BNY | INVESTMENTS

CAPITAL MARKET ASSUMPTIONS
ENDURANCE UNDER PRESSURE

2026

PRESSURE-TESTING MARKETS

A disciplined, forward-looking approach to strategic asset allocation – grounded in robust capital market assumptions and an understanding of structural changes – will be essential for navigating this environment and capturing long-term value.

Intense shifts in geopolitics, technology, and macroeconomic policy are compressing global capital markets. Dynamics have many investors wondering how to future-proof portfolios.

But pressure is a catalyst — it forges structure and builds resilience. Like carbon crystallizing into diamond under intense pressure, markets are repricing durability across growth, debt, currency, and capital. Yet, excess pressure can also strain market mechanisms and trigger dislocations. Navigating the difference requires discipline, a long-term lens, and a clear framework for a strategic asset allocation (SAA).

Our 10-year Capital Market Assumptions (CMAs) provide the initial building blocks for the development of an investor's SAA. To start, we outline the key structural themes we expect to exert pressure on the investment landscape over the next decade — dynamics that will shape returns over this time horizon. Second, we detail our approach to developing our assumptions while considering the impact of our structural themes.

The Importance of Capital Market Assumptions

With the backbone of 10-year return expectations, investors can develop their SAA, which plays a critical role in multi-asset investing and transforms forward-looking market forecasts into enduring portfolio allocations. BNY Investments develops CMAs across roughly 80 asset classes in U.S. dollars, British pounds, Japanese yen, and euros, spanning a 10-year horizon to guide the construction of multi-asset portfolios.

Developing our CMAs is a collaborative effort across macroeconomists, portfolio managers, quantitative and fundamental researchers, and client-facing investment professionals.

A disciplined, forward-looking approach to strategic asset allocation — grounded in robust capital market assumptions and an understanding of structural changes — will be essential for navigating this environment and capturing long-term value. Investors who adapt to a more fragmented, opportunity-rich global landscape will be best positioned to benefit from the next decade's structural shifts.

KEY TAKEAWAYS

2025 was a year of profound transformation for global capital markets, marked by structural shifts in geopolitics, technology, and macroeconomic policy. Investors faced a landscape defined by the interplay of persistent inflation, evolving monetary and fiscal regimes, and the rapid diffusion of artificial intelligence (AI). These forces accelerated the fragmentation and dispersion of the global economy.

Looking at 2026, we see growth re-accelerating, with support from global fiscal and monetary policies. As detailed in our 2026 Outlook, we believe policy direction is diverging, reflecting varying growth dynamics, inflation pressures, and policy priorities. This could create avenues for returns but potentially make it harder to spot the opportunities — a scenario in which careful selection becomes vital. Reflecting these market dynamics, our annual assessment of 10-year return expectations resulted in some notable changes from last year.

Equities

International equity markets improved the most in terms of return expectations, with developed ex-U.S. and emerging markets are forecast to deliver 7.8% and 8.1%, respectively. AI-driven productivity gains and a more favorable global outlook as the U.S. dollar weakens should support both asset classes.

Fixed Income

Fixed income markets showed mixed movement. U.S. aggregate bond return expectations moderated to 4.3%, driven by lower starting yields. U.S. municipal bonds edged up to 3.8%. The correlation between stocks and bonds rose slightly alongside increasing supply-side risks.

Alternatives

Private equity return expectations rose sharply to 10.5% per year, driven by a robust illiquidity premium and the expanding role of private capital in funding innovation and infrastructure.

2026 vs. 2025
Capital Market Assumptions

		2026		2025	
Asset Class		**Expected Return**	**Standard Deviation**	**Expected Return**	**Standard Deviation**
EQUITY	U.S. Equity	7.6%	15.9%	7.5%	16.2%
	Developed Ex-U.S.	7.8%	15.9%	6.7%	16.3%
	Emerging Markets	8.1%	17.6%	7.7%	18.7%
FIXED INCOME	U.S. Aggregate	4.3%	5.2%	4.8%	5.4%
	U.S. Municipal	3.8%	5.3%	3.6%	5.3%
	U.S. High Yield	6.1%	7.9%	6.0%	8.4%
	EM Sovereign USD	5.8%	9.1%	6.3%	9.5%
ALTERNATIVES	Commodities	2.3%	14.3%	2.2%	15.0%
	Hedge Funds	5.8%	6.1%	5.3%	6.3%
	Private Equity	10.5%	21.4%	9.7%	20.1%

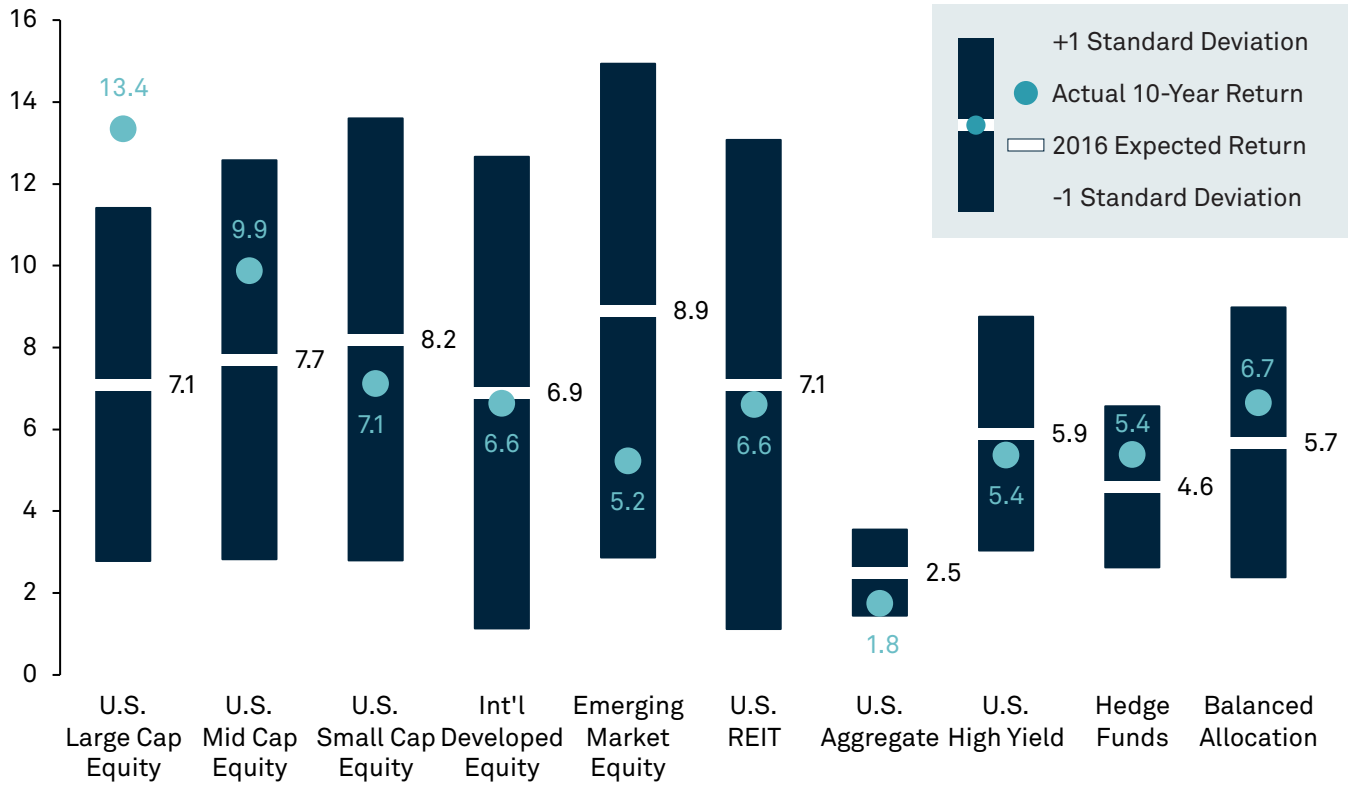
Source: BNY Investments. Data as of December 31, 2025.

A TIME-TESTED APPROACH

For years, BNY Investments has constructed CMAs to guide institutional and high-net-worth clients in strengthening their long-term asset allocations. We also validate these assumptions against realized market returns. Below, we compare our 2016 return expectations with the actual 10-year returns over the subsequent decade.

Overall, actual returns for nearly all asset classes fell within expected ranges. The primary outlier was U.S. large cap, which outperformed as valuations expanded from 18.8 to 26.5, based on price-to-earnings ratios. Emerging market equities also lagged slightly, driven by higher-than-anticipated share issuance. In contrast, international developed equity, U.S. real estate investment trusts (REITs), fixed income, and hedge funds delivered results closely aligned with our forecasts.

2016 Capital Market Assumptions vs. Actual 10-Year Returns



Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

THEMES FOR THE NEXT DECADE

When forming long-term expectations, it's essential to look beyond cyclical fluctuations and focus on the structural forces shaping trend growth, inflation, and interest rates. Our assumptions incorporate views on themes we expect to persist beyond the current market cycle. Against the current backdrop, several structural themes stand out as influential for the decade ahead.

01 Sovereign Debt: Developed Markets Feel the Weight

Developed markets face fiscal strain as higher borrowing costs meet persistent deficits and rising issuance.

Prepare for steeper yield curves and bond market volatility. Stay active in duration and across global sovereign markets.

02 The U.S. Dollar: From Privilege to Pressure

Shifting trade policies, rising FX hedging activity, and narrowing global growth differentials are eroding structural support for the U.S. dollar.

Reassess global currency exposure, hedge ratios and the diversification role of non-U.S. assets as capital flows broaden.

03 AI Adoption: The Macro Shock of the Decade

The impact of AI on productivity and competitive dynamics will become more visible. We expect the market to increasingly focus on who can capture value from AI.

Look toward firms and sectors that can both retain productivity gains and convert lower costs into sustained demand and earnings growth.

04 Private Markets: Engine of Value Creation

Private markets are at the center of an AI-driven capital expenditure boom, facilitating AI adoption and creating significant opportunities for investors.

Look beyond traditional public markets to access the full growth opportunity set and be mindful of increasing market concentration in public equities.

SOVEREIGN DEBT DEVELOPED MARKETS FEEL THE WEIGHT

Advanced economies are grappling with historically high levels of sovereign debt. The debt sustainability was less concerning a decade ago when rates were at historic lows, coupled with ample demand from quantitative easing (QE). However, recent inflation shocks, higher rates, quantitative tightening, and political and economic pressures for expansive fiscal policies have revived questions about fiscal sustainability and its implications for investors.

While we do not see a near-term catalyst for fiscal shock, countries with unsustainable debt dynamics and little political appetite for adjustment are likely to face a gradual buildup of risk premia in their sovereign debt markets.

Elevated Debt Burdens and Persistent Fiscal Pressures

Developed market governments are likely to maintain an expansionary fiscal stance, driven by strategic priorities such as AI infrastructure investment, defense modernization, and the reshoring of critical supply chains.

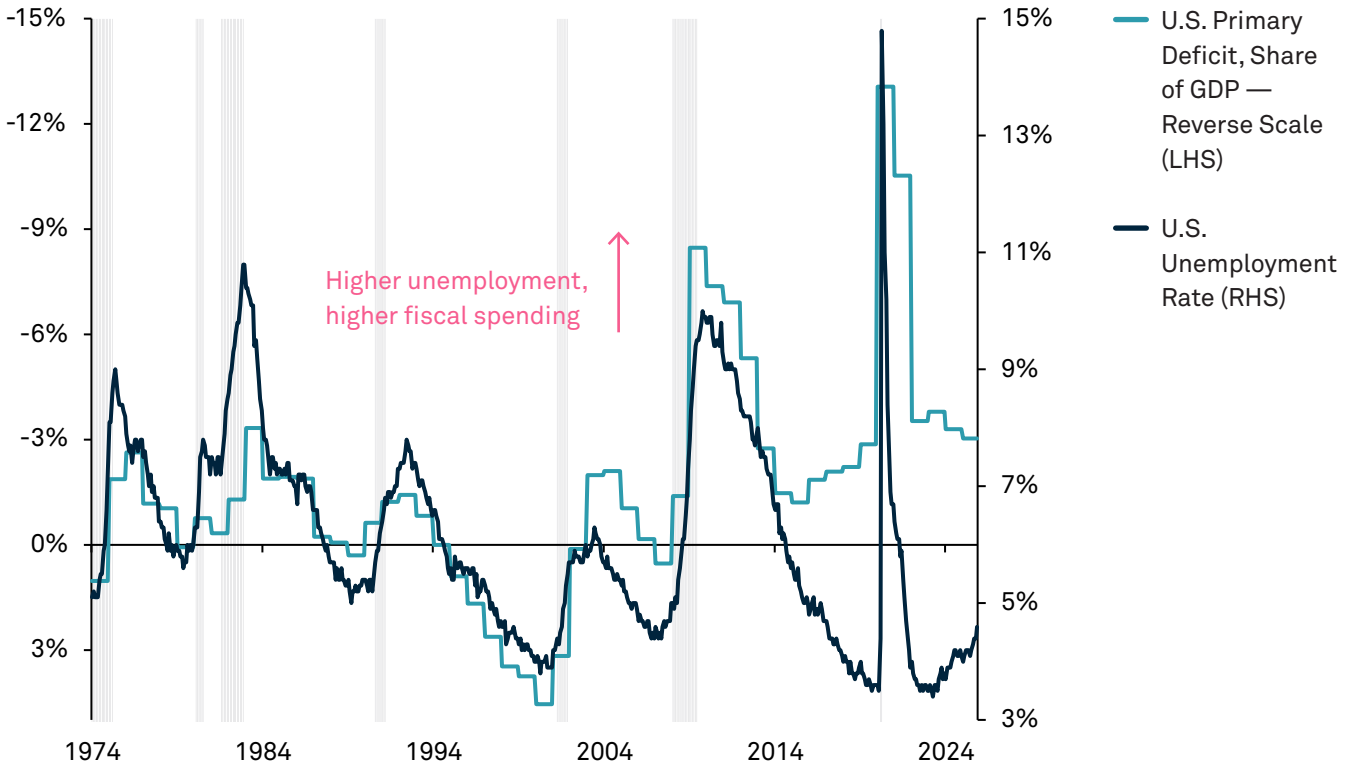
U.S.

The One Big Beautiful Bill Act (OBBBA) is projected to add $4.1 trillion to the national debt over the next decade, pushing the debt-to-GDP ratio from 100% to over 125%. Current tariff policies are projected to raise roughly $2 trillion over the coming decade, after accounting for substitution effects, only partially mitigating the anticipated budget deficits.

However, much of the tax bill is temporary by design, which will set in motion a series of fiscal cliffs, forcing lawmakers to either extend key provisions or let them expire. Historically, fiscal policy was countercyclical (loosened during economic downturns) as the government stepped in to boost aggregate demand. However, we observe fiscal policy has become procyclical (higher government spending during high GDP growth) circa the passing of the Tax Cuts and Jobs Act (TCJA). As fiscal cliffs near, a procyclical fiscal stance risks further steepening the debt trajectory.

U.S. Fiscal Policy & Unemployment Rate

U.S. fiscal policy has been expanding as the unemployment rate has been falling.



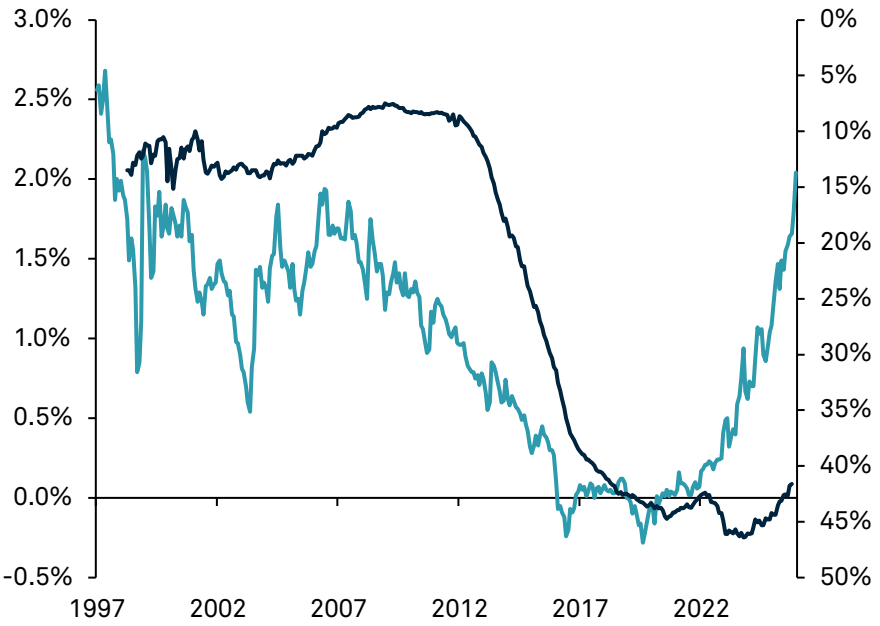
Sources: BNY Investments, BLS and CBO. Data as of September 22, 2025.

Japan

Japan has one of the highest debt-to-GDP ratios in the world, exceeding 200%. For decades, this dynamic has coexisted with low interest rates. However, the Bank of Japan (BOJ) implemented quantitative tightening in late 2024, effectively reversing the course of its extensive bond-buying program, which once accounted for nearly half of outstanding government debt.

BOJ Holdings of Japanese Government Bonds (JGBs) & 10-Year JGB Yields

The BOJ began tapering its bond purchase in late 2024, effectively reversing course of its extensive bond-buying program.



Sources: BNY Investments, BOJ. Data as of September 22, 2025.

