level shift in tariff-induced inflation. This increases the dual mandate dilemma.
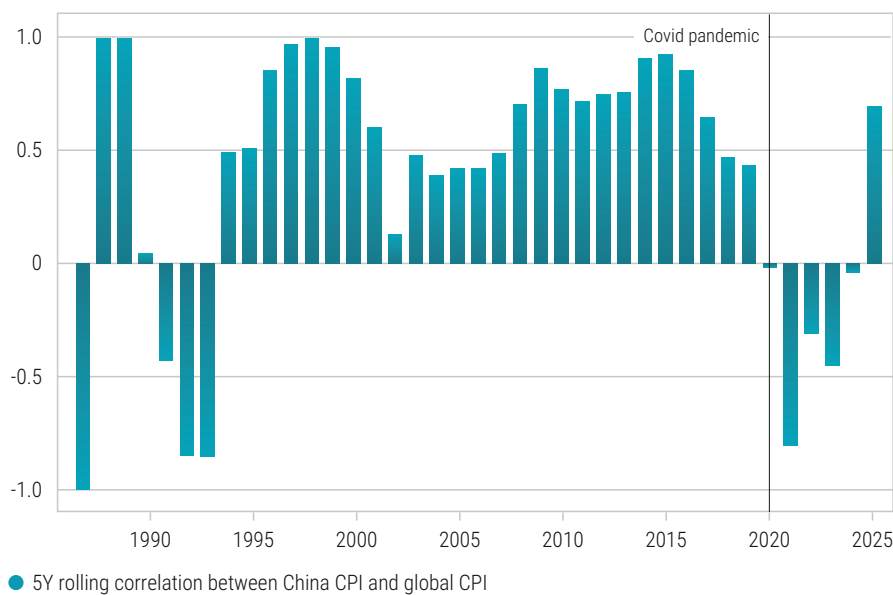
A loyalist Fed chair appointment in May 2026 might prioritize easing rates, even if the labor market bends but does not break, as we expect in our base case. This could lead to a situation in which the Fed makes deeper cuts and starts a second tightening cycle later, as has been reflected in a recent shift in Fed future market expectations. However, we think the market might have been overpricing the influence of the Trump administration, and expect the Fed rate to be 3.5% by the end of 2027 – 40 bps above current market pricing.

While the next Fed chair may be more inclined to side with President Trump than Jerome Powell has, in our base case we expect the Fed's design and legal protections to largely insulate monetary policy decisions from political pressures. We expect a second tightening cycle to begin late in early 2027 as we have upgraded our inflation forecast for the US by 15 bps since last year to 2.75% due to slower migration, geopolitical fragmentation leading to expensive import substitution, and a weakening dollar. We expect central banks to start to recognize that an era of fiscal dominance and a renaissance in productivity have shifted the neutral rate of interest upward.

Figure 5.5: Constrained normalization ahead as we remain around the upper end of the long-term Phillips curve

Source: LSEG Datastream, Robeco, July 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 5.6: China to no longer export deflation?

● 5Y rolling correlation between China CPI and global CPI

Source: LSEG Datastream, Robeco, July 2025.

In our bull case, a Goldilocks scenario for central banks emerges. There is an AI-induced productivity boom, providing a positive supply shock to the global economy. Inflation expectations remain well behaved as the risk of negative supply-side shocks fades in a world that reconnects. Another trade war is averted, removing an inflationary impulse that is present in our base case.

In our bear case, central banks – especially the Fed – become more politicized and there is genuine institutional decay. The combination of a less independent central bank and a profligate fiscal authority results in a second wave of inflation. Only after 2027 do central bankers try to get inflation under control by hiking rates, inducing a fairly deep recession. With this recession moving the needle from the risk of stagflation toward the risk of deflation, financial repression ensues.

5.2 Developed government bonds

In theory, long-dated nominal government bonds are considered riskier than cash because of their exposure to real productivity growth risk and inflation risk. Investors experienced how inflation risk can erode the real value of their nominal bonds when inflation shot up in 2022. Government bonds can also face mark-to-market losses in periods in which interest rates increase to curb inflation. Investors therefore typically demand a term premium as a reward for holding these long-term assets instead of cash. We expect that in the steady state, the premium for holding long-dated government bonds will be 75 bps over cash, slightly below the global average of 100 bps since 1900.

In the Valuation chapter, we saw that the term structure of interest rates is upward-sloping for the four base currencies. In the US, the difference between long-term bond yields and cash yields is relatively low, but for Germany, Japan and the UK, the carry is close to its steady-state level. At the same time, nominal interest rates are close to their steady-state level of 4% for the US and the UK, but substantially below for Germany (2.5%) and Japan (1.5%). The starting yield is of course a very important determinant of government bonds' expected returns.

In our base case, we expect bond yields in Germany to steadily increase to slightly above 3% and stay there over the remainder of the next five years. The mark-to-market losses

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result in an expected return for German Bunds of slightly below 3%. We expect US Treasury yields to initially fall below 4%, but with inflation pressures persisting and Treasuries' safe-haven status coming into question, they are likely to hit 5% around the middle of our projection period. We expect similar yield movements in the UK, but with yields staying well below 5%. We expect Japanese bond yields to rise to around 2% over the next five years.

The consequence of rising interest rates is that returns for government bond investors in Germany and the US will be below the central bank policy rate. We expect the term premium to be slightly negative for both countries. For Japan and the UK, we expect bonds to outperform cash by 50 bps per year, which is slightly below the steady-state level.

We hedge the local-currency return of each developed government bond market into the respective base currency. The currency hedging cost is the difference in predicted policy rates as currency hedging is usually achieved by rolling short-term derivative contracts. For example, the 3.50% expected return for US Treasuries becomes 2.75% when hedged into euros because of the 75 bps difference in cash interest rates between the US and Germany. Hence, global developed government bond markets provide a 3% expected return per year for investors with the euro as their base currency. For US dollar investors, developed government bonds' expected return is 3.75% per year.

In our bullish scenario, interest rates in most developed markets will be around their steady-state level of 4% after five years, except for in Japan, where they rise to 2%. This leads to somewhat lower expected returns for government bonds in Germany in this scenario than in our base case. The US interest rate is already at the steady-state level, but we believe it may increase to 5%, not because of concerns about debt sustainability, but because productivity booms are associated with higher nominal and real interest rates. This leads to expected returns for US Treasuries (3.75%) slightly below the steady-state level (4%), but slightly above our base case (3.50%).

In our bearish scenario, bond yields rise substantially in the first half of our projection period, hitting 6% in the US and UK and over 4% in Germany. But they fall back sharply in the second half, ending at around 2% in Germany and the UK. They only fall back to close to 3% in the US because in our bear case the US experiences massive capital outflows from investors that currently use US Treasuries as a safe haven. Initial losses due to rate increases are outweighed by larger subsequent gains, resulting in estimated returns for US government bonds of 6.25% per year and 5.25% per year for German government bonds.
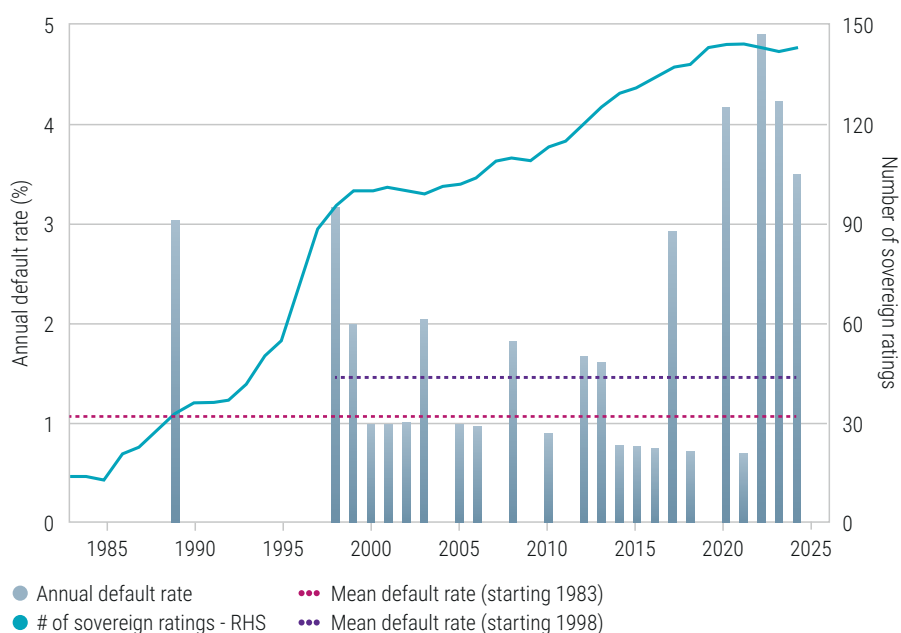
5.3 Emerging markets debt

For the first time, we explicitly discuss hard-currency emerging markets debt as a separate asset class in this publication. Emerging markets debt is a heterogenous asset class that sits between investment grade and high yield from a credit rating perspective. Country-specific idiosyncratic risks have historically played a prominent role when it comes to default risks. In recent years, several countries, including Argentina, Ecuador, Ethiopia, Ghana, Russia, Sri Lanka, Ukraine and Zambia, have defaulted on their government debt or restructured it at the partial expense of lenders.[2] The attractive credit spreads that emerging market bonds provide are clearly not earned without risk.