With BOJ demand plateauing, the burden of absorbing new JGB issuance is increasingly falling on large domestic institutions and foreign investors, particularly for the long end of the curve. The JGB market faces both liquidity and sustainability risks with gross financing needs over 30% of GDP, creating two main questions.

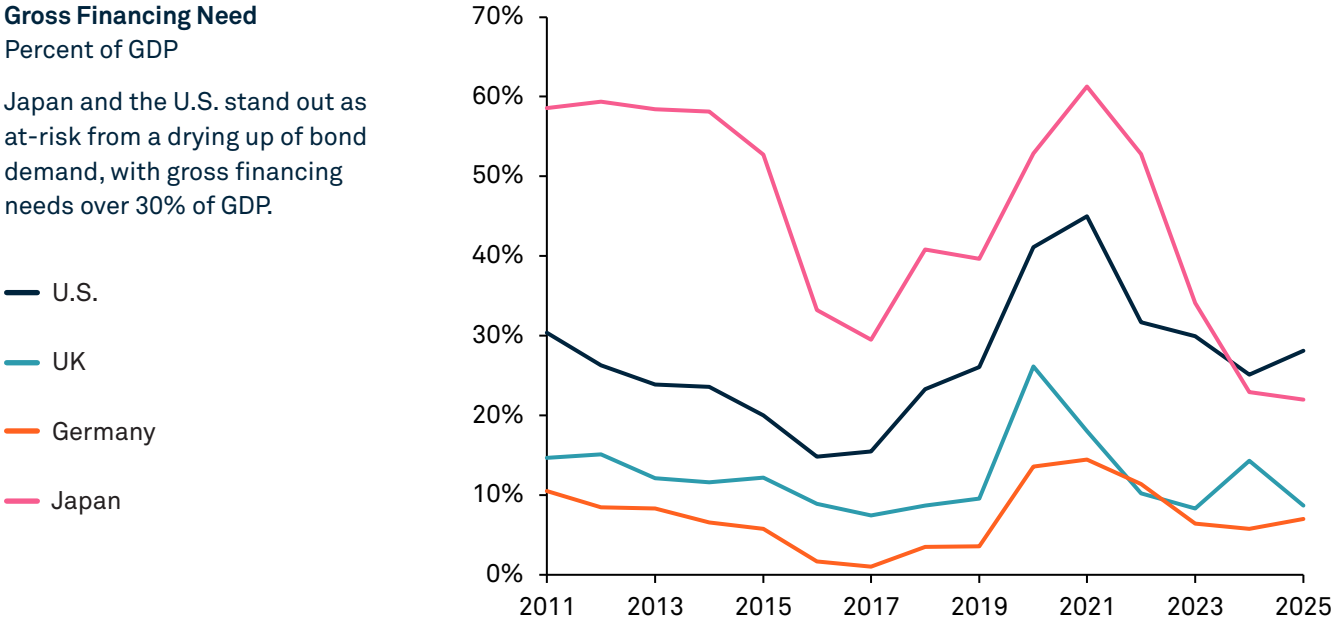
First, who will step in to meet the increase in net supply while the BOJ normalizes policy? Historically, pension funds and life insurers would be first in line to absorb excess issuance. While these traditional buyers of excess issuance still hold around 18% of outstanding JGBs, their role has diminished over time, mostly due to domestic reforms. Now, demand from both the central bank and domestic institutions is falling, which means excess supply, likely leading to lower bond prices and higher yields.

The second question is, how will elevated debt coexist with higher cost of debt? For most of the recent past, Japan lived with a high debt-to-GDP ratio without many consequences, largely due to record-low interest rates as the BOJ controlled the yield curve. But the BOJ's tapering of bond purchases suggests it has abandoned yield curve control for now.

Meanwhile, fiscal policy, traditionally a lever for managing the debt-to-GDP ratio, may be less effective in this capacity for now, as the new prime minister is a fiscal dove. Japan's supplementary budget highlights an additional spending package just shy of ¥18 trillion ($116 billion), about ¥4 trillion more than the previous year. To stabilize its debt burden, Japan may ultimately need stronger GDP growth driven by productivity gains. Persistently large fiscal impulses or stagnant growth can eventually lead to structural premiums in long-end yields, which has the potential to increase volatility and steepen the curve.

Gross Financing Need
Percent of GDP

Japan and the U.S. stand out as at-risk from a drying up of bond demand, with gross financing needs over 30% of GDP.



Sources: BNY Investments, IMF. Data as of September 22, 2025. Gross financing need: Measures the issuance of a country in a given year, a combination of deficit and rollover of maturities.

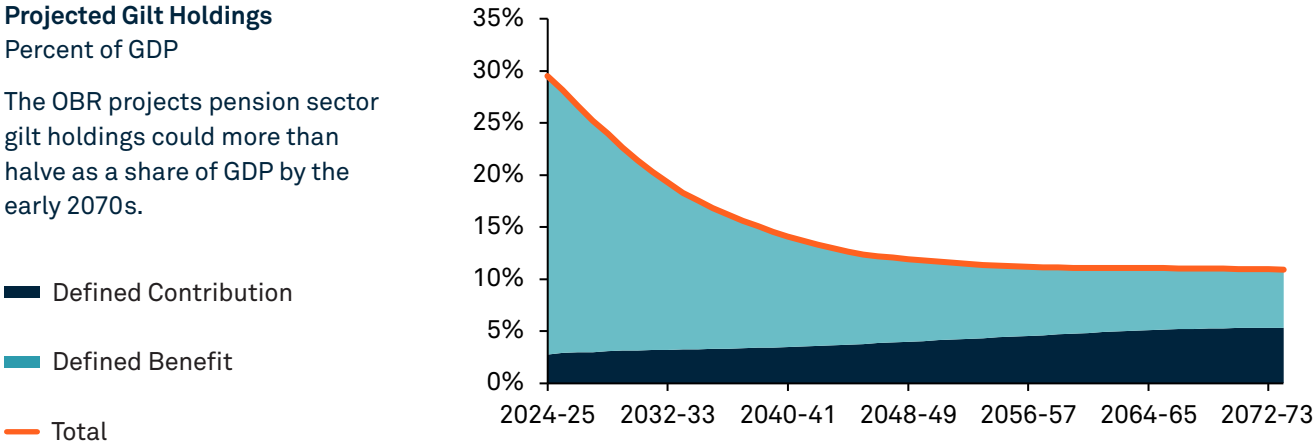
UK

The UK faces a similar backdrop with demand for duration softening. Defined benefit pension schemes, core buyers of long-dated gilts, are holding a smaller share of the market. While they remain key purchasers, these institutions' demand has not kept up with gilt issuance, which has climbed as the UK's debt-to-GDP ratio has risen. At the same time, many schemes are now in surplus and facing government encouragement to invest surplus assets in growth-oriented projects.

The rise in defined contribution schemes is unlikely to make up for the reduced demand as these portfolios tend to be more growth oriented. The UK's Office for Budget Responsibility (OBR) projects pension sector gilt holdings could more than halve as a share of GDP by the early 2070s. Insurance buyouts are further shifting investment from gilts to other assets.

Projected Gilt Holdings
Percent of GDP

The OBR projects pension sector gilt holdings could more than halve as a share of GDP by the early 2070s.

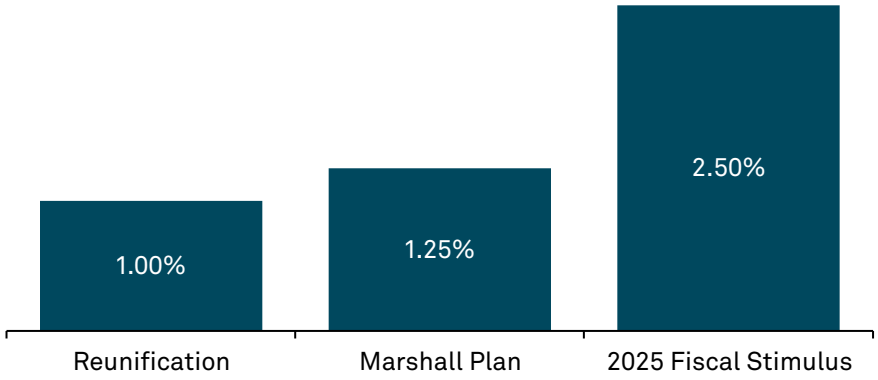


Sources: BNY Investments, OBR. Data as of September 22, 2025.

Europe ex-UK

In March 2025, the German government approved a constitutional amendment to exempt defense spending above 1% of GDP from borrowing limits and establish a €500 billion extrabudgetary fund for infrastructure and climate investment. This represents a significant loosening of Berlin's constitutional "debt brake," which surpasses the post-WWII Marshall Plan and the 1990s reunification stimulus. Implications of an increase in debt-to-GDP are highly dependent on allocating resources to productivity-improving projects. According to Fitch Ratings, Germany's debt-to-GDP ratio is forecast to climb to nearly 70% by 2027 from its 2024 level of 64%, testing the limits of its AAA credit rating (the AAA median debt-to-GDP ratio is currently 36.5%).

Germany Fiscal Stimulus in Perspective
Percent of GDP



Source: BNY Investments. Data as of September 22, 2025.

The post-Cold War model of maintaining fiscal leeway by minimizing defense spending under the U.S. security umbrella, while relying on inexpensive Russian energy and access to the Chinese market, has been upended by geopolitics. NATO defense spending targets (reaching 5% of GDP by 2035) are poised to boost spending by member states.

Slower Growth and Higher Interest Costs Squeeze Governments

To understand the trajectory of sovereign debt, we provide a formula that relates changes in government debt *(d)* to the cost of debt *(r)*, nominal growth rate *(g)*, and primary surplus *(s)*.

$$\Delta_1 d_t = \left(\frac{r-g}{1+g}\right) d_{t-1} - s_t$$

As we explored earlier, governments can control the growth of debt-to-GDP by one or more of the following:

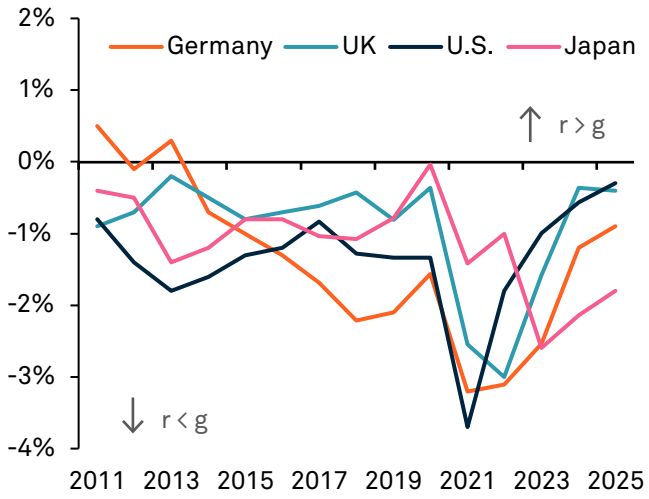
- Controlling the interest rate *(r)* via credibly lowering interest rates or exercising financial repression strategies.
- Increasing nominal GDP growth *(g)* either via inflation or higher real growth.
- Running tighter fiscal policy via higher primary surplus/lower primary deficit *(s)*.

The differential between cost of debt and growth (the *r-g* gap) largely denotes the sustainability of a country's fiscal policy, even more so when the country runs a fiscal deficit, as is the current case with most developed markets. When interest rates are less than growth, or $r < g$, a country with a primary deficit can offset an increase in its debt burden by simply growing faster. When the cost of debt is greater than rate of growth, or $r > g$, with a given primary deficit, a country's debt burden inexorably rises due to rising interest costs.

Currently, this *r-g* gap remains favorable in major economies (i.e., $r < g$), and there is fiscal space to run primary deficits. However, according to IMF projections, interest costs are expected to narrow while primary budget balances are expected to deteriorate, apart from in the UK. As the *r-g* differential shrinks, the risk of a fiscal reckoning increases, especially for economies with limited flexibility to cut spending or boost revenue (monetize assets).

Projected Interest Rate-Growth Differential Next Five Years

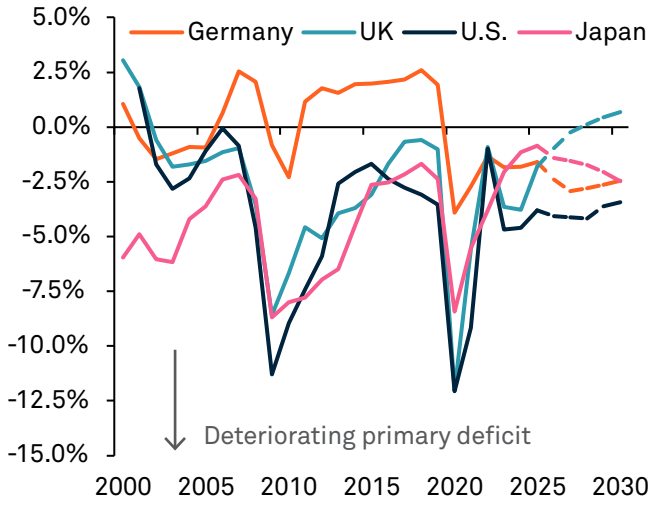
The r-g gap remains negative (i.e., fiscal space to run primary deficits); however, is expected to narrow.



Primary Budget Balance

Percent of GDP

Primary budget balance is expected to deteriorate, except in the UK.



Sources: BNY Investments, IMF. Data as of September 22, 2025.

Two Levers for Policy

We believe there are two main levers a country can realistically pull to manage the sustainability of its sovereign debt burden. The first is gradual public sector deleveraging through deficit reduction (i.e., increase *s*), coupled with policies that stimulate private sector growth via productivity gains or controlled re-leveraging. This is considered an economically sound way to increase *g*.

The second more direct, albeit riskier, approach is managing elevated sovereign debt through the artificial suppression of interest rates (i.e., lowering *r*), potentially through financial repression strategies. These can range from forced debt absorption by domestic institutions and households (such as by the issuance of debt at below market rates, or non-marketable securities) to unorthodox strategies such as yield curve control, which can raise perceptions of currency debasement.

These mechanisms may temporarily ease debt servicing costs, but each strategy carries distinct inflationary risks and credibility costs. Crucially, for such an approach to succeed in reducing the debt burden, without undermining price stability, inflationary shocks would need to be one-offs in nature and quickly revert to target, with inflation expectations remaining firmly anchored.

Implications for Bond Markets

We anticipate a gradual easing of developed market policy rates as most rates are currently restrictive relative to our normalized projections. At the same time, fiscal policy is likely to remain expansionary, driven by public investment demand for energy infrastructure and economic reshoring. However, without a clear focus on balancing capital deployment with debt sustainability, bond investors may demand greater fiscal discipline, a potential risk for bond markets that could keep long-end yields elevated or drive them even higher.

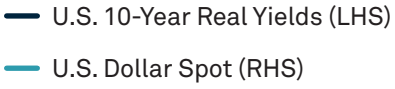
We will continue to monitor these dynamics closely. For now, our outlook on monetary and fiscal policy is reflected within the section describing our calculation methodology.

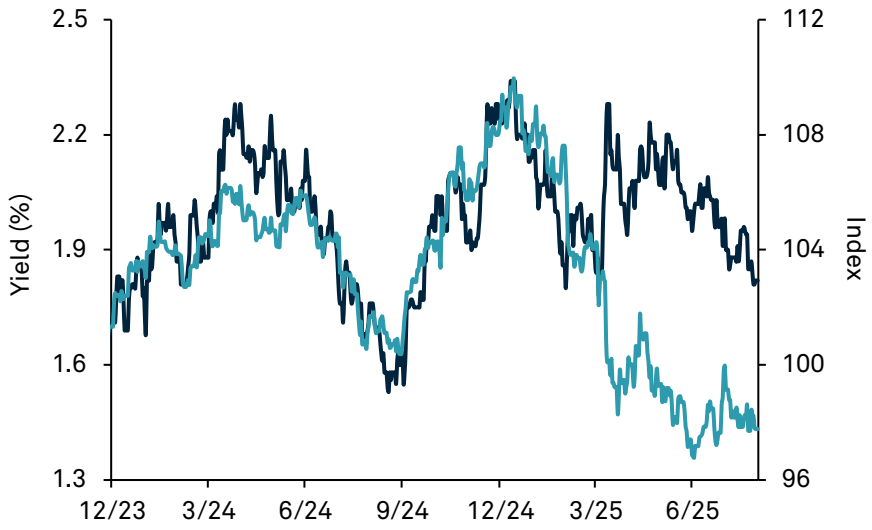
THE U.S. DOLLAR
FROM PRIVILEGE TO PRESSURE

Today's global economy is defined by a significant imbalance — the U.S.' large, persistent trade deficit. Expectations for continued U.S. economic strength, which keeps domestic consumption elevated and attracts foreign capital, is the primary reason for the imbalance. This dynamic has supported stronger import demand relative to the rest of the world and widened the U.S. trade deficit. If expectations of U.S. economic performance remain intact, global investors are likely to maintain their appetite for U.S. assets.

Through a shift in trade and industrial policy, the U.S. government aims to reduce import dependence and revive domestic production, particularly in manufacturing, as part of a broader effort to reshore the economy and critical supply chain infrastructure.

10-Year U.S. Real Yields vs. U.S. Dollar Index



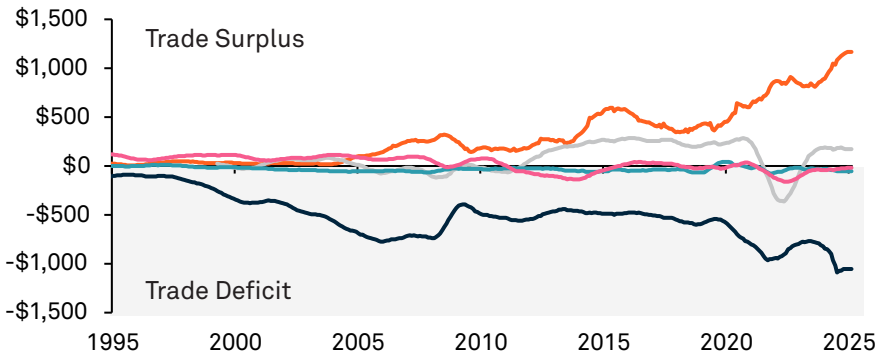


Sources: BNY Investments, Bloomberg. Data as of October 31, 2025.

Rebalancing Trade

Broadly, there are two primary paths to narrowing the U.S. trade deficit. The first is for U.S. growth to slow, either through tighter policy or by imposing restrictions on free trade to curb domestic demand for imports. The second is for the rest of the world to grow faster than the U.S., likely through stronger fiscal policy stimulus, thereby lifting demand for U.S. exports. The first path rebalances trade by reducing global demand, while the latter is more constructive for global growth.

Global Trade Imbalances
Trade Balance (Billions USD)

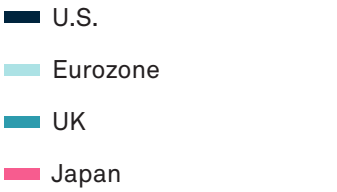


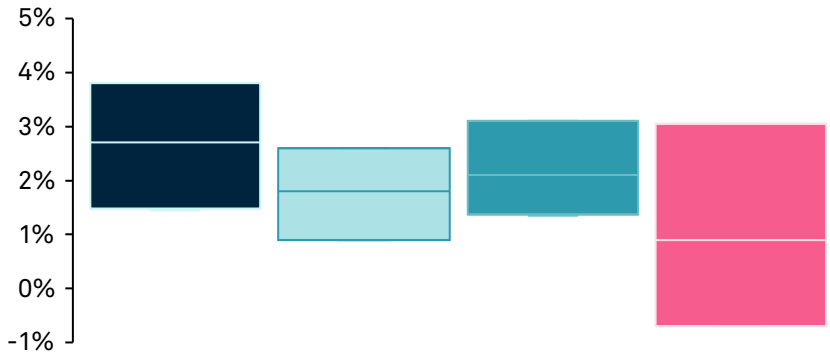
Sources: BNY Investments, Bloomberg. Data as of October 31, 2025.

Recent policy shifts around the world suggest that both sets of dynamics are at play. In the U.S., higher tariffs are functioning as a tax on domestic consumption, tempering demand. Meanwhile, increased fiscal stimulus in economies such as Germany and China supports foreign demand. Together, these measures contribute to a gradual redistribution of global growth, narrowing the gap between the U.S. and the rest of the world.

As global growth rates converge, growth differentials between the U.S. and other economies will narrow. The resulting convergence puts downward pressure on U.S. assets and the dollar as investors diversify their investment portfolios.

Developed Market Real GDP Growth Rates
Rolling 30-Year GDP Growth Rates, 25th to 75th Percentiles





Sources: BNY Investments, Bloomberg. Data as of October 31, 2025.

Strong Valuations

Another driver of U.S. dollar weakness is valuation. Despite this year's correction, the U.S. dollar remains above its 10-year moving average. One way to assess the currency's valuation is through purchasing power parity (PPP), which estimates the exchange rate at which a basket of goods and services would cost the same in the U.S. as abroad. The PPP rate, along with the real effective exchange rate (REER), serves as a benchmark for long-term fair value. When the market exchange rate is notably stronger than these measures, it suggests the U.S. dollar is rich by historical standards and may face further downside as valuation pressures persist.

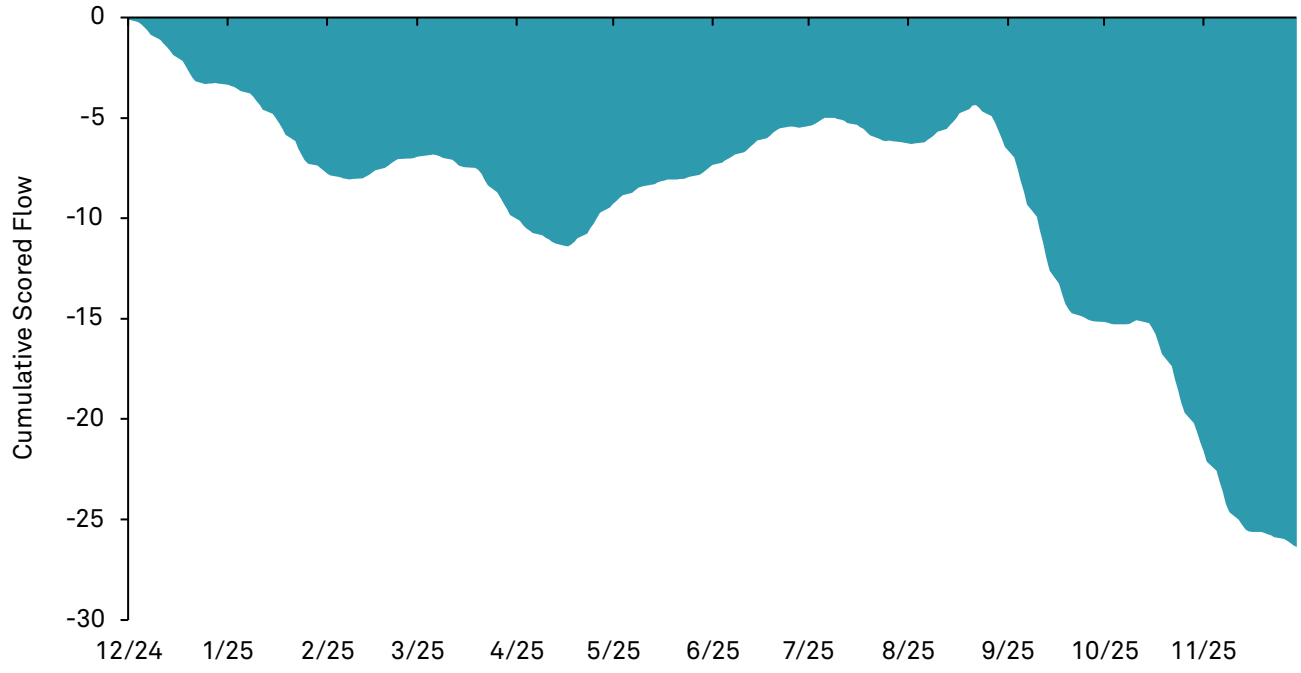
Increased Hedging

Against this backdrop of trade rebalancing, growth convergence and elevated U.S. valuations, global investors have structurally increased FX hedge ratios on U.S. dollar-denominated assets. For example, during April's cross-asset selloff, U.S. Treasuries didn't provide their typical stabilizing ballast and correlations broke down, prompting global allocators to raise currency hedges on U.S. exposures.

U.S. Treasury Flows

Cross-Border U.S. Treasury Demand

Flows are weaker since the beginning of the year.

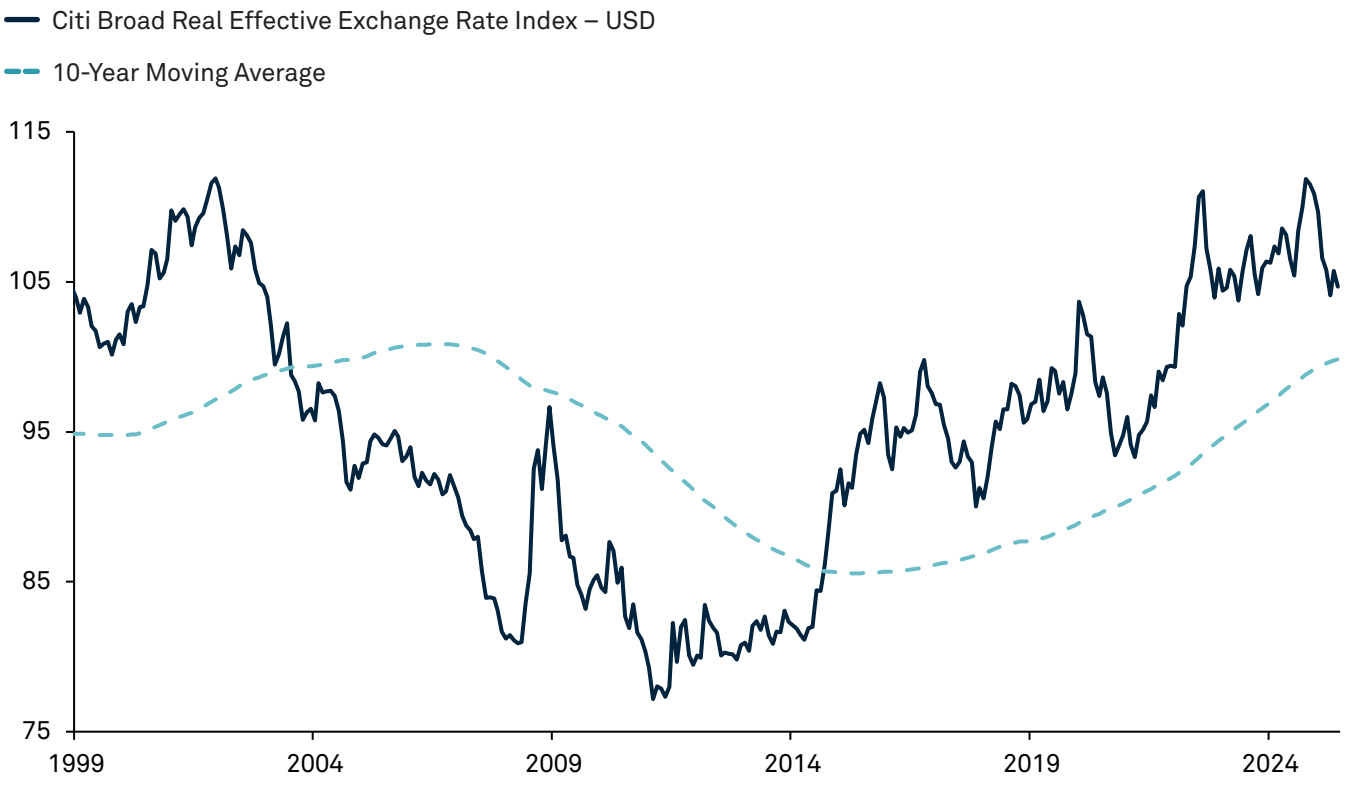


Sources: BNY iFlow, Bloomberg. Rebased to 0 as of December 2024. Data as of October 31, 2025.

Other incentives to hedge U.S. asset exposure have also grown increasingly compelling. As outlined in our debt-sustainability analysis, rising term premia could steepen the U.S. yield curve; a steeper curve boosts the pickup that foreign investors earn when hedging U.S. dollar bond exposure and lifts the optimal hedge ratio. As a result, even where capital continues to flow into U.S. assets, a growing share is likely to arrive hedged, dampening the traditional currency support that historically accompanied inflows.

Over time, we expect the U.S. dollar's REER to revert toward its 10-year moving average, as depicted below. Three persistent forces anchor this outlook: the ongoing convergence of global growth rates and rebalancing of trade, the structural rise in FX hedging by international investors, and the dollar's continued overvaluation relative to long-term benchmarks like PPP and productivity-adjusted measures. Even after this year's correction, the U.S. dollar remains elevated versus fundamentals. With policy shifts reducing the degree of U.S. outperformance, and capital flows becoming more diversified, these pressures reinforce a gradual, structurally weaker dollar over the long term.

U.S. Dollar Real Effective Exchange Rate Index vs. 10-Year Moving Average



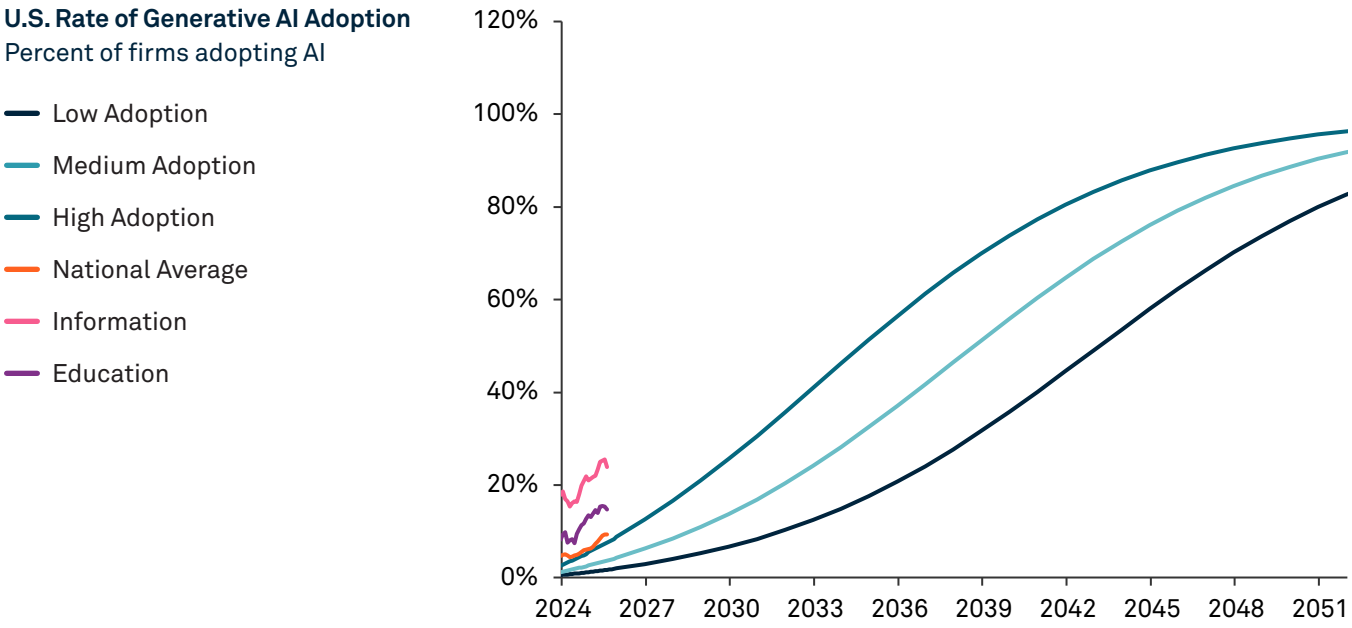
Sources: BNY Investments, Bloomberg. Data as of October 31, 2025.

AI ADOPTION
THE MACRO SHOCK OF THE DECADE

In a short period, AI has advanced from novelty to an integral part of workflows, often matching or surpassing human performance in areas such as image classification, algorithm design, and data analysis. Building on last year's outlook, we raised our equity earnings growth assumptions, reflecting growing evidence and breakthroughs that reinforce AI's capacity to drive innovation and productivity growth.

Admittedly, productivity gains have slowed since the advent of large language models and generative AI. But economic theory suggests innovations are subject to a J-curve, where the initial impact on productivity is limited, followed by a period of rapid improvement. This framework aligns with the slowdown in productivity growth over the previous few years and now points to a near-term surge, supporting our growth assumptions. Dynamics may result in decreased inflationary pressures and more resilient corporate profit margins, ultimately contributing to a positive macroeconomic environment for equity markets.

U.S. Rate of Generative AI Adoption
Percent of firms adopting AI



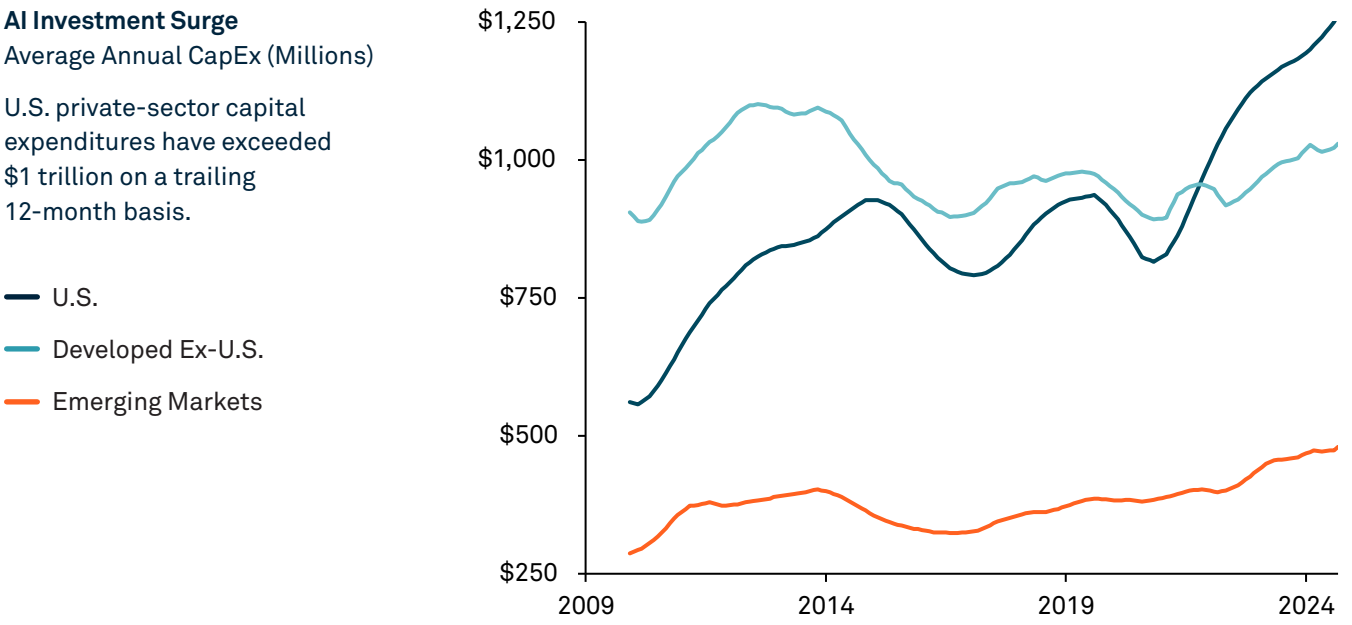
Sources: BNY Investments and Oxford Economics. Data as of August 31, 2025.