2. Source: Moody's (2025) Sovereign default and recovery rates, 1983-2024, and Bank of America (2025) The emerging markets debt primer.

Note, however, that most defaulting bond markets only account for small proportions of most indexes and that recovery rates can be as high as 100% (albeit with an average of about 50%). The total number of rated government bond markets by Moody's has increased over time to around 140, as displayed in Figure 5.7. It also shows the annual default rates in the bar chart. Moreover, the dotted lines indicate that the average default rate of government bonds rated by Moody's between 1983-2024 was 1.1% per year, and when we limit our sample to the period after the Asian debt crisis in 1998, 1.5%.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Figure 5.7: Global sovereign default rates

Source: Robeco, Moody's, July 2025.

We expect default rates for hard-currency to be similar to those we have seen over the past couple of years – around 3%. This, combined with an average 50% recovery rate, means the expected default losses are 1.50% per year for the next five years. This is a little less than half of the spread that the index provides, which is an assumption in line with the steady state. However, since we expect credit spreads to increase from 325 bps to 400 bps over the coming years, the mark-to-market losses reduce the return above US Treasuries to 100 bps (4.50% versus 3.50%).

Figure 5.8: Ex-post currency returns for local-currency emerging debt investors
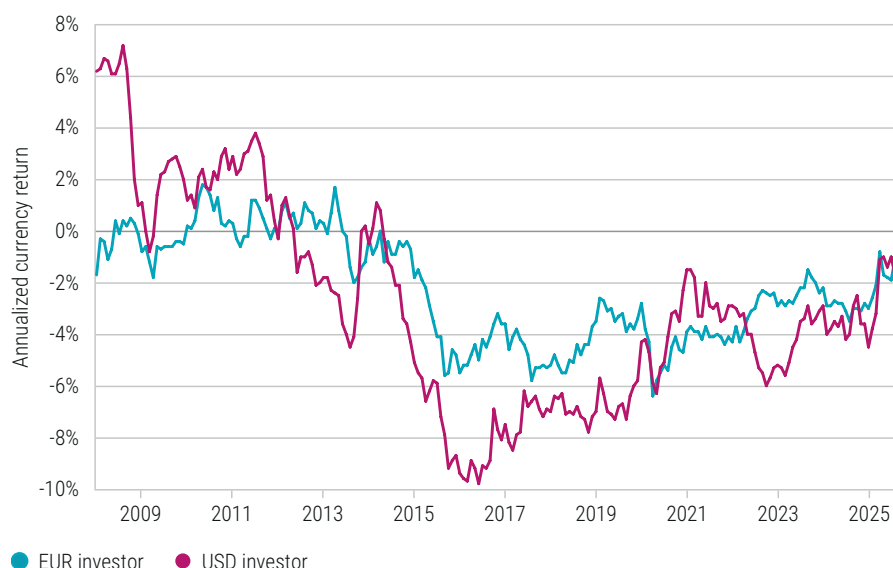
Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: Robeco, Bloomberg, July 2025. Rolling five-year monthly currency returns of the JP Morgan Global Bond Index – Emerging Markets Global Diversified versus the US dollar and euro.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

We expect local-currency debt yields to fall from around 6% to around 5.5%. Although governments do sometimes default on their local-currency debt, they do not have to as their central banks can print money to pay creditors, albeit probably at the expense of increased inflation and currency devaluations. Figure 5.8 shows that currencies are an important driver of local-currency emerging markets debt investments. Currency returns have generally reduced the overall return provided by local-currency emerging markets debt since the taper tantrum in 2013. More recently, currency returns have had a limited impact on overall returns for both the euro and the dollar. We do not expect a wave of defaults or currency depreciations, but since inflation in emerging markets is expected to be above that in the eurozone, a euro investor would receive 50 bps less on their return than a local investor in emerging markets. In total, the expected return for a euro investor is 5.5% on average over the next five years.

In our bullish case, we expect even more synchronization of emerging market central banks' rate cycles with those of other central banks around the world. As inflation returns to target in many economies, yields will fall, leading to higher bond prices. In this scenario we would expect local-currency debt to rise by 6.25% per year. Hard-currency debt would perform a little worse (5% per year) because increasing US interest rates would hurt the returns of all asset classes priced relative to US Treasuries.

In our bear case, a second wave of global inflation would lead to local-currency emerging bond yields rising, hitting the return the asset class provides. In this scenario, the US dollar loses its safe-haven status and, in contrast to what we assumed in the past in a recessionary environment, does not appreciate versus emerging market currencies. In this scenario we expect local-currency debt to provide a return of 3.50% per year for both euro and US dollar investors. Hard-currency returns will be lower (2.50% per year) because of increased losses from defaults.

5.4 Corporate bonds

Corporate bonds pay investors a premium over government bonds to compensate them for the credit and liquidity risks that investing in the asset class involves. The credit component of their overall return tends to be high when the economy is doing well as default losses are low and credit spreads tend to fall. Meanwhile, their interest rate sensitivity makes them vulnerable to interest rates being raised, such as when the economy is overheating and inflation pressures are increasing. Historically, more than 80% of the volatility of investment grade corporate bonds has been due to changes in the nominal risk-free interest rate. A disadvantage of corporate bonds compared with equities is that their upside is capped by their yield, whereas equities have, in theory, unlimited upside potential.

Where are we in the credit cycle? As we discussed in our Valuation chapter, corporate bonds are expensive based on their below-median credit spreads. This applies to both investment grade and high yield and corporate bonds denominated in both the US dollar and euro.

5.4.1 Investment grade

We expect investment grade corporate bond spreads to increase modestly over our projection period, but not to above 150 bps. Default losses will initially be 50 bps per annum, and in the US can even reach 100 bps, because total yields and real yields are highest there, but overall we expect a modest default cycle. After the weakest companies have defaulted, default losses will return to normal (a default rate of 0.25% per year) in the final two years of our horizon.

We expect a credit premium of 50 bps for EUR-denominated bonds but a credit premium close to zero for USD-denominated bonds due to the higher expected default losses. Since about 70% of the global investment grade corporate bond market is USD-denominated and

25% is EUR-denominated, the global credit premium is (rounded) 25 bps. And compared with global developed market government bonds, the credit premium is zero as for the euro investors global government bonds and global corporate bonds are both estimated to be 3%. This is because the global government bond index contains other issuers from the eurozone than Germany, and Japan and the UK, for which we expect slightly higher hedged returns than for German government bonds.

In our bullish scenario, we expect credit spreads and default losses to remain low and default losses. In this scenario we expect investment grade credit to provide a return of 3.75% per year for euro investors.

In our bearish scenario investment grade suffers higher default losses, but there is also a larger positive return contribution from duration in the second half of our projection period as central banks start cutting rates. As a result, we expect a return of 5.50% per year for euro investors in investment grade credit in this scenario.

5.4.2 High yield

High yield involves a considerable amount of equity-like risk. Its correlation with equities has averaged around 40% over the past 25 years, with the other 60% of its return variance explained by its bond-like features. High yield is much more susceptible to default risk and more heavily influenced by the earnings cycle than investment grade corporate bonds. We expect solid earnings growth in developed markets over the next five years, which will certainly provide a cushion, but it will probably not prevent a worsening in interest coverage, corporate earnings relative to interest rate payments, for the lower-rated segment within the high yield market. In our view, an era of higher real rates will result in rising defaults as high yield issuers are facing a wall of maturing bonds around 2026-2027, and these will need to be refinanced at higher rates.

The era of ultra-low interest rates during the 2009-2019 expansion has kept defaults for high yield debt relatively low, with default losses after recovery at 1.7%, compared to 2.6% on average since 1983, as Figure 5.9 shows.

Figure 5.9: Default losses of investment grade and high yield bonds
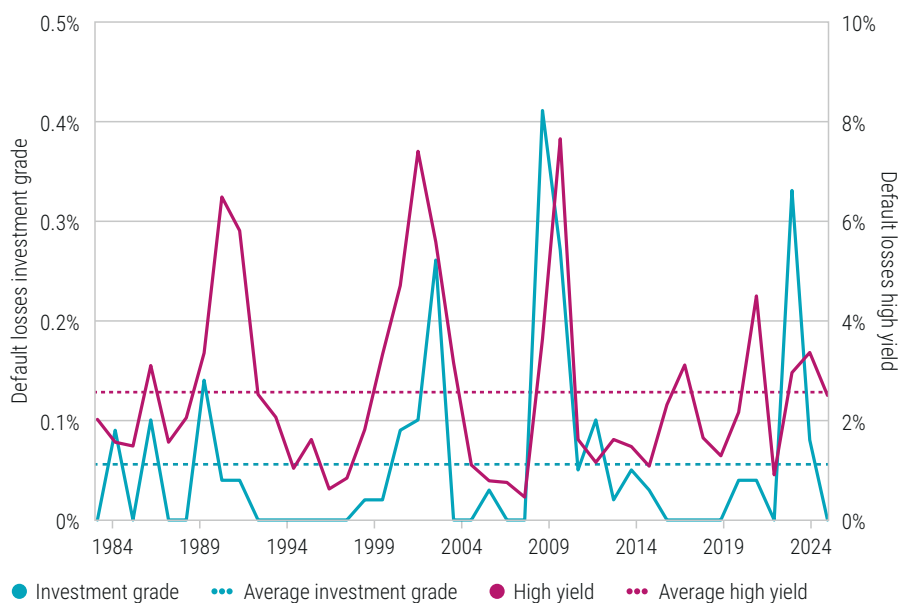
Source: Moody's, Robeco, July 2025.