Rapid Adoption Drives Infrastructure Demand

Adoption of AI has already surpassed many expectations from a few years ago. The rapid uptake and deployment of the technology require substantial infrastructure investment, including the construction of data centers, semiconductor facilities, and an energy grid capable of supporting AI's significant computational demands. These prerequisites have created a geopolitical race to accelerate AI deployment in pursuit of potential growth opportunities. U.S. private-sector capital expenditures have exceeded $1 trillion on a trailing 12-month basis, the most pronounced post-pandemic investment surge among major economies. This positions the U.S. to achieve earlier and potentially more rapid productivity gains. We discuss these infrastructure investments further in our section on private markets.

AI Investment Surge
Average Annual CapEx (Millions)

U.S. private-sector capital expenditures have exceeded $1 trillion on a trailing 12-month basis.



Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

Productivity Is Not the Only Factor

While productivity gains may be on the horizon, we believe it's key to look beyond early productivity gains to see which firms and sectors can turn technological advantage into lasting market power. As adoption expands, the impact on productivity and competitive dynamics will become more visible. We expect the market to shift focus from who is building and using AI to who can truly capture value from AI.

AI lowers the cost of accessing and transforming information, reducing the scarcity that underpins information-based competitive advantages. Sectors whose advantages stem from physical assets, regulatory barriers, or network effects may find their advantages preserved, and AI-related

productivity gains in these sectors could more likely accrue to shareholders. Sectors that rely heavily on information processing, such as software, search engines, and health care diagnostics, could see competitive dynamics intensify as AI levels the playing field. Several large, public companies have already faced market concerns over how generative AI may negatively affect their existing business models.

Tapping Unmet Demand

AI-driven shifts in profit margins are only part of the story; another part of the story lies in demand. As the price falls, demand for a given good or service typically rises. Even sectors facing margin and price compression due to AI may still see an increase in overall profits — if the rise in demand outweighs the decline in prices.

Over time, as AI boosts productivity and lowers prices, aggregate real incomes could rise — potentially driving further outsized demand in some sectors. Healthcare, for example, is a sector with significant unmet demand. Most people want good health care, but many can't afford it. Lower-cost diagnostics and treatments would likely drive volume growth, potentially boosting overall profits.

Dynamics That Determine Durability

The biggest beneficiaries of AI adoption won't simply be the fastest adopters. Winning firms will likely leverage two advantages: strong productivity gains even after widespread adoption and the ability to capture unmet demand where lower prices translate into higher volumes. Sectors that pair these two dynamics together can become important plays in the AI theme. While information technology remains a favored sector under this framework, it also faces significant disruption with wide dispersion between winners and laggards.

Retained Productivity Gain vs. Demand Elasticity

Retained Productivity Gain	Demand Related to Price & Income Sensitivity: Low	Demand Related to Price & Income Sensitivity: High
High	Financials Industrials Communication Services	Information Technology
Low	Utilities Energy Materials	Healthcare

Source: BNY Investments.

PRIVATE MARKETS
ENGINE OF VALUE CREATION

The AI revolution is not just a tech story; it is a capital allocation story, and private markets are at the center of an AI-driven capital expenditure boom. Given AI's infrastructure requirements from data centers and semiconductor fabricators to energy infrastructure, private investment should become a facilitator of AI adoption, creating significant investment opportunities for investors.

AI as a Capital Allocation Story

In 2024, global venture capital (VC) funding for AI startups surged to $131.5 billion, marking a 52% increase year over year.[1] Landmark deals, such as Databricks ($10 billion),[2] Anthropic ($13 billion),[3] and OpenAI (close to $7 billion),[4] underscore the scale of private investment flowing into foundational models and infrastructure. This deal flow reflects confidence in AI as a dynamic sector with significant growth potential.

We are also seeing more partnerships between large tech companies and startups, as corporations tap into the VC sector for R&D and selective acquisitions, expanding exit opportunities for early investors. Additionally, crossover public-private investment in later-stage rounds helps to temper bubble concerns by estimating value from cash flow fundamentals and comparable valuations rather than speculation.

AI Drives Infrastructure Spending

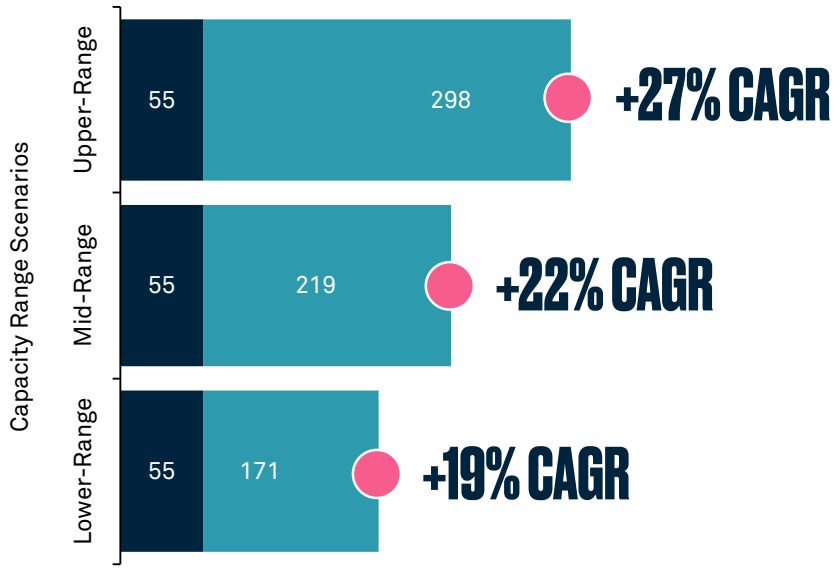
AI's potential for productivity growth is fueling unprecedented demand for data centers, semiconductor facilities, and energy systems critical in supporting the computationally intensive workloads of AI. The top five hyperscalers spent over $215 billion on data center infrastructure in 2024 — a 50% year-over-year increase.[5] Data center capacity is expected to grow at a CAGR of 19% to 27% through 2030.[6] This creates significant opportunities for private real asset funds to invest in the initial buildout of the AI ecosystem.[7]

Data Center Capacity Demand
Gigawatts

2023

2030

Three scenarios showing the upper-, low- and mid-range estimates of demand, based on analysis of AI adoption trends; growth in shipments of different types of chips (application-specific integrated circuits, graphics processing units, etc.) and associated power consumption; and the typical compute, storage, and network needs of AI workloads. Demand is measured by power consumption to reflect the number of services a facility can house. Based on the McKinsey Data Center Demand Model.



Source: McKinsey, "AI power: Expanding data center capacity to meet growing demand." Data as of October 29, 2024.

Energy & Electricity Requirements

The energy implications from AI are profound. U.S. data centers consumed 176 terawatt-hours (TWh) of electricity in 2023, accounting for 4.4% of total national energy usage. That figure is projected to rise at a much faster rate, to between 7% and 12% of total U.S. consumption by 2028.[8] Meeting this demand requires private investment in energy infrastructure, including natural gas, independent power producers, and renewables. Private real asset funds are well-positioned to capitalize on this trend.

Private Market Vehicles for Infrastructure

Private equity and venture capital remain key funders of startups and are well-suited for long-term, active investments in AI infrastructure. They are increasingly complemented by private infrastructure and real estate funds, which offer inflation-linked returns and exposure to secular trends in energy and data.

Private Credit: A Bigger Deal

Over the last three decades, private credit has evolved from a niche allocation to a core component of corporate financing. While the number of FDIC-insured banks fell from 14,434 in 1980 to approximately 4,200 in 2024,[9] private credit funds stepped in to supply middle-market companies with flexible capital. Filling this disintermediation gap pushed assets under management in private credit to approximately $1.7 trillion by 2025.[10]

Rise of Direct Lending

Direct lending — privately negotiated loans typically secured as senior debt from asset managers by middle-market companies — has become one of the fastest-growing segments of private credit. Transactions now routinely exceed $1 billion and offer a compelling alternative to public markets or syndicated loans. Borrowers benefit from faster execution, tailored terms, and reduced syndication risk, while lenders benefit from higher interest rates and an illiquidity premium. Private credit has historically delivered a 200–300 basis point premium over public debt.[11]

Asset-Backed Lending as a Complement

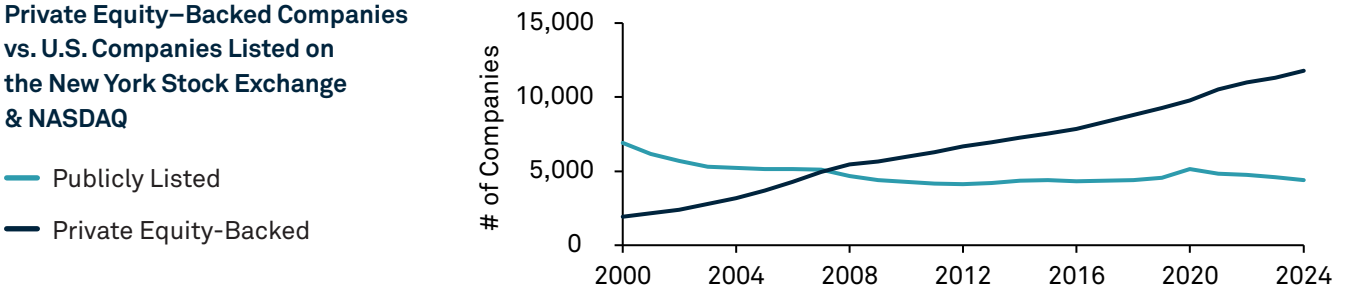
Asset-backed lending — another subset of private credit — has also gained traction and complements direct lending by offering loans secured by tangible assets such as inventory, receivables, and equipment. The global asset-based lending market was valued at $661.7 billion in 2023 and is projected to grow at a CAGR of over 11% through 2032.[12] These loans offer front-loaded cash flows and reduced correlation to public markets, enhancing diversification and income generation.

Private vs. Public Markets: Shifting Capital Formation

The structural shift in capital formation is reshaping where value is created. More companies are choosing to remain private for longer, allowing more growth to occur before reaching public markets. This shift is reflected in market composition. As of December 2024, there are almost three times as many U.S. companies with private equity-backing than public listings.[13] Many firms opt to remain private to retain strategic flexibility and avoid the regulatory burden that comes with a public listing, while maintaining access to capital with potentially favorable terms.

This backdrop has important implications for investors. With fewer companies entering public markets and more value creation happening privately, investors are increasingly looking beyond traditional markets to access the full spectrum of growth opportunities.

Private Equity–Backed Companies vs. U.S. Companies Listed on the New York Stock Exchange & NASDAQ



Sources: World Bank, as of December 31, 2024. Note: Publicly listed data from before 2024 is from World Bank and Statista; 2024 data is from Morningstar.

Private Markets: Finding Value

With more value creation happening before companies go public, early-stage growth is shifting from small-cap stocks to private investors. As a result, venture capital and growth equity strategies are capturing much of the dynamic opportunity set that once fueled the small-cap premium. This shift has compressed public market returns while expanding access to high-growth potential for private investors.

Within private markets, venture capital continues to thrive — particularly in sectors like technology, health care, and energy. In fact, AI startups captured 53% of all global venture capital dollars in the first half of 2025, with that percentage jumping to 64% in the U.S.[14] The post-2021 valuation reset has created a more investor-friendly environment, characterized by higher-quality entrants and more favorable deal terms.

Growth equity complements this trend by targeting founder-led businesses with scalable models in transformative sectors such as technology, health care innovation, and energy transition. By remaining private longer, these companies can scale efficiently before public exposure, allowing investors to benefit from extended growth cycles and stronger return profiles.[15]

Concentrated Public Markets: Strategies for Risk Management

Meanwhile, public markets are becoming increasingly concentrated. With fewer companies going public, leading stocks now hold a larger share of the market, raising portfolio risk, especially for investors with meaningful exposure to mega-cap names. Hedge fund strategies, particularly long-short equity strategies, can play an effective role in helping investors diversify from crowded exposures while hedging market-wide drawdowns. These strategies can serve as a complementary risk management tool in an environment where public market performance is dependent on an increasingly narrow set of companies.

BUILDING OUR ASSET CLASS ASSUMPTIONS

In this section, we cover our expected 10-year returns for each asset class, including the methodology behind our expectations. This includes adjusting our expectations based on the themes shaping our views across equities, bonds, alternatives, and currencies. We close with a note on model construction, covering calculations for volatility and correlation, adjustments for private markets, and the relationship between arithmetic and geometric returns.

01 Income and Earnings Growth Drive Equities

Building on a baseline for earnings growth and income, we incorporate currency assumptions and market capitalizations to estimate broad passive exposure.

Capture gains through AI-driven productivity growth and look for diversification opportunities globally.

02 Pressure Across Fixed Income

Anchored by normalized yield curves and starting yields, fixed income returns are increasingly shaped by credit spreads and default risk.

Explore short-duration credit, real assets, and private markets for additional diversification to buffer supply shock-induced inflation.

03 Alternatives Offer High Return Potential

Risk-adjusted returns are expected to be broadly consistent with traditional markets over the longer term.

Consider allocations to real assets, hedge funds, or private markets for potentially high total returns and diversification.

04 Diminishing Dollar Dominance

Trade rebalancing, hedging dynamics amid higher risk premia, and rich valuations continue to point to a structurally weaker U.S. dollar.

Contemplate the impact of the cost of carry relative to underlying securities to possibly capture additional return.

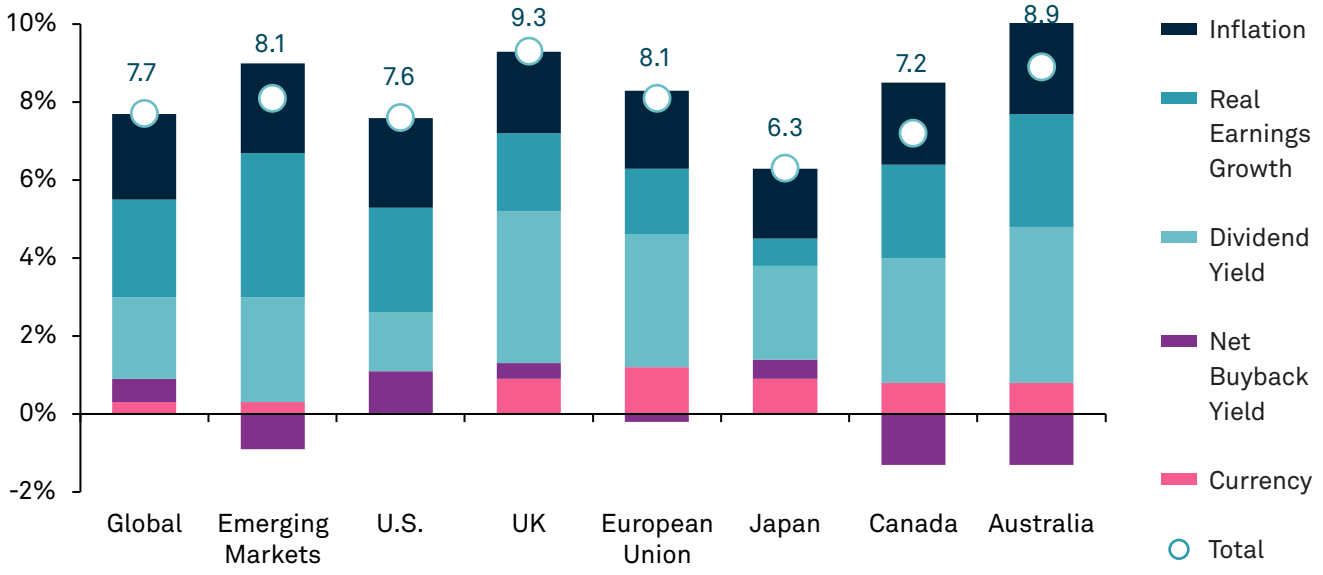
EQUITIES

Global equities advanced this year despite a difficult macro backdrop, including tariff shocks and weakening labor markets. Even so, the S&P 500 was able to set new highs in the fourth quarter of 2025, supported by resilient earnings and expectations of policy flexibility. The tension between macro risk and market strength underscores the importance of a disciplined assumptions process.

Two structural themes shape our equity views this year:

- **AI-Driven Productivity Gains:** AI is fueling a new wave of corporate efficiency, with U.S. firms leading a global surge in private investment. Early signs of productivity growth are emerging, in technology, financial services, and healthcare. As adoption spreads, we expect higher equity returns across nearly all sectors and regions.
- **Global Diversification Benefits:** We expect a structurally weaker U.S. dollar due to converging global growth rates and developing policy stances. As such, diversifying equity exposure internationally presents an opportunity to capture growth while hedging currency risk.

10-Year Equity Market Expected Returns (Unhedged USD)



Source: BNY Investments. Data as of October 31, 2025.

Estimating Equity Returns

We estimate long-term equity market returns using the Grinold-Kroner model to establish baseline expectations for earnings growth and income across 20 regional equity markets. We then incorporate currency assumptions and weight regional projections by market capitalization to arrive at global equity assumptions that reflect broad passive market exposure.

Beyond passive benchmarks, we apply arbitrage pricing theory to incorporate our views on key risk factors into our projections for specialized equity and alternative asset classes.