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We believe that default rates could rise to about 5% in the coming years, but that they will probably fall back to or slightly below their long-term average of 3% in the years after. As a result, default losses after recovery for the next five years are expected to be slightly above the average since 1983 of 2.6% per year. In the Valuation chapter, we showed that credit spreads of high yield corporate bonds are historically low. It is our expectation that credit spreads will normalize to 400 bps over the next five years. Declining corporate bond prices because of increasing credit spreads and expected defaults lead to only 25 bps additional return from high yield compared to investment grade corporate bonds.

The Commission Parameters, a committee tasked with determining expected returns for Dutch pension funds, has mapped credit risk for each corporate bond credit rating. It finds that the lowest-rated segment of investment grade (BBB) has 80% bond-like exposure and 20% equity-like exposure, and that high yield bonds have 60% bond-like exposure and 40% equity-like exposure. As such, another way to calculate expected returns for corporate bonds would be to combine the expected returns of government bonds and equities in the appropriate proportions.

For a eurozone investor, this would mean (80% x 2.75%) + (20% x 6.00%) = 3.4%, a little above the 3% that we have estimated for investment grade. For high yield, the calculation would be (60% x 2.75%) + (40% x 6.00%) = 4.05%, which is well above our estimate of 3.25%. This calculation shows that we are more positive about the return on equities than that on corporate bonds.

In our bullish case a wave of defaults is averted thanks to a strong earnings cycle, leverage remaining low and interest rates falling. US real activity grows at on average 3% per year, and the ISM manufacturing leading indicator is in the 55-60 range. In such environments in the past, high yield default rates have only been around 2.3%. In the absence of an impending wave of defaults, global high yield provides a return of 5.25% per year over the next five years despite US Treasury yields rising.

In our bear case, spreads are on average almost 100 bps higher than in our base case, peaking close to 1000 bps as the maturity wall hits around 2027. By then, central banks have embarked on a second tightening cycle in the wake of a second round of above-target inflation. In this environment, spreads do not fully cover for the default losses that US high yield investors incur. In this scenario we expect global high yield to provide a return of 2.25% per year for a euro investor over the next five years, meaning high yield underperforms investment grade considerably.

5.5 Equities

The equity market has jumped over a wall of worry so far in 2025, with the 90-day pause on reciprocal tariffs that President Trump announced on 10 April paving the way for one of the S&P 500's sharpest V-shaped recoveries in decades (+ 23% in four months). Rallies of such magnitude are typically only observed around the end of US recessions. The market has shrugged off the stagflation risk that tariffs involve as the broader backdrop has remained supportive. Corporate earnings have been solid while liquidity has remained ample, inflation has been easing and central banks are cutting rates.

We are in an equity market that believes central bank easing and fiscal stimulus are enough to offset geopolitical risks and tariff escalation. At the same time, this is clearly an unloved rally that is hiding some structural pessimism. While the rally has been strong, it has lacked breadth. As Blitz (2025) argues, "For a turnaround, emerging market equities primarily need improved operating performance, especially in China, Korea and EMEA, while small-cap and low-volatility stocks do not really have a profitability problem but need to regain favor among investors."

Many market observers doubt whether the current bull market is sustainable due to elevated valuations, high concentration risk and lingering macroeconomic vulnerabilities in a global economy that is facing policy upheaval, particularly in the US. These are valid concerns and we would agree the market may have jumped too easily over the existing wall of worry, potentially triggering some payback later on. However, we expect equities to rise further over the next five years in our base case, even though the pace of their increase will be more moderate. We forecast a below-steady-state return for developed market equities of 6% per year in euro terms, down from 6.50% last year.

Figure 5.10: Breakdown of annualized total equity returns: 2015-2024
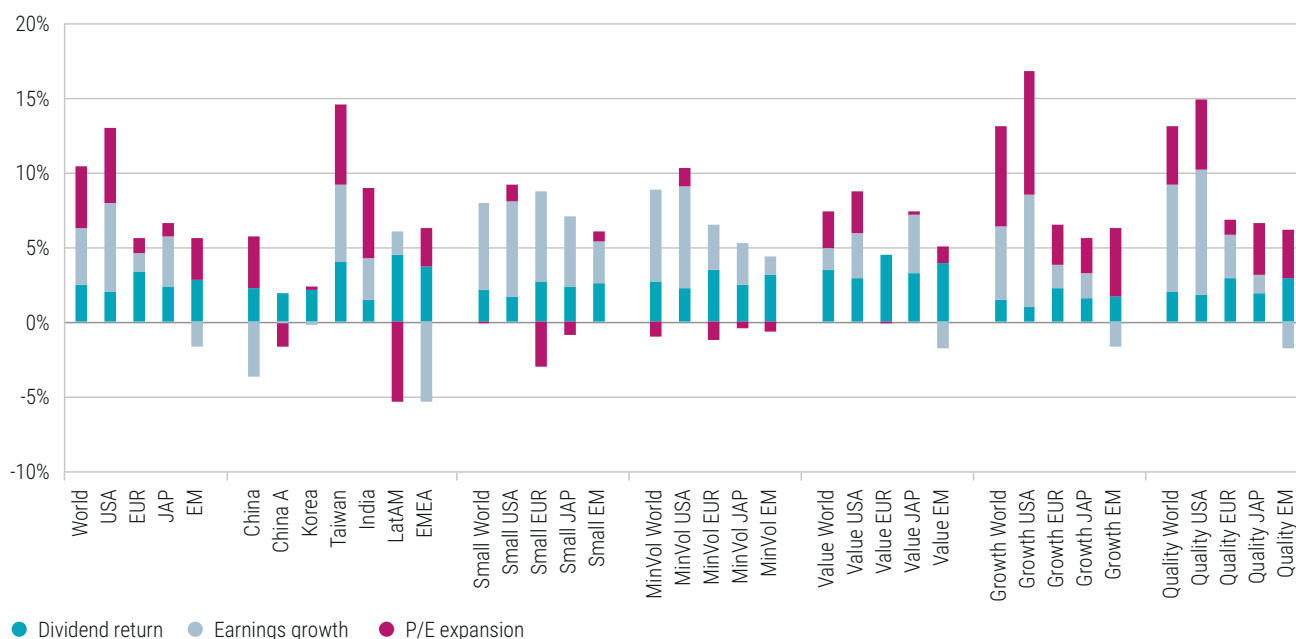
Past performance is no guarantee of future results. The value of your investments may fluctuate. Source: MSCI, Robeco, Blitz (2025).

Uncertainty shocks and high-for-longer climate sees US multiple compression

On the discount rate side of the equation, we find that a 10Y US Treasury yield level averaging around 4.6% – which is what we project over the next five years – historically coincides with a P/E in the US in the low 20s: below the current P/E of 27. We also find that US equity risk premium implies that US real GDP will increase by 2.9% per year over the next five years, which in our view is too optimistic – our forecast is for 2.1% per year.

In addition to the risk of lower growth than is currently baked into equity prices, we think some widening of the US equity risk premium is justified due to the ongoing policy incoherency of the Trump administration. Tariff revenues will likely not offset the rising interest bill for the US Treasury. This could result in the market demanding a lower multiple to take on equity risk. As such, we expect multiple compression to act as a drag on total US equity returns over the next five years. Multiple compression might not be imminent: US exceptionalism might last longer than we imagine before collapsing quickly. To illustrate, we find that on average the US CAPE at t+1 year is still at 90% of its level at time t, but at t+5 years has declined to 60% of its initial level.

US earnings growth below consensus long-term projection of 15%

Turning to the cashflow side of the equation, we have also made a downward adjustment to our US economic growth forecast for cyclical reasons. This translates into a below-consensus earnings growth estimate: we believe US EPS growth will be closer to 10% than the 15% projected by consensus over the next five years.

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We believe the US will remain the world's largest economy over the next five years, in part thanks to reaping the benefits of its leadership in AI, which results in a boost to productivity growth of 0.4-0.5% over this period. However, a number of factors will partly offset this positive effect – these include slowing immigration, the rise of populism and reduced scope for tax cuts and government spending as interest costs for the US Treasury rise relative to GDP. We believe that profit margins will fall by a few percentage points from historical peak levels, with revenue growth moderating.