The formula below illustrates the Grinold-Kroner model, which decomposes expected equity returns into three components: income, earnings growth, and repricing.

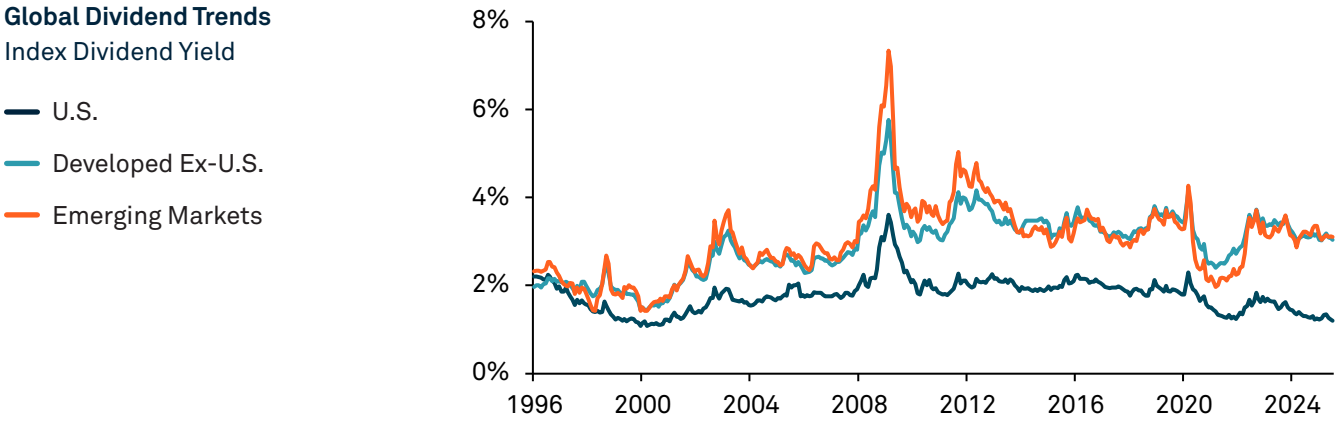
$$E[R] = \underbrace{\frac{D}{P} - \frac{\Delta S}{S}}_{\text{Income}} + \underbrace{i + g}_{\text{Earnings Growth}} + \underbrace{\frac{\Delta PE}{PE}}_{\text{Repricing}}$$

Source: Richard Grinold and Kenneth Kroner, "The Equity Risk Premium," (Barclays Global Investors, July 2002).

Income

Income, which comprises dividend and share repurchase yields, captures the cash returned to shareholders. Income returns are a vital yet often underappreciated component of equity performance. Dividends, in particular, have been a consistent contributor to returns for decades. Given this persistence, we base our dividend assumptions on the trailing five years of data.

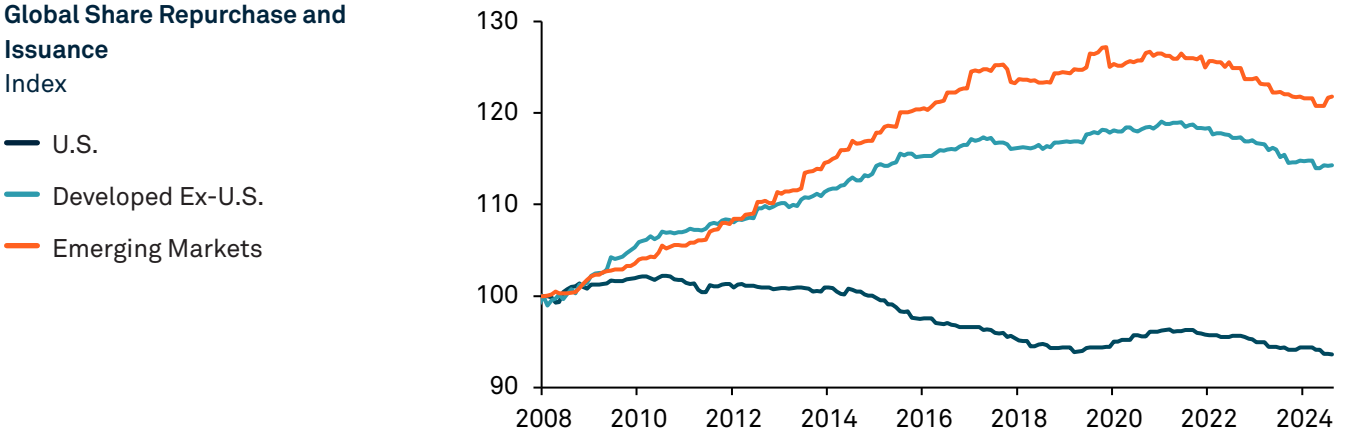
Global Dividend Trends
Index Dividend Yield



Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

Share repurchase and issuance trends have had a slightly less consistent effect on equity returns than dividends. Since the global financial crisis (GFC), share repurchases rather than dividends have driven U.S. equity income, unlike the rest of the world. International markets have historically issued shares for financing; however, this trend has reversed since the pandemic. To capture these evolving dynamics, we base our share repurchase assumptions on 10 years of trailing data.

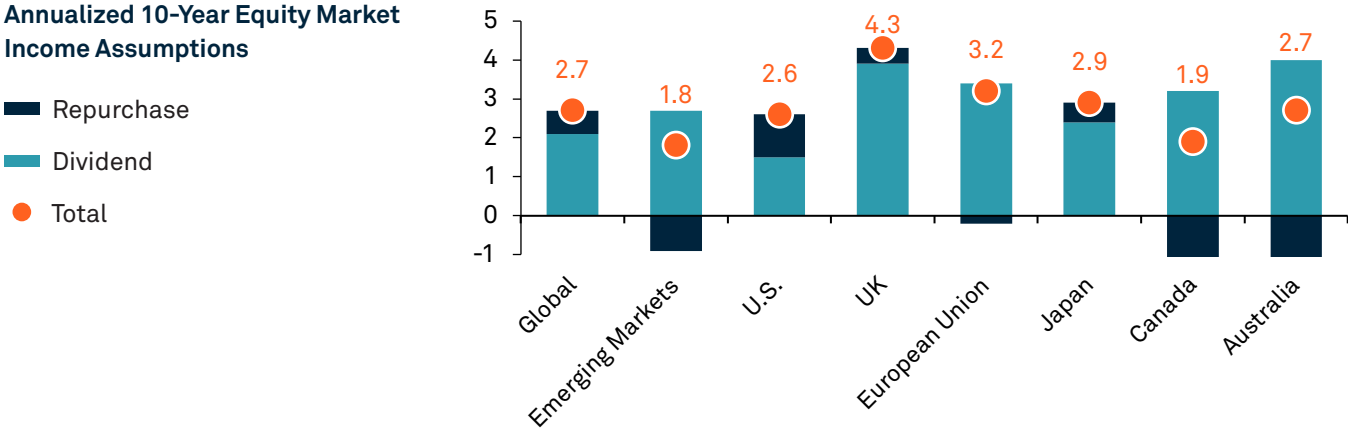
Global Share Repurchase and Issuance
Index



Sources: BNY Investments, Bloomberg. Index divisor rebased to 100 as of December 31, 2008. Data as of June 30, 2025.

Here, we summarize our regional income return assumptions, decomposed into dividend and repurchase components. Additional details on currency assumptions, which also influence total return expectations, are provided in the *Currencies* section of this report.

Annualized 10-Year Equity Market Income Assumptions



Source: BNY Investments. Data as of October 31, 2025.

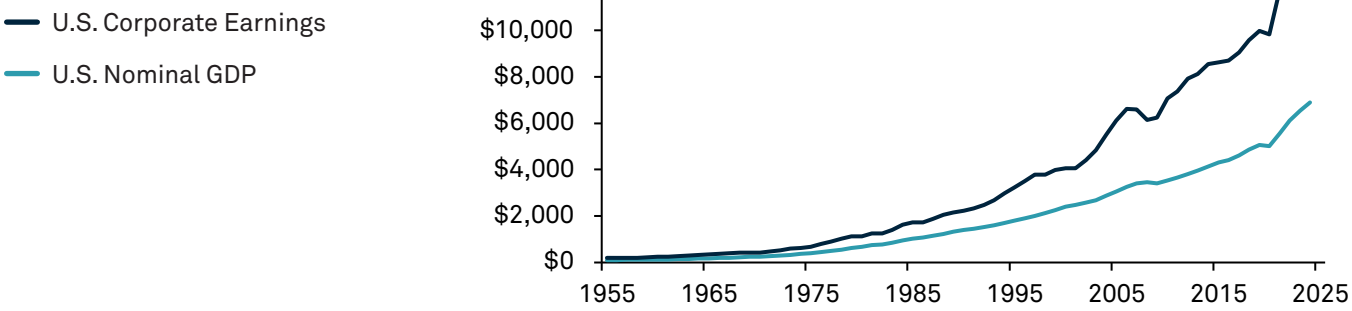
Earnings Growth

Earnings growth reflects the fundamental drivers of corporate profitability, including inflation and real earnings growth. Although not shown in the formula, we also account for changes in exchange rates.

When projecting equity earnings growth, we begin with our economic forecasts for inflation and real GDP. The historical relationship between U.S. corporate earnings and nominal GDP are linked, as shown in the chart. However, we do not assume a one-to-one relationship between nominal GDP growth and equity earnings growth over our horizon.

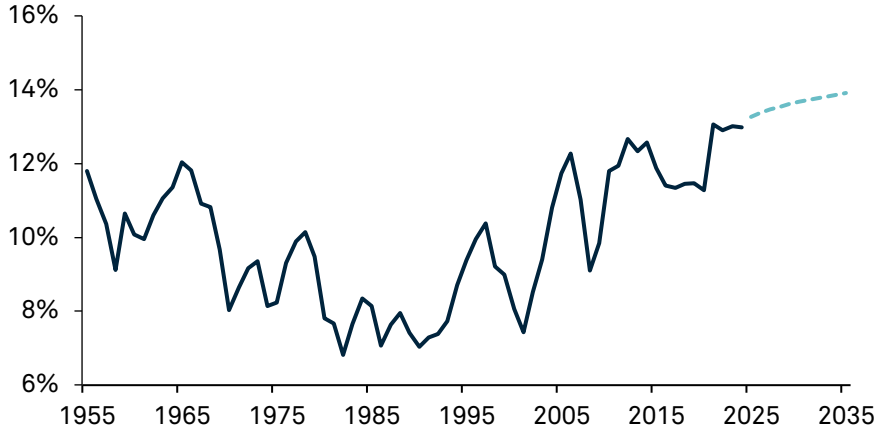
Instead, we expect AI adoption to provide a near-term boost to corporate earnings relative to the broader economy before normalizing at the same rate of growth. We also anticipate private-sector AI investment will influence the share of global equities generated by U.S.-listed companies, or earnings share.

Nominal U.S. GDP vs. U.S. Corporate Earnings
Index



Sources: BNY Investments, U.S. Bureau of Economic Analysis, Bloomberg. Data as of June 30, 2025. Index rebased to $100 as of December 31, 1995.

U.S. Earnings Share
U.S. Corporate Earnings/
U.S. Nominal GDP

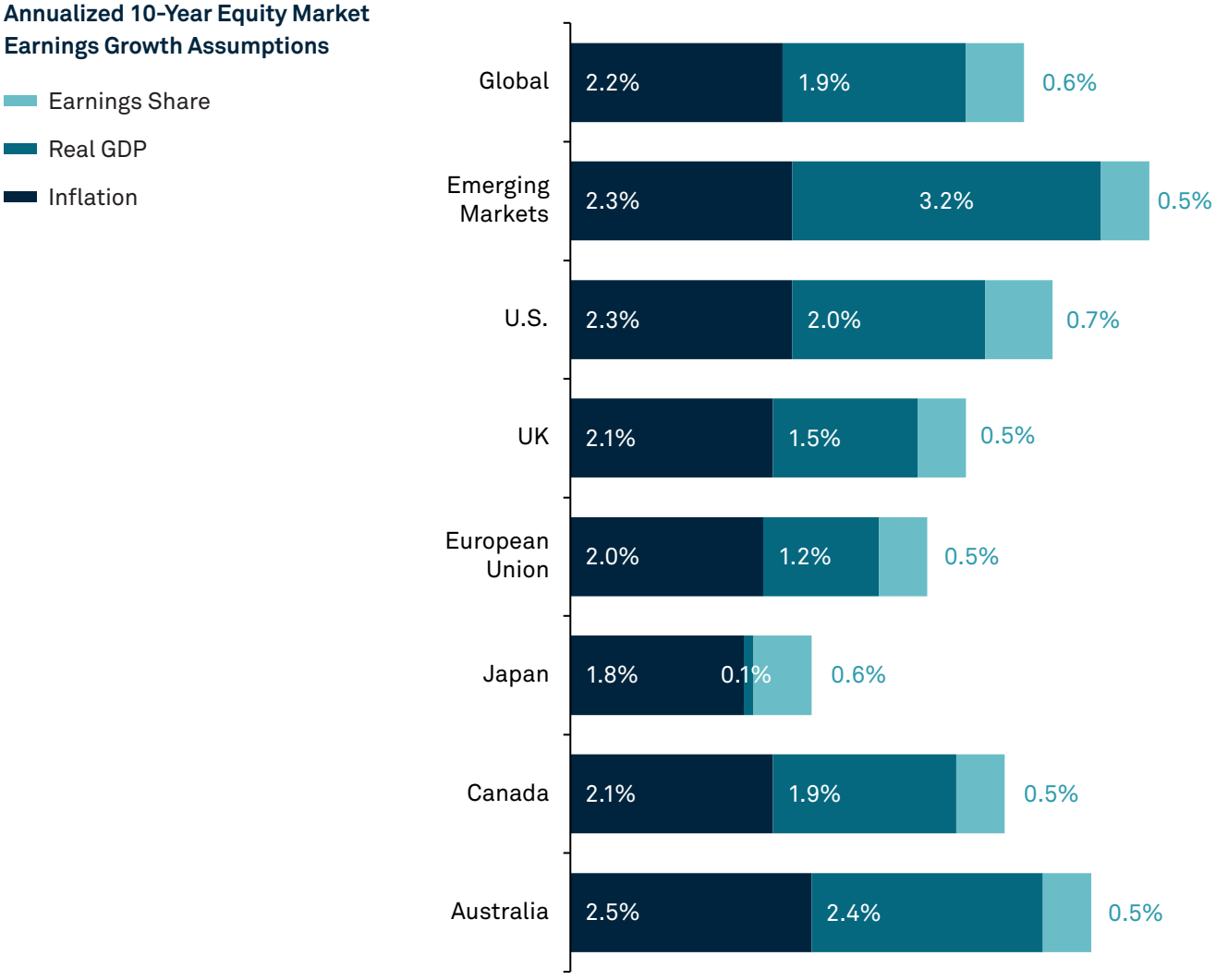


Sources: BNY Investments, U.S. Bureau of Economic Analysis, Bloomberg. Data as of June 30, 2025.

We apply similar assumptions to equity markets outside of the U.S. These assumptions were calibrated to each region's sectoral composition and AI readiness. Globally, we expect AI to strengthen every economy; and ones which perform less physical labor will likely receive larger boosts in productivity.

We summarize our 10-year regional earnings projections, breaking growth into contributions from inflation, real GDP, and changes in the earnings share.

Annualized 10-Year Equity Market Earnings Growth Assumptions



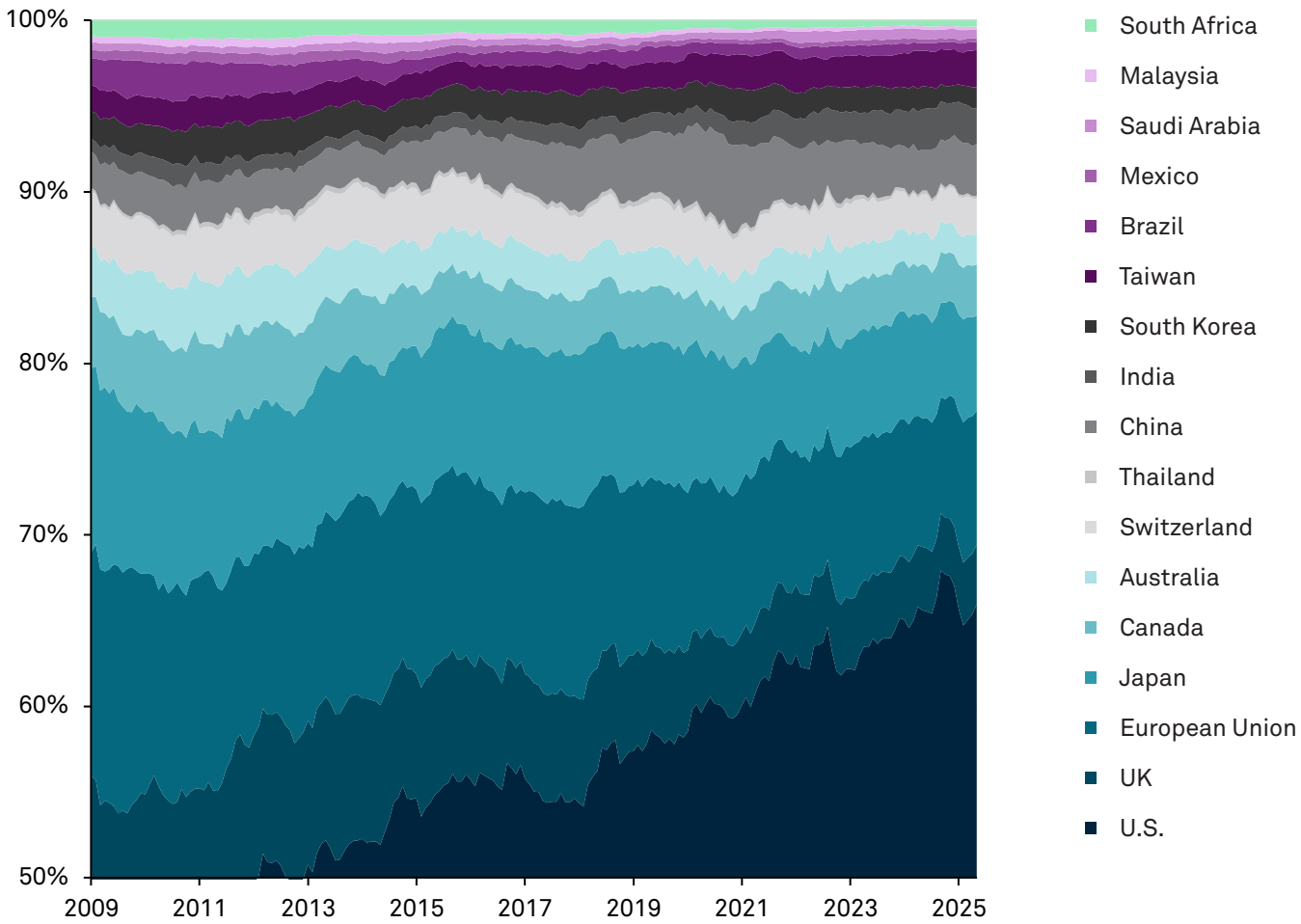
Source: BNY Investments. Data as of October 31, 2025.

Repricing

The third component of the Grinold-Kroner model is repricing. It reflects shifts in the market's price-to-earnings ratio by comparing today's level to an assumed multiple at the end of the forecast horizon. Valuation changes account for most errors in return forecasts and have not reliably indicated market entry points. As a result, we keep our outlook anchored to trend growth rates, and we assume valuations remain constant over the projection period.

To develop our global equity market assumptions, we apply market-capitalization weights to our regional equity expectations. Collectively we estimate our assumptions reflect 96% of global equity markets. The evolution of these weights highlights the importance of refreshing benchmark composition annually to avoid unintended regional drifts in strategic allocations.

Global Equity Market Composition



Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

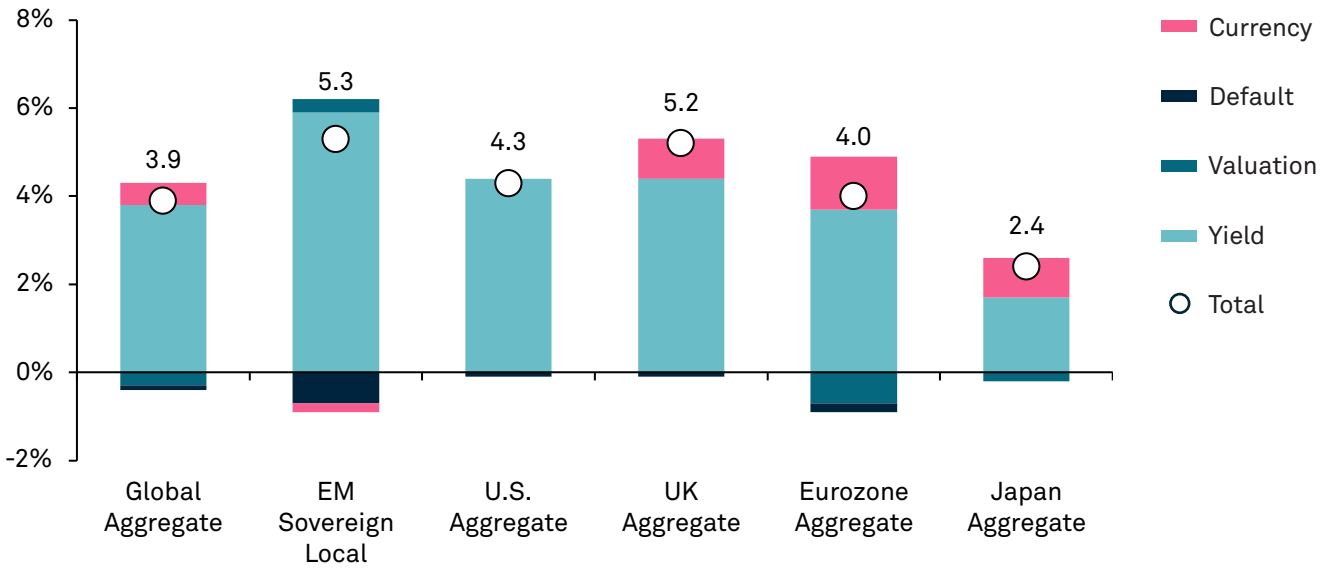
FIXED INCOME

After the April 2025 selloff, the U.S. Treasury curve steepened slightly, and credit spreads compressed sharply. Our projections remain above neutral, but on a risk-adjusted basis, sovereign debt market returns may be less compelling. The risk of supply shock-induced inflation remains elevated, and we encourage investors to consider real assets and private markets for additional diversification.

Several forces drive our fixed-income expectations this year:

- **Debt Sustainability Risks Are Rising:** Sovereign debt levels in developed markets remain historically high and growth–interest rate differentials are narrowing. Countries with unsustainable debt dynamics and limited political willpower to reduce spending are likely to face steeper and more volatile bond markets.
- **Structural Shifts in Demand:** Supply and demand are reshaping sovereign bond markets, especially in Japan and the UK where institutional investors have been cutting their long-end exposure. We have already seen the impact of these developments in market pricing, which indicates there may be a structurally higher premium for long-duration bond yields.

10-Year Fixed Income Expected Returns (Unhedged USD)



Source: BNY Investments. Data as of October 31, 2025.

Estimating Fixed Income Returns

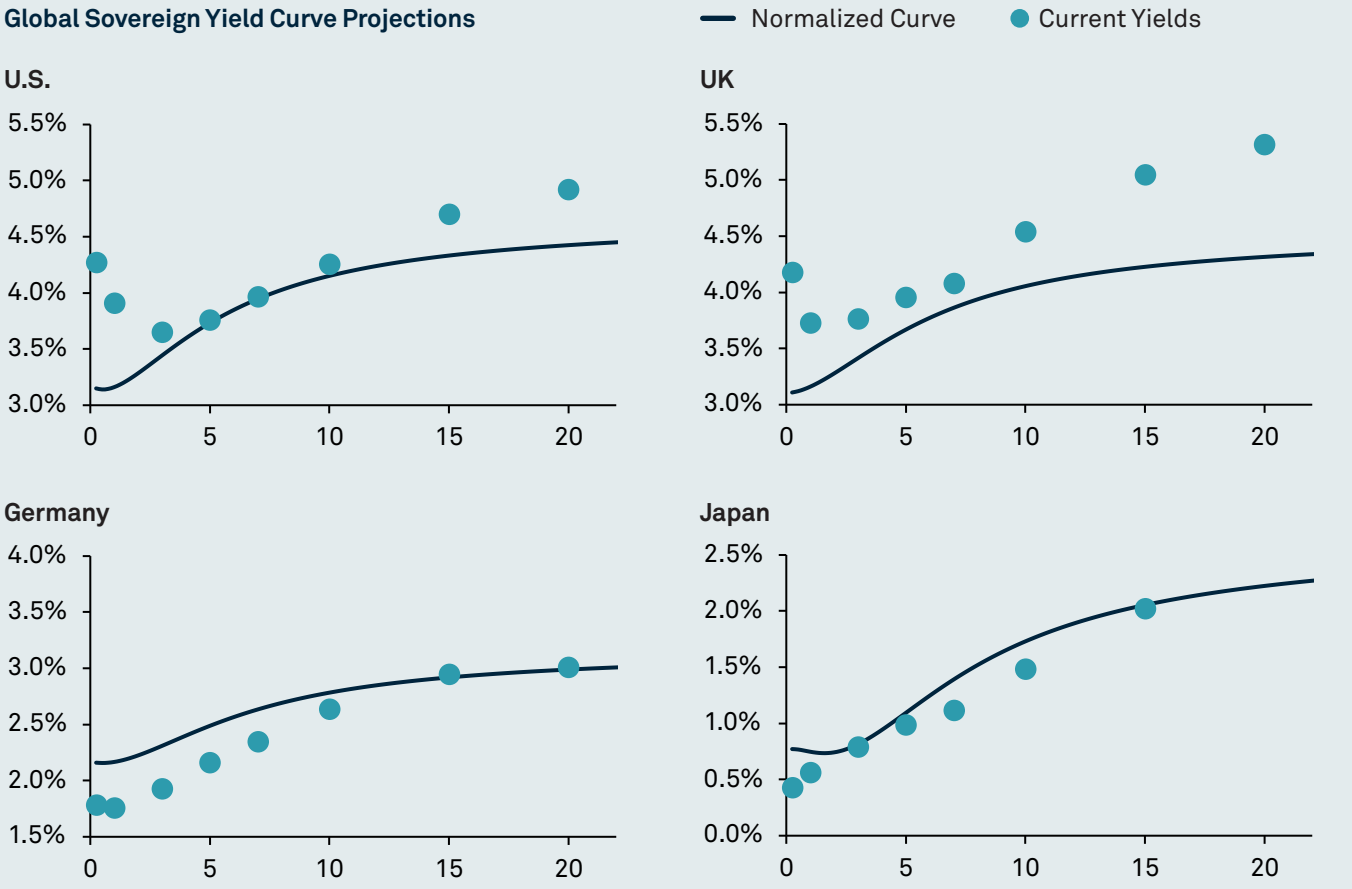
We apply a building-block approach to developing our 10-year fixed income return assumptions. The process begins with modelling sovereign yield curves for about 15 developed and emerging markets to get a baseline set of risk-free rates across maturities. We then compensate for credit risk with an additional spread above duration-equivalent sovereign yields.

We assume current yields converge to our projections over three years and apply horizon analysis to generate the expected returns over the full forecast period. We also adjust our projections for hedging costs and inflation where appropriate.

Sovereign Debt Markets

Elevated yields, particularly in the U.S. and UK, support our fixed income outlook. We believe most developed market central bank policy rates are currently restrictive relative to our normalized projections, so we expect gradual easing should steepen yield curves over time. However, we caution that market pricing may be signaling a structurally higher credit premium in long-term government bond yields, a topic discussed earlier in *Sovereign Debt: Developed Markets Feel the Weight*. Our projections for sovereign yield curves are shown below.

Global Sovereign Yield Curve Projections



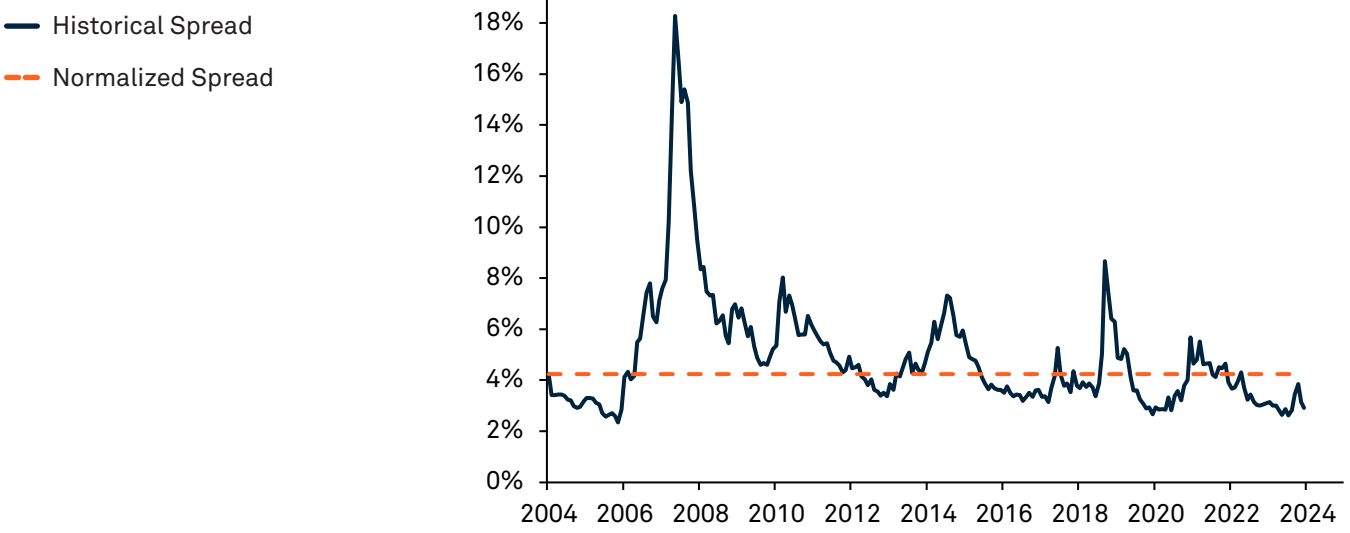
Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

Our normalized yield curve projections are derived using the Nelson-Siegel-Svensson framework, which fits a realistic curve through a small number of observed yields. The model captures short-, medium-, and long-term rate dynamics, allowing us to interpolate across maturities using forecasts for 3-month, 5-year, 10-year, and 30-year government bond yields. This creates smooth, consistent yield projections across all maturities of sovereign debt markets.

Credit Markets

We anticipate credit spreads will widen from the current historically tight levels, supporting a preference for short-duration credit. Our projections assume a reversion toward the 20-year historical median, which we consider more reliable than averages that can be skewed by outlier events. The GFC underscores this point — during this time U.S. high yield credit spreads spiked to approximately 18%.

U.S. High Yield Spread to Treasury



Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

We estimate annual default rates at 30% of our projected credit spreads. This approach provides a forward-looking measure of credit risk that adapts well to current market conditions and incorporates the nonlinear nature of credit risk that ratings do not capture. For Italy, Brazil, Mexico, and countries with similar economic dynamics, we reference spreads relative to the U.S. Treasury curve rather than domestic sovereign curves to consider global credit dynamics.

Key Credit Spread and Default Rate Projections

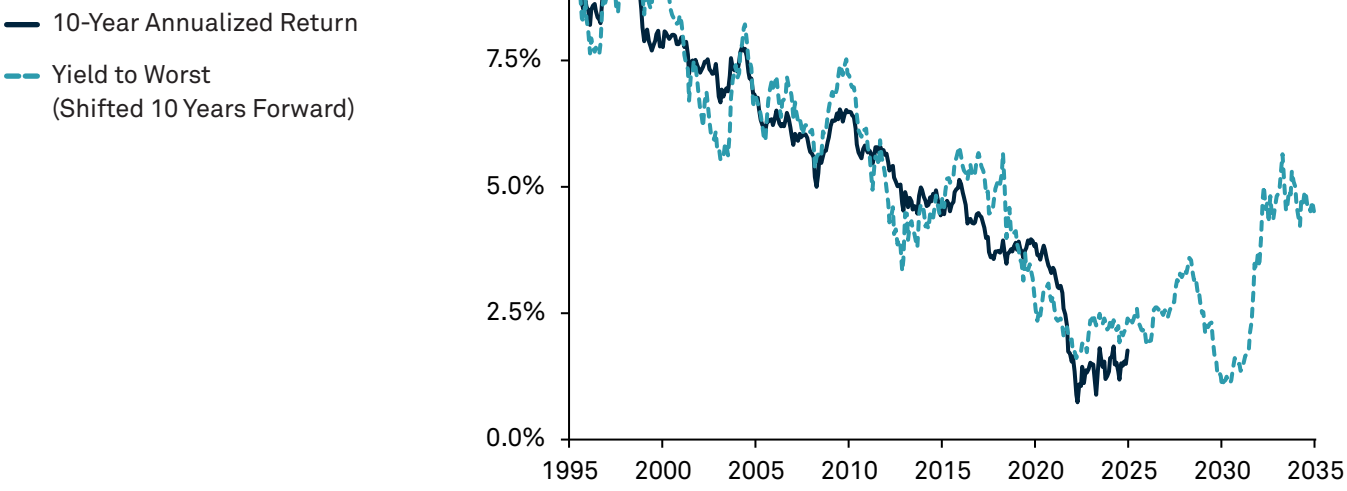
Asset Class	Current Spread	Normalized Spread	Default Assumption
U.S. Aggregate	0.3%	0.5%	0.1%
U.S. Intermediate IG Credit	0.7%	1.0%	0.3%
U.S. Long IG Credit	1.0%	1.7%	0.5%
EM Sovereign USD	2.9%	4.2%	1.3%
U.S. High Yield	2.5%	3.2%	0.9%

Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

Starting Yields Drive Our Fixed Income Assumptions

Examining the historical relationship between starting yields and subsequent long-term performance helps validate our fixed income assumptions. Regardless of where projections suggest yields may move, current yields have historically been a strong indicator of future returns. To illustrate this, the chart below compares rolling 10-year annualized returns of the Bloomberg U.S. Aggregate Bond Index with its starting yield at the beginning of each period.