Figure 5.11: US equities have primarily outperformed on price, rather than superior EPS
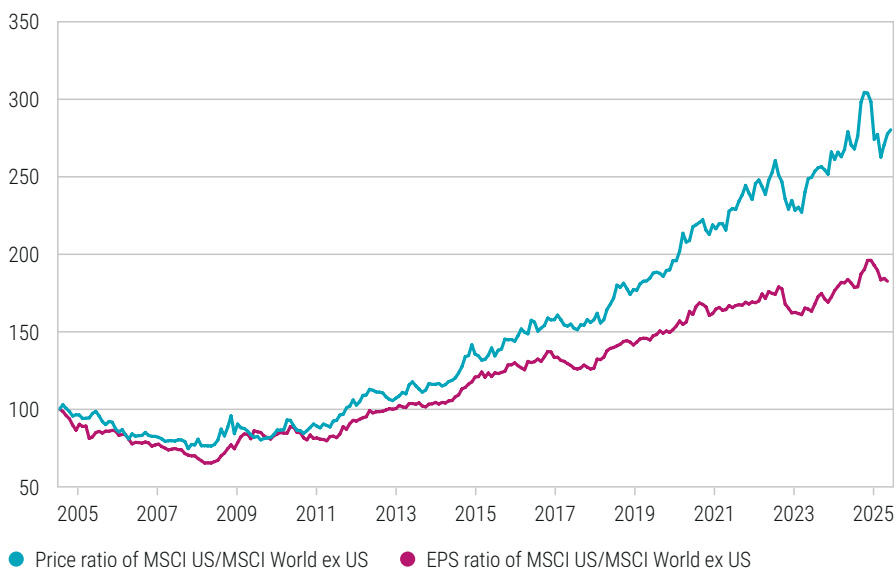
● Price ratio of MSCI US/MSCI World ex US   ● EPS ratio of MSCI US/MSCI World ex US

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: LSEG Datastream, Robeco, July 2025.

Historically high profit margins reflect concentrated pricing power and low demand elasticity

Textbook economics tells us that if capitalism functions as it should, margins ought to mean-revert. However, US national accounts-based profit margins increased to a record 13.4% in the post-pandemic expansion and have been hovering around that level for the past four years. The uneven distribution of overall profits is evidence of the 'winner takes most' phenomenon, hallmarked by the combination of increasing market concentration and high pricing power, especially among dominant tech firms. Due to rising barriers to entry, companies at the technological frontier benefit from rising margins, while others experience much more volatile margins. This supports the idea that margins may not revert to historical averages due to structural changes in market power and technology adoption.

Three reasons why US margins could falter

This is not to say that we believe the business cycle is dead as there are reasons to expect some sort of margin reversion (even if they settle above historical averages).

One reason that US profit margins have stayed so high in our view is reduced consumer price elasticity on the back of the huge fiscal support the government provided during the pandemic. This might be set to change, however, as excess personal savings are depleted and cracks in the US labor market have appeared.
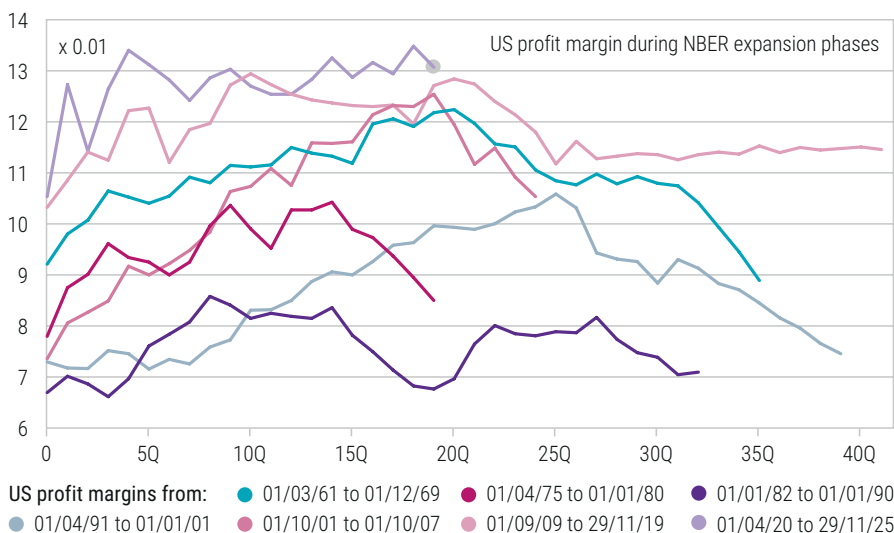
Second, productivity gains from AI adoption do not automatically imply that unit labor costs will fall proportionally if AI mainly augments rather than substitutes labor, who show that capital-labor elasticity is much lower than typically assumed.

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Third, we are keeping a close eye on the US tech industry's capex to sales ratios, which have been rising recently. Higher such ratios tend to lead to lower profit margins, suggesting it is possible that capital is being misallocated.

Lastly, we expect US corporates to have to absorb a higher proportion of the costs of any future tariff rounds than in the first Trump presidency.

Figure 5.12: US NIA profit margins typically fall as the cycle matures

US profit margins from:
- 01/03/61 to 01/12/69
- 01/04/75 to 01/01/80
- 01/01/82 to 01/01/90
- 01/04/91 to 01/01/01
- 01/10/01 to 01/10/07
- 01/09/09 to 29/11/19
- 01/04/20 to 29/11/25

Source: LSEG Datastream, Robeco, July 2025.

Europe is back

Last year in this section we wrote that "Europe gets things just right enough to unlock the value in European equities." Value seems to have been unlocked. While European equities are still trading at a sizable discount to US stocks on a P/E basis, it has shrunk by 20% since the US elections in November. European equities have outperformed the US market over the past year, and we think our thesis has more room to run. We expect to see increased benchmark exposure to European equities over the next few years and a further compression of Europe's discount to US equities on the back of global portfolio reallocations away from the US.

Figure 5.13: US premium versus European equities peaked late 2024
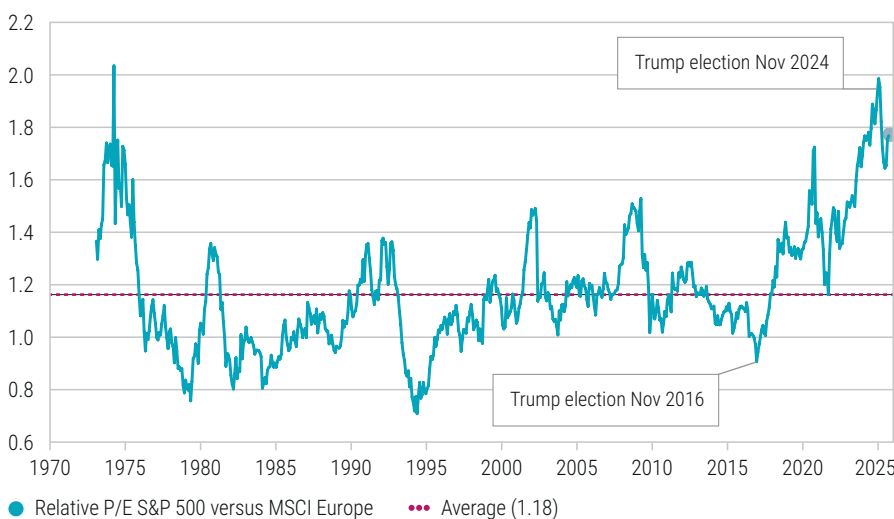
- Relative P/E S&P 500 versus MSCI Europe
- Average (1.18)

Source: LSEG Datastream, Robeco, July 2025.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Europe did get things right. Smoother-than-expected political transitions (such as the formation of a coalition in Germany) and a pivotal move away from austerity in German fiscal policy have helped revive investor confidence in the region. Meanwhile, infrastructure spending and the ReArm Europe defense plan, coupled with the ECB's recent rate cuts, are expected to boost medium-term growth, particularly in manufacturing and construction. Our research shows that the European business cycle typically lags that of the US by 3.5 years, and we expect Europe's GDP growth to catch up with that of the US on the back of a recovery in domestic consumption and sizable fiscal spending on infrastructure and defense (which in our view has positive fiscal multipliers given a pre-existing negative output gap in Germany).

Figure 5.14: Bund yield curve steepening represents bullish growth signal for the eurozone

● 10-2y Bund yield curve ● ECB SPF: GDP growth - forecast of 5 years ahead (%YoY): Eurozone (RH scale)

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: LSEG Datastream, Robeco, July 2025.

It won't be a smooth ride for Europe

At the same time, it will not be a smooth ride for Europe, with the war on its borders in particular keeping a lid on expectations. We expect the euro to strengthen over the next five years, which will act as a headwind to European countries that lean more on external competitiveness than internal competitiveness. Italy, for example, seems more sensitive to a strong euro than Germany in this respect. A high-tariff regime will hit global trade, potentially impacting Europe's open, trade-oriented economies. Meanwhile, Europe is lagging the US by two to three years when it comes to artificial intelligence, and here it seems it will be difficult to close the gap. The OECD (June 2025) expects increased AI diffusion in Europe, but that it will be driven by leaders escaping the pack rather than laggards on the European continent catching up.