U.S. Aggregate Index Returns vs. Starting Yields

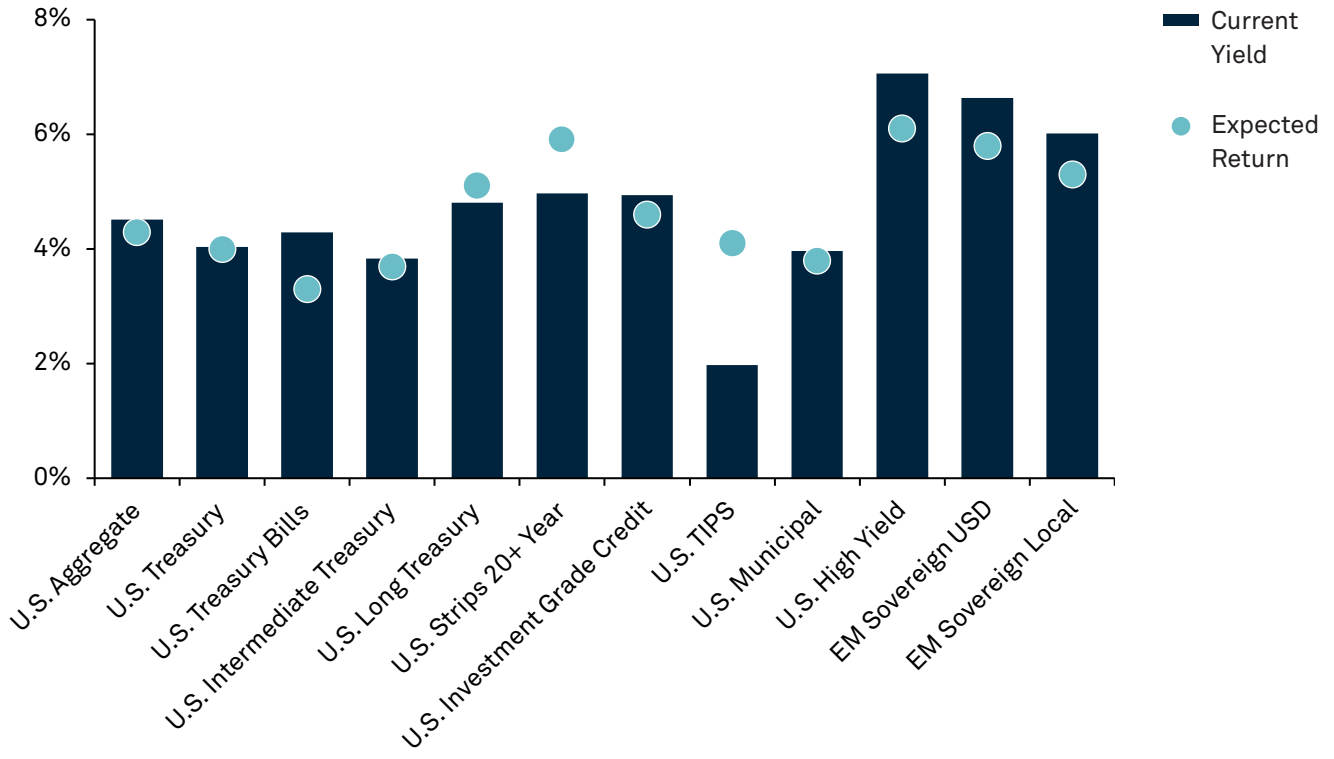


Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

Despite significant interest rate fluctuations over the past two decades, realized returns have generally aligned closely with starting yields, with differences rarely exceeding 1%. This reinforces the principle that today's elevated yields provide a solid foundation for favorable long-term return expectations. Based on this relationship, our 10-year expected return for the Bloomberg U.S. Aggregate Bond Index is 4.3%.

Below, we compare current yields across fixed income sectors with our forward-looking return projections. For asset classes with limited reinvestment, credit, or currency risk, expected returns generally align with prevailing market yields. Variances occur where additional factors influence outcomes. For example, inflation-protected securities require adjustments for inflation, default assumptions reduce returns relative to stated yields, and differences in duration reflect the expected normalization of the sovereign yield curve.

Current Fixed Income Yields vs. Expected Returns



Sources: BNY Investments, Bloomberg. Data as of June 30, 2025.

ALTERNATIVES

Allocations to real assets, hedge funds, or private markets offer potential for high total returns and diversification. Over the long run, we expect risk-adjusted returns in these markets to be broadly consistent with traditional markets. We refine these expectations further using the Arbitrage Pricing Theory (APT), which estimates returns by summing the compensation for a set of underlying risk factors. This helps ensure our assumptions reflect how these risks contribute to long-term performance.

A Factor Approach

To develop our assumptions for hedge funds and private capital, we estimate each asset class's exposure (β) to several factors and apply the formula illustrated below.

Expected Return

For the asset class over given time horizon

Equity Market Risk Premium

U.S. and global equities selected in line with each asset class's composition

Small Minus Big

Measures the return premium of small cap over large cap stocks

Alpha/Residual

The portion of return not explained by systemic factors, including manager skill

$$E[R] = R_f + \beta_{MKT}(MKT - R_f) + \beta_{HML}HML + \beta_{SMB}SMB + \beta_{DXY}DXY + \alpha$$

Risk-Free Rate

Approximated with U.S. Treasury Bills

High Minus Low

Measures the return premium of value over growth stocks

U.S. Dollar Currency Factor

Measures the sensitivity of the asset class relative to U.S. dollar strength or weakness

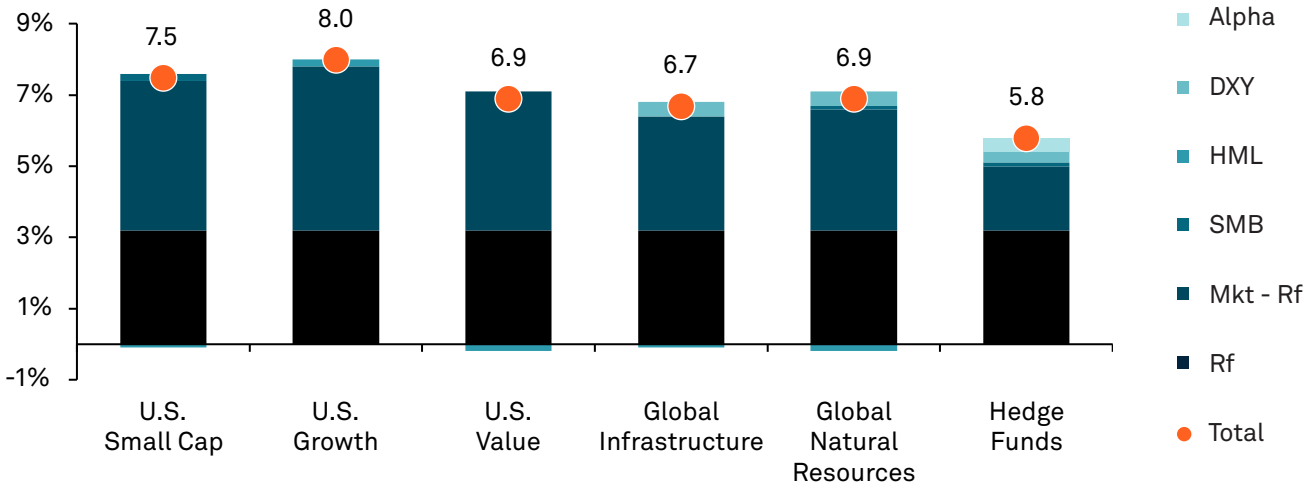
β is the beta coefficient, a measure of how sensitive an asset's return is to a given risk factor's return.

We base our factor premium assumptions on forward-looking market views, anchored by historical context through the Law of Large Numbers (LLN). Said differently, as the number of independent, identically distributed observations increases, the average converges to the true expected value. While LLN provides a useful reference, relying solely on historical averages is insufficient given the dynamic nature of markets. Our approach ensures assumptions remain within two standard deviations of long-term norms for historical awareness, while allowing for adjustments — higher or lower — consistent with our structural views. Below, we outline these views:

- **Value vs. Growth Premium (HML):** We expect a negative HML premium, favoring growth over value, as value from AI-driven productivity growth is most likely to be created and retained within technology and health care sectors.
- **Small Cap vs. Large Cap Premium (SMB):** Traditional norms favor the small cap premium; however, small cap performance has been weak since the 1980s, and as corporations stay private longer, public small cap companies are less likely to see early-stage value creation.
- **U.S. Dollar Currency Factor (DXY):** Using a basket of developed market currencies compared to the U.S. dollar (the DXY index), we expect a softer dollar over the next decade horizon given narrowing growth differentials, persistent twin deficits, and central bank reserve diversification.

Using this modified Fama-French 3-factor model, we developed the below 10-year expected returns for several key alternative asset classes. In general, the total return of their high minus low (HML) and small minus big (SMB) factors produced premiums since the 1980s. However, the past two decades have eroded the statistically significant positive mean of both factors.

10-Year Alternative Market Expected Returns (Unhedged USD)



Source: BNY Investments. Data as of October 31, 2025.

Hedge Funds

Our projections for hedge fund strategies follow the same factor-based framework described earlier, with an additional 0.4% alpha premium *(α)* applied to reflect expected manager skill. These projections are index-level estimates, not forecasts for any individual manager or mandate. To align with our forward-looking views on hedge fund strategies, we segment hedge funds into two categories — absolute return and alternative growth.

- **Absolute Return Strategies:** We expect lower returns relative to the broader hedge fund composite with reduced volatility and more consistent outcomes.
- **Alternative Growth Strategies:** We expect slightly higher returns and volatility, consistent with their directional equity exposure.

Index Composition of Hedge Fund Asset Classes

The distinction between absolute return and alternative growth strategies reflects an equal-weighted allocation to the HFRI indexes listed below.

Hedge Funds — Absolute Return	Hedge Funds — Alternative Growth
HFRI Event-Driven: Credit Arbitrage Index	HFRI Equity Hedge: Long/Short Direct Index
HFRI Event-Driven: Merger Arbitrage Index	HFRI Equity Hedge: Fundamental Value Index
HFRI Equity Hedge: Equity Market Neutral Index	HFRI Equity Hedge: Fundamental Growth Index
HFRI Relative Value: Fixed Income – Convertible Arbitrage Index	HFRI Equity Hedge: Quantitative Directional Index
HFRI Relative Value: Fixed Income – Direct Index	HFRI Event-Driven: (Total) Index
HFRI Relative Value: Fixed Income – Corporate Index	HFRI Macro: Discretionary Thematic Index
HFRI Equity Hedge: Multi-Strategy Index	HFRI Macro: Systematic Diversified Index
	HFRI Relative Value: Yield Alternatives Index

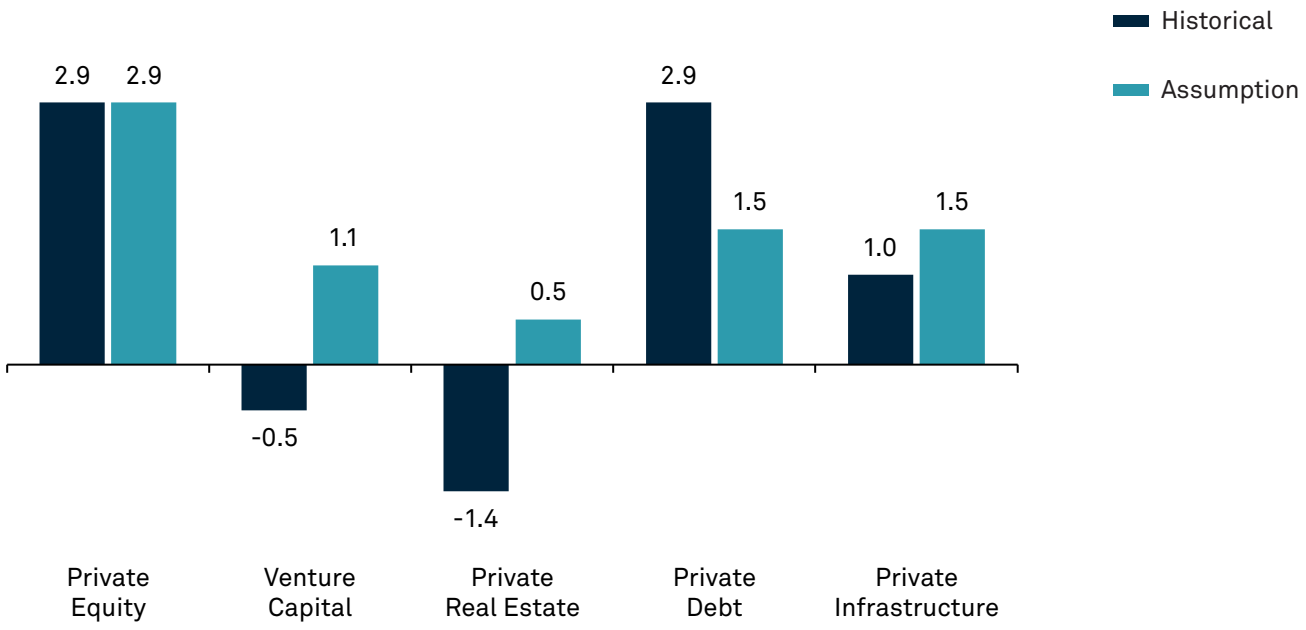
Sources: BNY Investments, Hedge Fund Research, Inc.

Private Capital

In private markets, we apply an additional illiquidity premium on top of our return expectations for publicly traded markets. The chart below illustrates how our forward-looking illiquidity premium compares to historical experience, using 20 years of private capital index data alongside their public market equivalents. For this comparison, we equate private equity and venture capital to U.S. equity, private credit to U.S. high yield, private real estate to U.S. REITs, and private infrastructure to global listed infrastructure.

We maintain constructive assumptions for private real assets — infrastructure and real estate — given the significant capital investment required to expand electricity generation and grid capacity to support AI-driven growth. We remain optimistic on private equity and venture capital due to the potential for AI value creation and exposure to early-stage business growth. We expect private credit to play a growing role in portfolios, but its relative performance is expected to moderate as interest rates normalize.

Private Market Illiquidity Assumption vs. Historical Premium
Illiquidity Premium



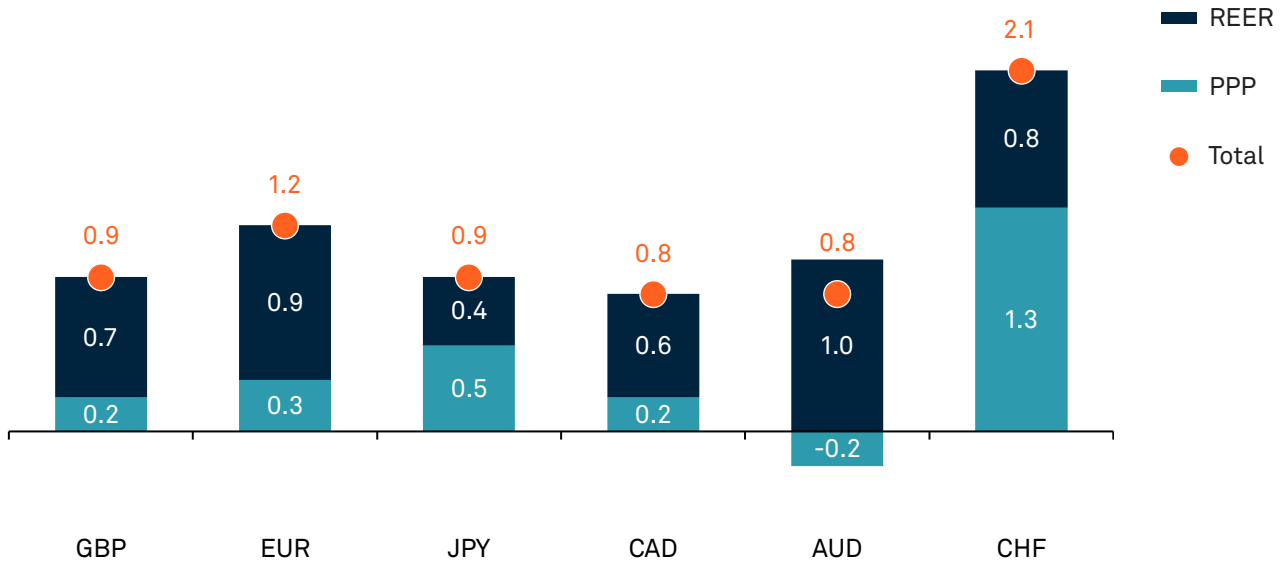
Sources: BNY Investments, Preqin. Data as of June 30, 2025.

CURRENCIES

We maintain a strategic bias for a weaker U.S. dollar over the 10-year horizon. Even after the depreciation seen in 2025, the U.S. dollar remains elevated on long-run valuation metrics, and the policy mix points to gradual global rebalancing away from U.S.-centric demand. These forces — trade rebalancing, hedging dynamics amid higher risk premia, and rich valuations — all point to a structurally weaker U.S. dollar.

As noted earlier in *The U.S. Dollar: From Privilege to Pressure*, our long-term exchange rate assumptions are grounded in two complementary frameworks: purchasing power parity (PPP) and the real effective exchange rate (REER).