Are emerging markets approaching a major inflection point?

There are a number of reasons to expect a cyclical dollar bear market. First, we expect the US's growth differential with the rest of world to decline. Second, the dollar is still expensive, trading at a 14% premium from trend in relative purchasing power parity terms. Third, the US still runs a twin deficit, with a 4% current account deficit.

A weakening dollar regime is typically supportive of emerging equities: the MSCI Emerging Markets has significantly outperformed the MSCI US in unhedged euro terms in previous episodes of dollar weakness. While emerging equities might outperform again, we would

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add the caveat that not every dollar bear market is created equal. A secular dollar bear market that is due to doubts about the rule of law in the US would probably lead to lower returns from emerging equities than a dollar bear market that is linked to a synchronized global upswing in the business cycle. This has been the case in previous periods of emerging market outperformance.

Figure 5.15: Dollar depreciation in excess of 2% per year results in increased likelihood of emerging market outperformance
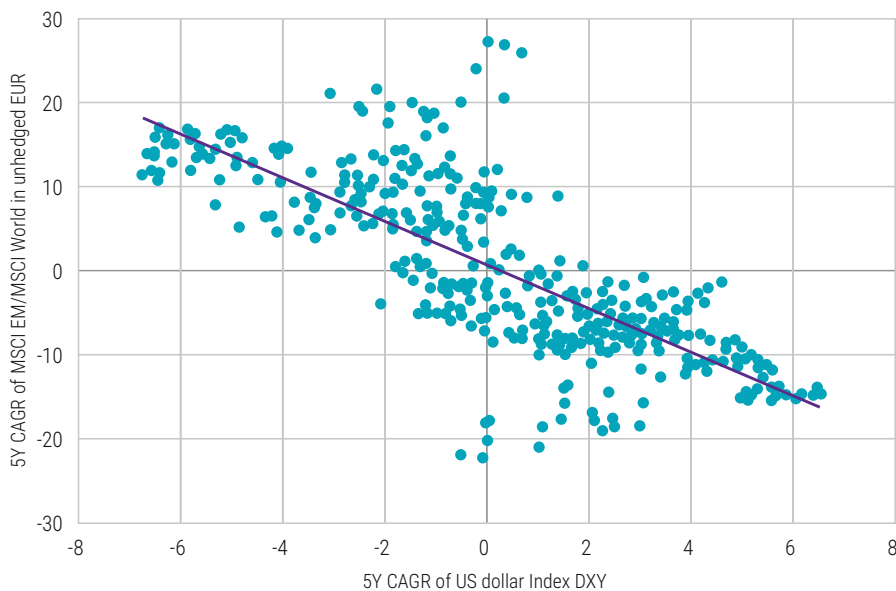
● 5Y CAGR of US dollar Index DXY vs 5Y CAGR of MSCI EM/MSCI World in unhedged EUR

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: LSEG Datastream, Robeco, July 2025.

In our bull scenario, profit margins and sales growth increase and productivity growth reduces unit labor costs. US equity multiples do not compress as much as in our base case, but pay-out ratios for a given earnings level are lower as increased AI adoption requires higher corporate capex. We expect developed equities to provide a return of 10.5% per year for a euro investor in this scenario, and emerging equities to significantly outperform developed equities, rising by 16% per year thanks to emerging market productivity growth catching up more with that of developed markets, a weaker US dollar signaling an improvement in global growth, fading tariff pressures and higher external demand for commodities to facilitate the green transition. While outperformance of 550 bps per year may sound unrealistic, emerging equities outperformed developed equities by over 2000 bps per year over five-year periods during the heydays of globalization.

In our bear case, companies around the world are increasingly forced to prioritize supply-chain security above efficiency, denting their profitability. Higher tariffs, especially on imported technology goods, hurt profit margins. Restrained international labor mobility and expensive import substitution keep local labor markets tight, while fading productivity gains from the stalled adoption of AI raise unit labor costs.

While high nominal growth in a high-inflation regime (US inflation is above 3% on average) means nominal equity earnings are still solid initially, a tightening cycle to re-anchor inflation expectations results in a sharp drop in both earnings and multiples. Lower equity multiples are also a reflection of higher geopolitical risk premiums in a world faced with frequent negative supply shocks.

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In this scenario we expect a nominal return of 2% per year for developed equities for a euro investor. We predict a real return for US equities of -1.5% per year, slightly above the -1.7% per year during stagflationary episodes since 1875, as reported by Baltussen, Swinkels, Van Vliet and Van Vliet (2023). Emerging market equities return 5% per year.

5.6 Real estate

Despite their equity-like features, REITs have significantly underperformed the broad global equity market since 2020 – the MSCI World REIT index has underperformed the MSCI AC World index by a cumulative 36% (6% on an annual basis) between January 2020 and July 2025. The sector is still adjusting to the shock of a high-for-longer interest rates regime, which has resulted in it trading at a sizable discount of almost 50% to global equities on a CAPE basis.

The need to refinance at high rates is likely to continue to pose a headwind for the sector in the coming years. That said, our calculations suggest that current relative performance already reflects the impact of persistent high rates. Our regressions even suggest REITs might have undershot global equities conditioned for the change in real 10-year yields over the past year. However, other valuation measures suggest that REITs are still expensive relative to US Treasuries on a cap yield basis, creating a mixed picture. Given our view on rates, we do not expect valuation changes to be a major contributor to REIT returns over the next five years; significant positive performance will need to come from dividend yield and rental growth.

We expect modest rental growth over the next five years, with 1.5% EPS growth for the MSCI World REIT index. REITs are a heterogenous asset class covering a diverse range of real estate activities, and this index is tilted toward industrials and data centers. While these are linked to the big macro themes of AI and defense, we are cautious about data centers because annual expected completions as a percentage of existing stock are expected to be higher over the next five years than for other sub-sectors. An increase in the global manufacturing share of GDP due to a different approach to industrial policy in the coming years would be helpful to sustain demand for industrial REITs, while expected new supply is declining.

Other sub-sectors like office and residential REITs have still not fully recovered from the shock of the pandemic, hinting at a structural break with the pre-Covid market environment. Keeping occupancy levels healthy in these sectors could bring about a higher willingness among landlords to forego rental growth.

REITs remained unloved compared with the broad equity market, even though their inflation hedging-capabilities may prove useful despite their higher leverage. We forecast a 4% dividend yield and 1.5% rental growth, resulting in a 5.5% per year return for the asset class in euro terms over the next five years.

Figure 5.16: REITs have become an unloved asset class
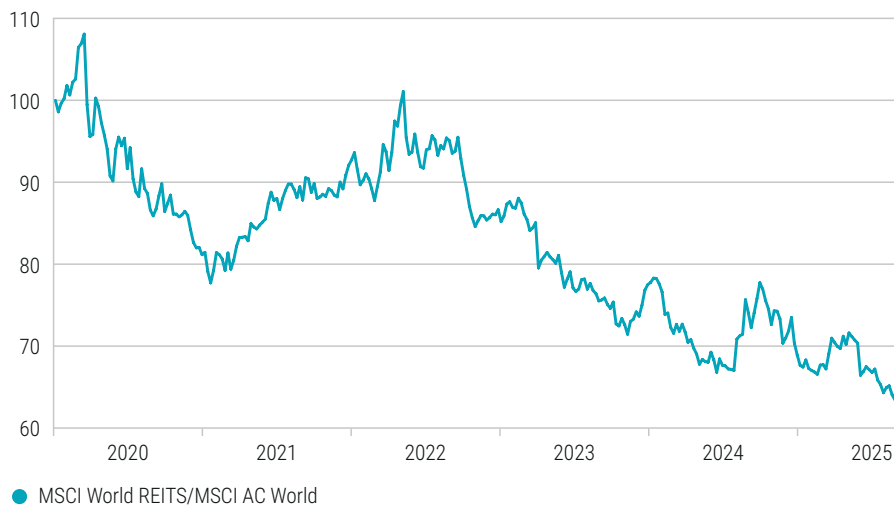
● MSCI World REITS/MSCI AC World

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Source: LSEG Datastream, Robeco, July 2025. Relative performance (Jan 2020=100).

In our bullish case, the global economy does not fragment further. While this might be bad news for local logistics REITs, the overall impact would be positive for the asset class. Sub-sectors of the REITs market that have underperformed, such as offices and residential, rebound to well above pre-Covid levels. Due to increased adoption of AI there is further upside for REITs that specialize in data storage. A much more stable rates trajectory than in our base case (with investment grade spreads remaining well behaved) contributes to improved interest coverage for the asset class. However, higher expected rental growth does not lead to a proportional rise in multiples as a high-for-longer rates environment caps REITs' upside potential relative to equities. In this scenario we expect REITs to rise by 9% per year, which is three percentage points above their steady-state level but slightly below the return of developed market equities.

In our bearish case, real yields drop more sharply as a second wave of inflation develops. In an environment of stagflation, REITs outperform equities by 1.75%. This is thanks to lower real rates, the defensive characteristics of the asset class and REITs' (albeit limited) inflation-hedging capabilities over the long run.

Table 5.3: REITs tend to outperform equities in periods of high inflation

	ISM					
CPI	< 40	40-45	45-50	50-55	55-60	> 60
< 2%	0.07%	-0.76%	-0.09%	-0.68%	-0.12%	-1.95%
2-3%	-	0.22%	-0.95%	-0.16%	-0.22%	0.83%
> 3%	-7.45%	1.81%	-0.28%	0.05%	0.73%	1.78%

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Source: LSEG Datastream, Robeco, July 2025.

5.7 Commodities

Our long-standing secular theme for commodities, which we introduced in the 2022-2026 edition of this publication, is the 'Roasting Twenties': a period of increased demand for commodities to facilitate electrification, which should result in above-steady-state returns for this asset class. The GSCI Commodity Total Return index has risen by 10.9% annualized over the past four years, which is much closer to the 9% per year we forecast in our bull case than

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the 5% we predicted in our base case back in 2021. The electrification theme has further to run. We continue to expect above-steady-state returns for commodities over the next five years. However, we are not significantly upgrading our return estimate for our base case, forecasting that commodities will return 5.25% per year in euro terms over the next five years.

Figure 5.17: The commodities capex cycle has picked up: Metals and energy capex above long-term trend levels

● Global Capex Metals, Mining – detrended   ● Global Capex Energy – detrended   ● Recession

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Source: LSEG Datastream, Robeco, July 2025.

Figure 5.18: Commodity capex cycle and five-year annualized total commodity returns
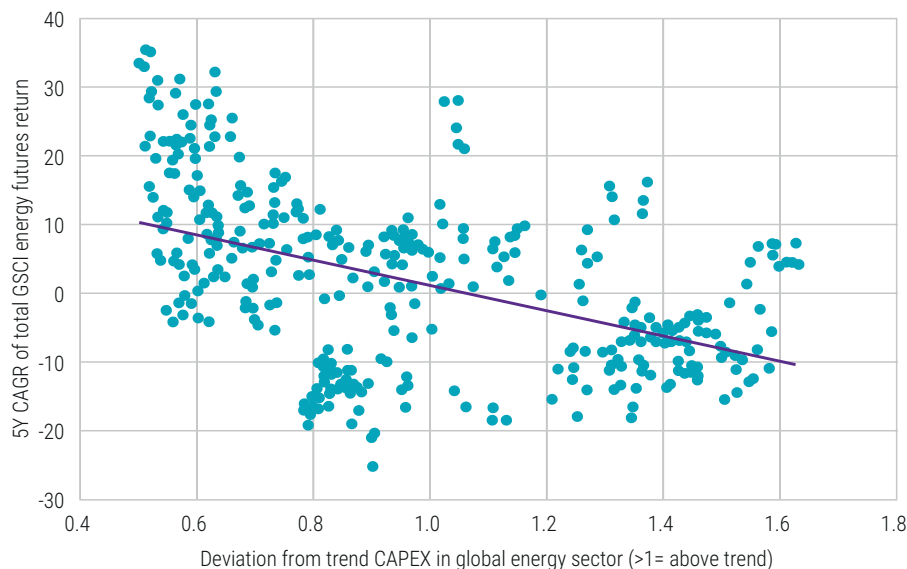
Past performance is no guarantee of future results. The value of your investments may fluctuate.
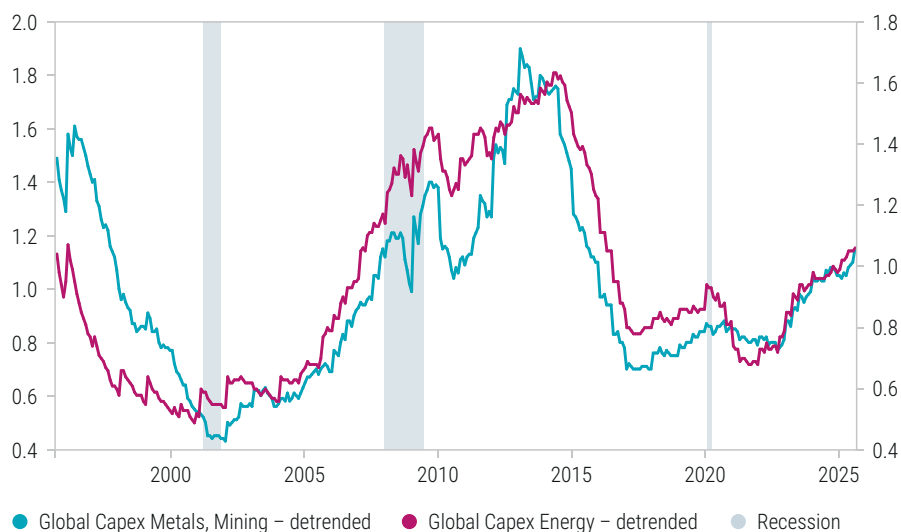Source: LSEG Datastream, Robeco, July 2025.

As explained in the Valuation chapter, commodities are no longer cheap. The backdrop was much more benign for the asset class five years ago as there had been significant under-investment in commodity production, with capex in the energy and metals sectors 25-30% below historical trend levels (Figure 5.18 shows this point for energy commodities). A subdued capex environment typically leads to strong investment returns over the subsequent five years (and vice versa). Commodity-related capex has increased over the past five years such that it is now above long-run trend levels again. This means further

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double-digit returns over the medium term have become less likely, even if secular drivers of demand such as infrastructure spending, the energy transition and defense remain firmly in place. Supply has been catching up, reducing backwardation and positive roll returns.

We upgraded our base-case return expectation since last year because of rising inflation (we now expect US inflation to be 15 bps higher than we did last year) and because higher US debt levels have made traditional safe-haven asset classes look less attractive, potentially enhancing the appeal of real assets like commodities, especially precious metals. We find, using regression analysis, that real rates, the traditional driver of gold prices, have been fully overtaken by variables like policy uncertainty and the US fiscal outlook.

In our bullish case, there will be higher demand for energy as the AI revolution really takes off, requiring many more data centers. The dollar weakens for benign reasons, sustaining commodity demand. There are also greater efforts to implement climate-neutral policies, resulting in increased demand for raw materials. But in this scenario productivity is higher, so there is less economic overheating than in our base case. There are also fewer supply-side disruptions. Given that gold prices have been driven by a worsening policy outlook, this scenario could see a crash in the price of gold, mean-reverting to its real-yield-implied level. But the outlook for commodities overall is still positive, so we forecast a return of 6.75% per year in euro terms in this scenario.

In our bear case there is further geopolitical fragmentation, incentivizing dual sourcing. Gold benefits as foreign reserve managers increasingly diversify away from the US dollar. The rebalancing between supply and demand is predominantly achieved by demand destruction. While growth is significantly below trend levels, the commodity intensity of economic growth increases due to reshoring, industrial policy boosting the share of manufacturing in the economy and a surge in military expenditure. This mitigates the drop in demand against a backdrop of more inelastic supply. The scarcity premium in commodities rises sharply. Commodities return 8% per year in euro terms, which represents a positive real return, showing its inflation hedging capabilities in an inflationary environment.

Table 5.4: China holds the cards when it comes to rare earths

Rare earths	% of global supply originated in		% projected demand increase 2025-2039 by IEA, USGS
	China	Indonesia	
Gallium	98.7	0	67
Graphite	95.2	0	233
Manganese	95	0	58
Rare earths	92.1	0	76
Silicon metal	84.8	0	50
Molybdenum	81	0	17
Cobalt	77.2	0	129
Tellurium	76.5	0	25
Antimony	74	0	1233
Germanium	73.9	0	50
Indium	70.4	0	67
Lithium	70.2	0	400
Titanium metal	68.8	0	25
Vanadium	59	0	50
Tantalum	45.5	0	33
Tungsten	44.3	0	25
Copper	44	0	25
Nickel	0	42.9	88
Chromium	42.1	0	25
Zirconium	38	0	25

Source: Robeco, July 2025.

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5.8 Summary

We provide a full overview of our return expectations for the main asset classes in our base case scenario in the introduction to this chapter. In the table below we show these returns alongside our expectations for the other two scenarios, both for euro and US dollar investors.

In our bullish scenario we expect high returns for risky asset classes, whereas in our bearish scenario we forecast below-steady-state returns for most riskier asset classes, at least for a euro investor. The exception is commodities, which benefit from higher inflation in the bear case. ●

Table 5.5: Five-year return forecasts for asset classes in our three macroeconomic scenarios

	Expected Returns 2026-2030 (EUR)				Expected Returns 2026-2030 (USD)		
	Bull	Base	Bear		Bull	Base	Bear
Fixed income							
Domestic cash	3.25%	3.00%	2.25%		3.50%	3.75%	2.50%
Domestic bonds	1.50%	2.75%	5.25%		3.75%	3.50%	6.25%
Developed	3.00%	3.00%	5.75%		3.25%	3.75%	6.00%
Emerging debt (local)	6.25%	5.50%	3.50%		7.25%	6.25%	3.50%
Emerging debt (hard)	5.00%	3.75%	2.50%		5.25%	4.50%	2.75%
Corporate inv grade	3.75%	3.00%	5.50%		4.00%	3.75%	5.75%
Corporate high yield	5.25%	3.25%	2.25%		5.50%	4.00%	2.50%
Equity							
Developed	10.50%	6.00%	2.00%		11.50%	6.75%	2.00%
Emerging	16.00%	7.50%	5.00%		17.00%	8.25%	5.00%
Real estate	9.00%	5.50%	3.75%		10.00%	6.25%	3.75%
Commodities	6.75%	5.25%	8.00%		7.75%	6.00%	8.00%
CPI							
Inflation	2.00%	2.50%	3.75%		2.00%	2.75%	3.25%

Capital at risk: Returns are geometric and annualized. The scenarios presented are not an exact indicator. They are an estimate of future performance based on current market conditions and evidence from the past on how the value of this investment varies. Expected returns will vary dependent on market performance. Source: Robeco, September 2025.

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6. Historical performance

This is the 15th edition of our Five-Year Expected Returns publication. Several readers have asked us how accurate our predictions have been since we started making them back in 2011, so in this chapter we set out our forecasts for the various asset classes and their actual returns for the five-year periods that have been completed since we began. We also plug these figures into a simple mean-variance asset allocation model to determine the extra return that our predictions could have resulted in.

6.1 Predicted versus realized returns

We now have nine overlapping five-year periods for which we have both predicted and actual returns. We show our predicted returns in Figure 6.1, which have always been rounded to the nearest quarter percent.

Note that we stopped predicting the returns of hard-currency emerging debt after the 2016-2020 report, changing to local-currency emerging debt instead. The main reasons were that the local-currency emerging debt market had increased in size, more investors had started allocating to it, and its risk and return drivers were more different from those of the US corporate bond market. We estimated the returns of hard-currency emerging debt to be equal to those of developed market high yield corporate bonds from 2011 to 2015. The market for hard-currency emerging debt seems to be highly correlated with high yield bonds; see Giesta and Swinkels (2025). We have included hard-currency emerging markets debt again in this year's report, and its expected return is now allowed to differ from that of corporate high yield.

Figure 6.1 shows that our five-year expected annualized returns for the various asset classes have varied substantially over time, with those for developed market equities ranging from 3.25% (2020-2024) to 7.00% (2012-2016), and those for government bonds ranging between -3.50% (2017-2021) and 2.50% (2024-2028). We predicted that emerging equities would outperform developed equities in every five-year period except one (2022-2026), but never by more than 2 percentage points per year (2021-2025).

The expected credit risk premiums for both global investment grade and global high yield have been steady, and often above 1.5% and 3.0% per year, respectively. These differences can be partially attributed to the global nature of corporate bonds, compared with German government bonds as the risk-free rate. Even though we hedge currency risks for fixed income asset classes, US Treasuries may be more attractive than German government bonds, which also lifts the global corporate bond return, as about 70% of the market are bonds issued in USD.

Figure 6.1: Five-year expected annualized returns for the main asset classes
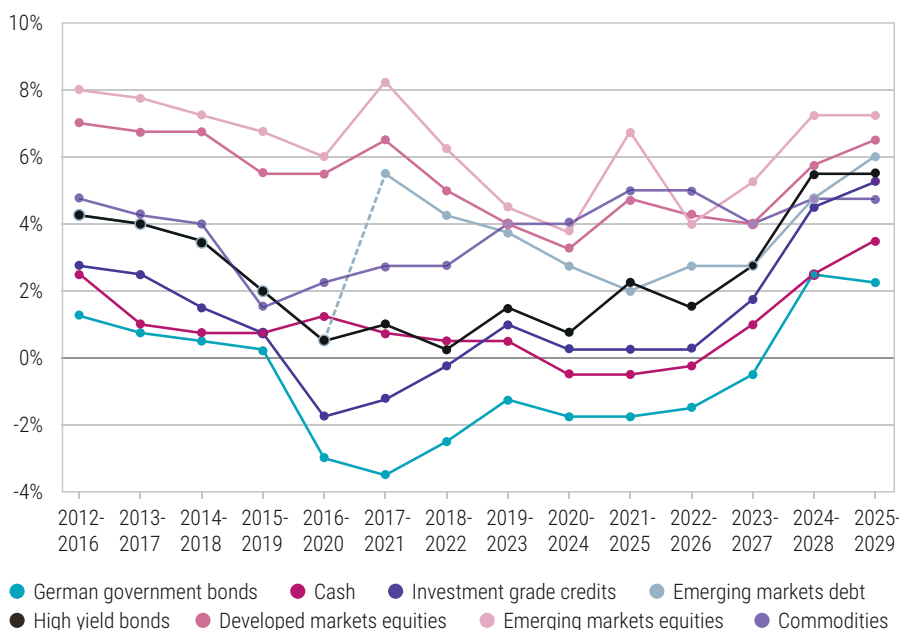
Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: Robeco. These expected returns are taken from each of our five-year Expected Returns reports, which were published during the last quarter of each calendar year.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

Table 6.1: Expected and achieved annualized five-year returns for the main asset classes

	2012-2016		2013-2017		2014-2018		2015-2019		2016-2020		2017-2021		2018-2022		2019-2023		2020-2024	
Asset class	Pred	Real	Pred	Real	Pred	Real	Pred	Real	Pred	Real	Pred	Real	Pred	Real	Pred	Real	Pred	Real
High-quality government bonds	1.25	3.30	0.75	2.10	0.50	3.04	0.50	1.64	-3.00	2.18	-3.50	0.84	-2.50	-2.78	-1.25	-2.18	-1.75	-2.71
Cash	2.50	0.39	1.00	0.06	0.75	-0.13	0.75	-0.28	1.50	-0.36	0.75	-0.43	0.50	-0.47	0.50	0.16	-0.50	0.93
Investment grade credits	2.75	4.34	2.50	2.95	1.50	2.22	1.50	2.54	-1.75	4.00	-1.25	2.72	-0.25	-1.59	1.00	0.43	0.25	-0.95
Emerging markets debt	4.25	4.98	4.00	3.09	3.50	2.93	3.50	3.52	0.50	4.00	5.50	1.86	4.25	0.97	3.75	2.58	2.75	0.84
High yield bonds	4.25	7.67	4.00	5.35	3.50	2.92	3.50	4.41	0.50	5.48	1.00	3.10	0.25	-1.04	1.50	2.21	0.75	2.03
Developed markets equities	7.00	15.75	6.75	14.38	6.75	9.15	5.50	11.01	5.50	10.17	6.50	13.91	5.00	9.23	4.00	14.15	3.25	13.52
Emerging markets equities	8.00	5.95	7.75	6.71	7.25	5.91	6.75	7.61	6.00	10.56	8.25	8.62	6.25	1.33	4.50	4.79	3.75	3.77
Commodities	4.75	-9.44	4.25	-10.50	4.00	-11.27	1.50	-2.88	2.25	-4.16	2.75	1.26	2.75	9.00	4.00	9.46	4.00	8.87

Past performance is no guarantee of future results. The value of your investments may fluctuate.
Source: Robeco, LSEG Datastream. Annualized geometric returns in euros. Expected returns published during the last quarter of the previous year.
Until 2015-2019, emerging debt was hard-currency debt, from 2016-2020 onward it has been local-currency debt.

Table 6.1 shows our predicted returns from Figure 6.1 alongside the actual returns that
the various asset classes have achieved over the nine full five-year periods since we began
making these forecasts. What are our main takeaways?

It is difficult to try to predict cash returns over a period of five years. In the first report, our
predicted return was more than 2 percentage points higher per year than the return cash
actually achieved (2.50% versus 0.39%), and the deviations between predicted and actual
returns have been greater than 1 percentage point per year several other times. We know
that the return on cash is risky over extended holding periods from Campbell and Viceira
(2005), and, unfortunately, our findings back this up. Cash is only risk-free for investors
with a short investment horizon.

We expected long-term interest rates to increase (and therefore government bond returns
to suffer) for several years before they actually did, as we can see with our expected return
for German government bonds of -3.00% per year for the 2016-2020 period. However, it
turns out that timing the market is just as difficult in fixed income as it is for equities. It
was not until 2022 that interest rates finally rose substantially, resulting in our predicted
annualized return for German government bonds for 2018-2022 of -2.50% being close to
their achieved return of -2.78% per year. Compounding the issue, the following year we
stopped predicting that yields would increase sharply, such that our prediction for
2019-2023 was nearly 1 percentage point per year too high.

Commodity returns can be very volatile. They were highly negative – around -10% per year
– in the initial five-year periods in which we were making our predictions. Inflation, which
tends to be positively related to commodity prices, was substantially below our expectations
during these periods. Over the last three full five-year periods, however, commodities
performed strongly, with almost double-digit annualized returns. For these periods we
increased our predicted return for commodities, but substantially less than we should have.

Equity markets have performed extremely well since 2012, partly due to central banks
helping investors in times of crisis in combination with governments across the globe
creating large debt-to-GDP ratios. Emerging markets, which are often deemed to involve

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higher required returns than developed equities, only outperformed developed equities in one of the full five-year periods, and even then only marginally – they rose by 10.56% per year between 2016-2020, compared with 10.17% per year for developed equities. The stellar performance of the US stock market is the driving factor behind developed equities' consistent outperformance over the period.

Note our prediction of 3.50% per year for emerging market debt for 2015-2019 and its actual return of 3.52% or emerging markets equities for 2020-2024 with 3.75% predicted and 3.77% realized. It doesn't get any better than that!

Even though it is interesting to compare predictions with the actual outcome, the value added by forecasting returns for an investor can best be judged in practical terms, such as the performance of a dynamic asset allocation that is based on the predictions relative to a static benchmark. For this, it is more important to correctly predict the direction and the relative returns of asset classes than their absolute returns. For example, although our prediction for emerging markets equities was spot-on for the 2020-2024 period, we severely underestimated the returns of developed markets equities (3.25% expected versus 13.52% realized).
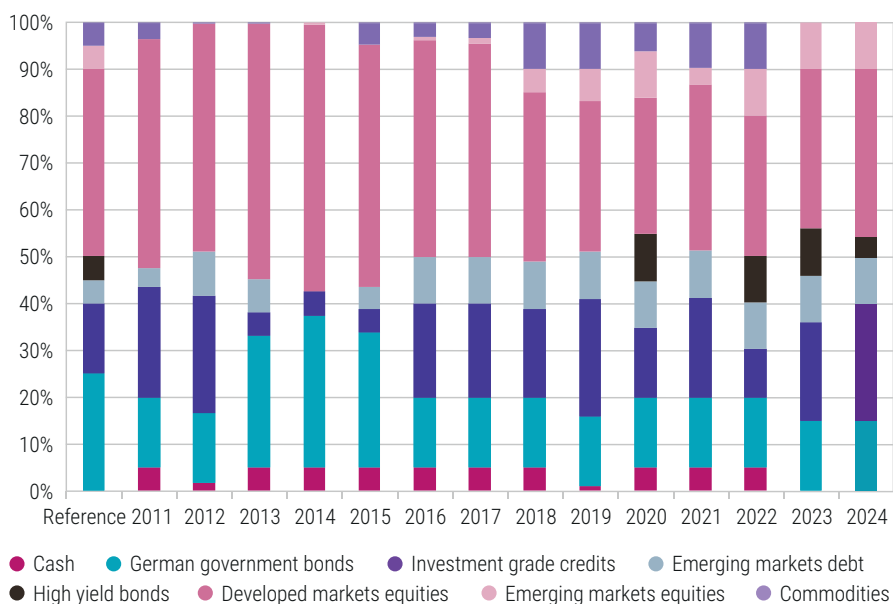
6.2 Dynamic asset allocation

To calculate a dynamic asset allocation based on our five-year expected returns, we need to make several assumptions. We assume a mean-variance investor uses our latest Five-Year Expected Returns outlook to inform their expected returns for the main asset classes. However, we do not have many non-overlapping five-year periods available, which makes it difficult to assess their performance over such a long horizon. What's more, many investors re-evaluate their asset allocation every year, updating it with the latest insights. This implicitly shortens the investment horizon to one year. So, for this exercise we use the five-year expected returns over a one-year horizon. At the end of each calendar year, we use monthly returns from the previous ten years to estimate a covariance matrix that enables us to calculate portfolio volatility. We compare the dynamic asset allocation to a static reference portfolio. The difference in return between the dynamic asset allocation and the reference portfolio is the value added from using our return expectations. The static reference portfolio is derived from average market capitalization weights for the various asset classes (see Doeswijk, Lam and Swinkels, 2014). Its composition is shown in the first column, labeled 'Reference', in Figure 6.2.

Our dynamic allocations are constrained such that they do not deviate too much from this reference portfolio. The weight in the portfolio of German government bonds must remain within 15% and 35%. The range for global investment grade credit is 5-25%, and that for global developed markets equities 20-60%. All asset classes with a 5% weight in the reference portfolio have a permissible range of 0-10%. The ex-ante volatility of the dynamic portfolio must be at most equal to that of the reference portfolio, such that any extra return cannot be the result of taking on more ex-ante risk; it must only come from better use of the available risk budget.

This approach above is designed to keep things simple. There are improvements that could be made, but they would come at the expense of additional complication. For example, we could use a more sophisticated risk model than calculating risk based on 10-year historical returns, we could include the insights of Black and Litterman (1992) by shrinking the outcome to the reference portfolio, or we could recognize that correlations tend to increase during crises in our calculation of risk; see Chow et al. (1999) and Campbell, Huisman and Koedijk (2001).

We show the resultant dynamic asset allocations at the end of each year in Figure 6.2. Although the reference portfolio contains no cash, the dynamic portfolio regularly invests up to the maximum of 5% in this asset class to enable it to allocate more to higher-risk assets if we believe they have strong return potential at that time. The dynamic portfolio does not always contain high yield bonds, emerging markets equities or commodities, but at other times allocates the maximum of 10% to these asset classes. As such, our predictions result in a truly dynamic allocation.

Figure 6.2: Dynamic asset allocations over time

Source: Robeco. Dynamic asset allocations based on our five-year expected returns for the various asset classes.

6.3 Performance of the dynamic asset allocation

We now turn to the performance of the dynamic allocation relative to the reference portfolio. We evaluate it on a calendar-year basis, which is different from Table 6.1, which compares our five-year predictions with the actual returns over five-year periods. The calendar year returns of this dynamic asset allocation are shown in Figure 6.3.

The dynamic allocation outperforms the reference benchmark in half of the calendar years and underperforms in the other half, but as most outperformances are substantially larger than the underperformances, there is an average outperformance of 36 bps per year. Since the double-counted turnover is about 25% per year, transaction costs would amount to 3 bps per year if we assume trading at the asset class level costs 10 bps. In the two years in which there are negative total returns for the reference portfolio (2018 and 2022), the dynamic portfolio outperforms the reference portfolio. Although this sample size of two is small, it may be indicative that our valuation component signals when investment returns would be low.

By comparing the average five-year expected returns of the dynamic portfolio with that of the reference portfolio, we can obtain an estimate of its expected outperformance. The average expected outperformance over this period is 30 bps per year, for the same ex-ante volatility. Ex-post, the average outperformance is slightly higher at 36 bps per year, and the dynamic asset allocation's ex-post volatility of 7.2% is lower than the 8.0% of the reference portfolio. Given the ex-post tracking error of 2.1%, the dynamic portfolio achieves an information ratio of 0.17.

Past performance is no guarantee of future results. The value of your investments may fluctuate.

These results are achieved using simple techniques and assumptions. Introducing more complexity in the process might further increase the return for the amount of risk taken. In practice, we use more sophisticated methods for the multi-asset solutions that we develop for our clients. ●

Figure 6.3: Performance of dynamic asset allocations over time

● Reference ● Optimized ● Relative performance
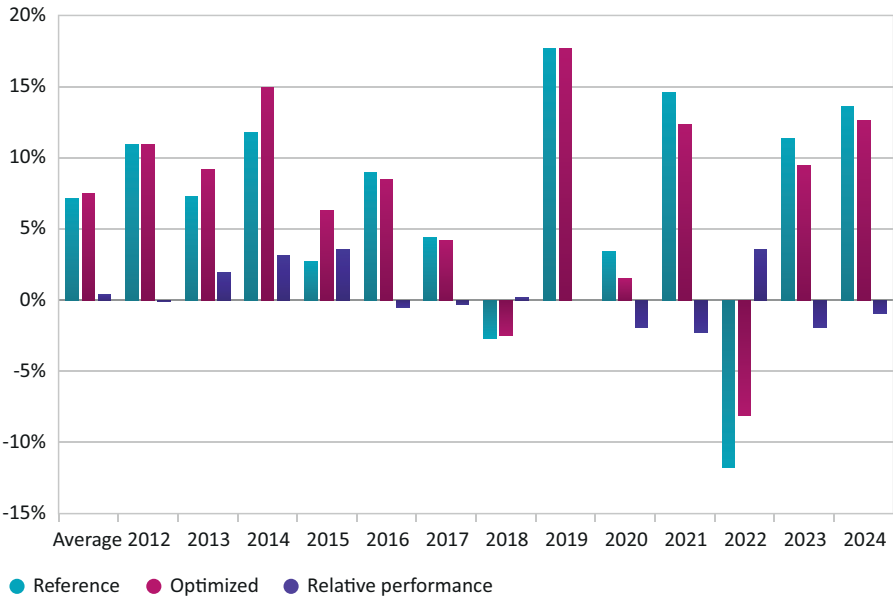
Simulated past performance is no guarantee for future results. The performance shown is based on a simulated and hypothetical (back-tested) data and may suffer from the benefit of hindsight. Although Robeco is prudent in its assumptions for simulations, no representation is made that the index will achieve results similar to those shown and actual performance results may deviate significantly.
Source: Robeco, LSEG Datastream. June 2025. Annual returns in euros for the reference portfolio, the dynamic asset allocation and the difference between the two. Back-tested performance. For illustration purposes only.

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