10-Year Exchange Rate Assumptions
FX vs. USD



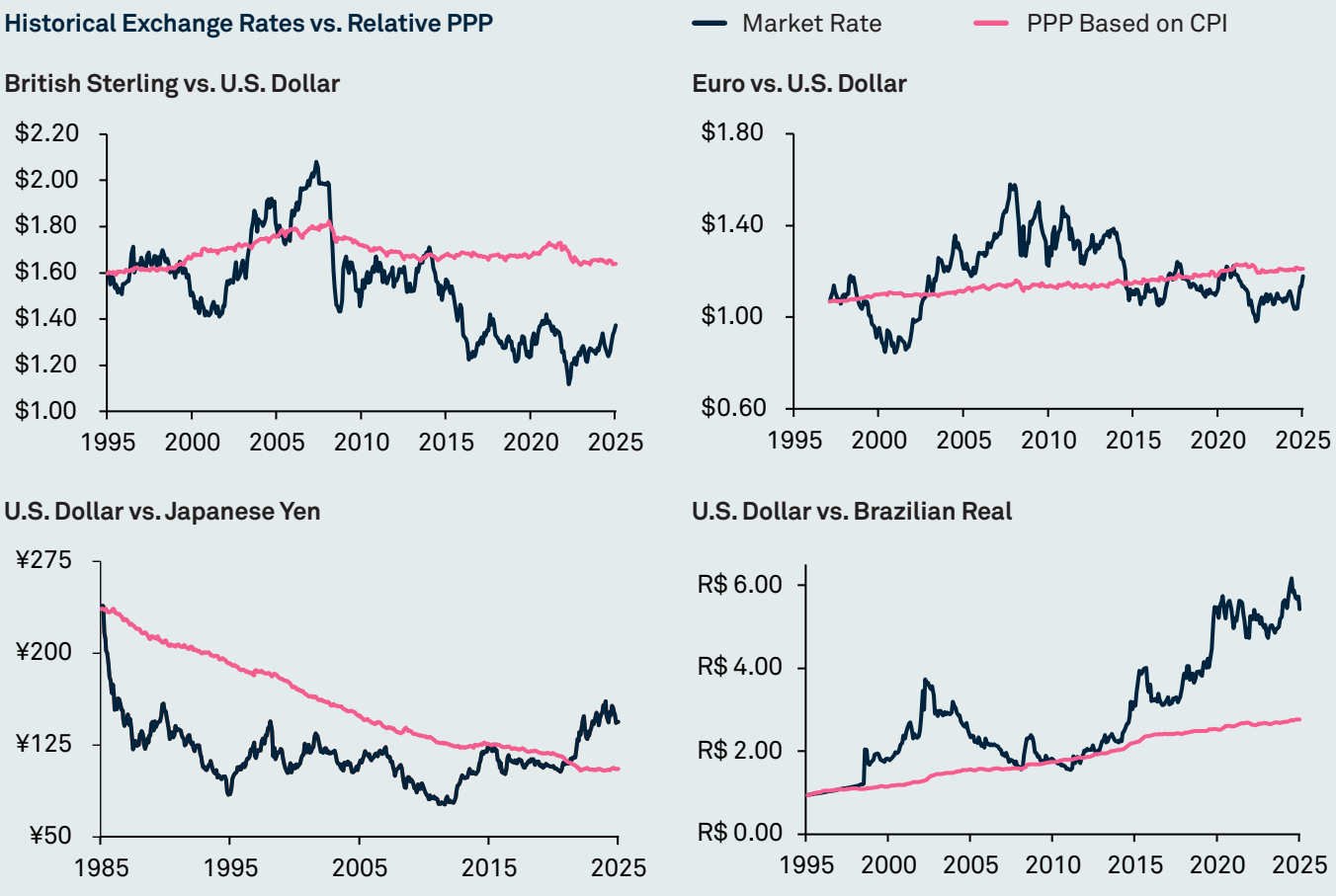
Source: BNY Investments. Data as of October 31, 2025.

Exchange Rates

PPP is the cornerstone of our exchange rate forecasts. We believe sufficient historical evidence, particularly for emerging market currencies, supports the theory. Consequently, we expect exchange rates to align with our 10-year projections of inflation rate differentials. This provides a strong baseline; however, other structural forces have caused significant deviations from PPP.

To supplement the PPP framework, we incorporate additional projections from the REER, which captures the U.S. dollar's value against a basket of trading partners, adjusted for inflation. Given that the dollar's current valuation remains elevated relative to its 10-year moving average, we anticipate gradual mean reversion in the REER over our forecast horizon. While the timing of the correction is uncertain, it reinforces our strategic bias for a weaker dollar.

Historical Exchange Rates vs. Relative PPP

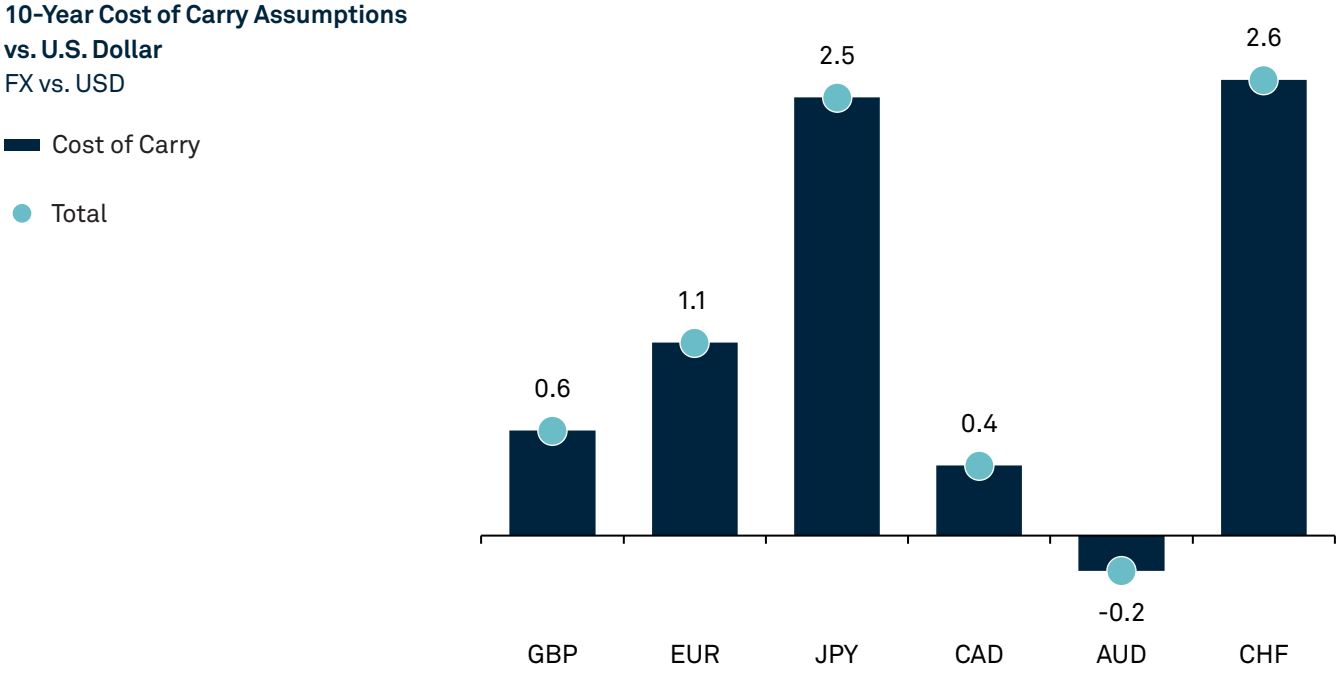


Sources: BNY Investments, Bloomberg, U.S. Bureau of Labor Statistics, Eurostat UK Office for National Statistics, JP Ministry of Internal Affairs and Communications, Brazilian Institute of Geography and Statistics. Data as of June 30, 2025.

Cost of Carry

For hedged currency exposures, our return assumptions incorporate the cost of carry — the interest rate differential between an investor's home currency and a given foreign currency. This reflects the net return from hedging, which can be positive or negative depending on relative short-term rates. For example, U.S. investors hedging euro or yen exposure typically earn a positive carry, given that U.S. rates have been higher recently. Conversely, hedging higher-yielding currencies may incur a cost. We assume currency hedges are implemented perfectly, so only the carry differential remains. This approach ensures our projections for hedged assets are grounded in prevailing rate environments and reflect realistic implementation costs.

10-Year Cost of Carry Assumptions vs. U.S. Dollar
FX vs. USD



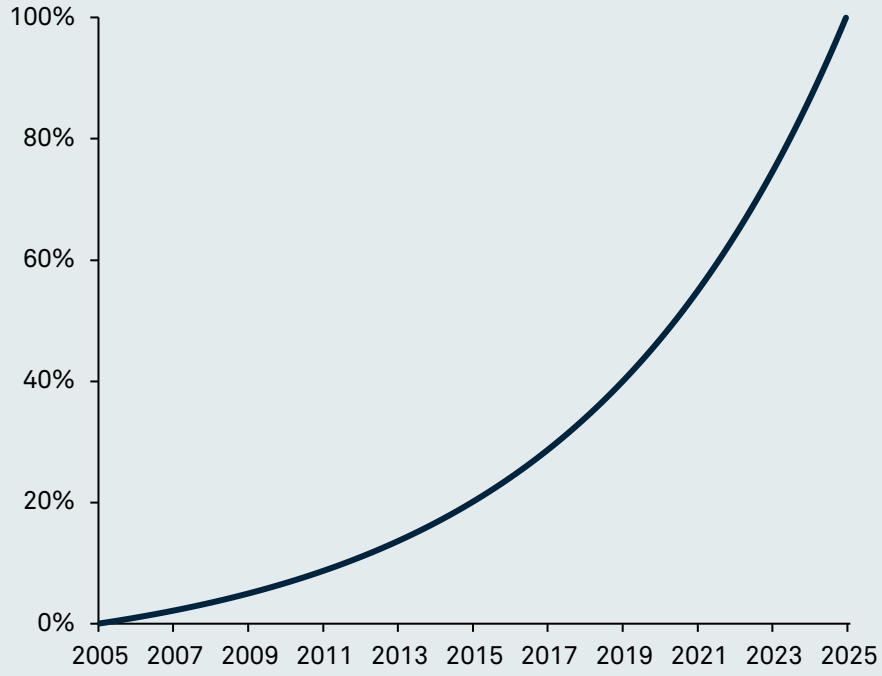
Source: BNY Investments. Data as of October 31, 2025.

NOTES ON MODEL CONSTRUCTION

Volatility and Correlation

Our standard deviation and correlation assumptions are developed through samples of realized monthly returns over the past 20 years, weighted according to a five-year half-life. Our weighted approach aims to achieve a balance between mitigating the impact of regimes, business cycles, and economic shocks, which can skew sample results, while also reflecting recent market conditions. The chart below depicts the cumulative historical weights of our sample.

Historical Weightings for Standard Deviations and Correlations
Cumulative Weight



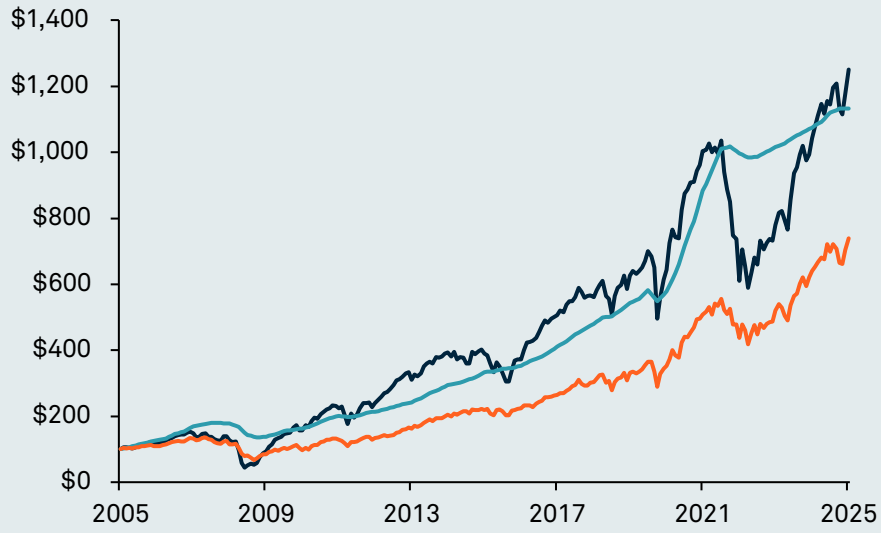
Source: BNY Investments. Data as of October 31, 2025.

Adjustments for Private Markets

Private market returns are subject to a well-documented smoothing bias. Unlike public markets, where prices are continuously updated through observable transactions, valuations for illiquid private assets rely on appraisals. This dynamic introduces stale pricing and persistence into private market returns as valuations are anchored to their prior estimates. The statistical consequence is a significant level of autocorrelation or artificially smooth returns. If left unadjusted, estimates of portfolio volatility and correlation to public markets may be understated.

Smoothed, Desmoothed, and Public Market Returns
Index Level

- Preqin Private Equity (Desmoothed)
- Preqin Private Equity (Smoothed)
- S&P 500



Sources: BNY Investments, Bloomberg, Preqin. Data as of June 30, 2025. Rebased to $100 as of June 30, 1995.

To address this bias, we apply the Geltner Adjustment — developed by MIT professor and real-estate economist David Geltner — which inverts the smoothing process embedded in appraisal-based indices to estimate underlying market returns. This adjustment removes serial dependence and restores volatility and correlations to levels more consistent with economic reality.

The impact is shown above, where desmoothed returns exhibit higher volatility and stronger correlation with public markets, providing a more reliable foundation for portfolio risk modelling. Geltner's formula is shown below.

$$r_{Desmoothed} = \frac{r_t - p\, r_{t-1}}{1 - p}$$

Geltner, D. (1993). Estimating market values from appraised values without assuming an efficient market. *The Journal of Real Estate Research*, "Estimating market values from appraised values without assuming an efficient market." 8(3), 325–345.

Geometric and Arithmetic Returns

Investment expectations can be expressed in two distinct ways: geometric or arithmetic returns.

- **Geometric Return:** Often referred to as a compounded annual growth rate (CAGR), accounts for compounding and is the most relevant metric for investors.
- **Arithmetic Return:** The arithmetic return is a simple average of periodic returns. It is a critical parameter for investors performing portfolio optimization or simulation analysis.

Under our assumptions, we use the following approximation to capture the relationship between arithmetic and geometric expectations:

Arithmetic Returns

Simple average of periodic returns

Natural Logarithm of Geometric Average Returns

Reflects continuously compounded returns

$$R_A = ln(1 + R_G) + \frac{1}{2}\sigma^2$$

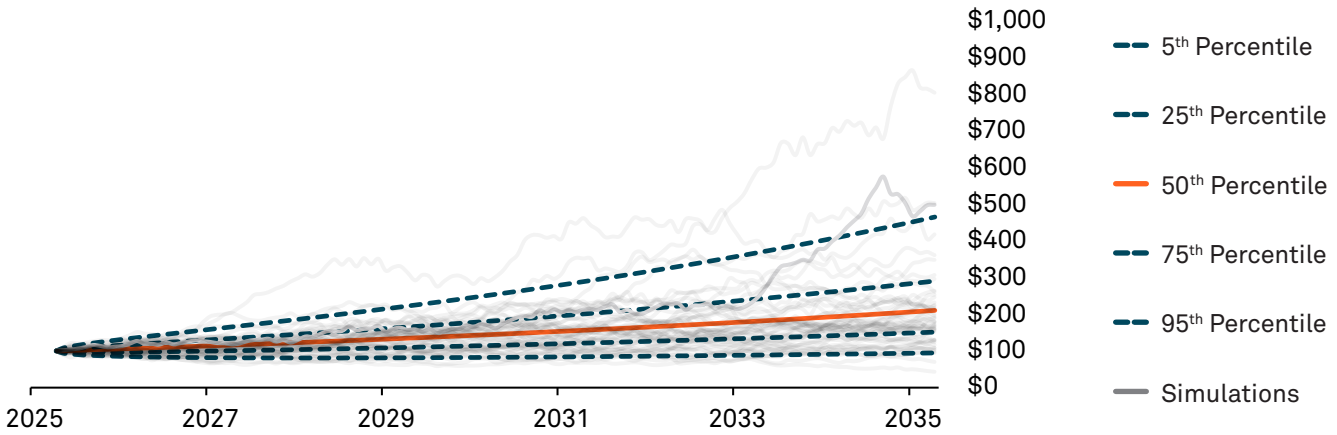
Inequality/Lognormal Adjustment

Captures how volatility increases the arithmetic mean relative to the geometric mean

To illustrate this relationship, we run a Monte Carlo simulation. The setup is straightforward: we generate many potential return paths using Geometric Brownian Motion (GBM), a standard framework in quantitative finance for modeling asset prices. Our arithmetic assumptions determine the model's expected growth rate, while GBM ensures consistency with our geometric-return framework. This approach preserves alignment across our assumptions; using a different method would break that consistency.

To demonstrate using our 7.7% annualized expected return for global equities, we project a $100 investment to be worth $210 after 10 years. As demonstrated below, the median (50th percentile) path leads to that exact price. Thus, the framework described equates the geometric projection as the median outcome, a strong measure of central tendency.

Monte Carlo Simulation of Global Equity Returns



Source: BNY Investments. Data as of October 31, 2025. Rebased to $100 as of December 31, 2025.

Endnotes

1. PitchBook, "AI startups grabbed a third of global VC dollars in 2024," January 9, 2025.
2. *The New York Times*, "Databricks Is Raising $10 Billion, in One of the Largest Venture Capital Deals," December 2024.
3. *The Wall Street Journal*, "Anthropic Valuation Hits $183 Billion in New $13 Billion Funding Round," September 2025.
4. *Forbes*, "OpenAI Valued at $157 Billion After Closing $6.6 Billion Funding Round," October 2, 2024.
5. MetLife Investment Management, "Data Center Investments: A 360-Degree View," June 2, 2025.
6. McKinsey & Company, "AI power: Expanding data center capacity to meet growing demand," October 2024.
7. McKinsey & Company, October 2024.
8. Berkeley Lab: Energy Analysis & Environmental Impacts Division, "2024 United States Data Center Energy Usage Report," December 2024.
9. Preqin, "2025 Global Report: Private Debt," December 11, 2024.
10. Preqin, December 2024.
11. Global Market Insights, "Asset-Based Lending Market Size Industry Report," July 2024.
12. Global Market Insights, July 2024.
13. Apollo Global Management, Inc., Apollo Academy, "Share of public and private companies in the U.S. with revenue greater than $100 million," April 2024.
14. PitchBook, "2024 Annual Venture Capital First Look," January 6, 2025.
15. Apollo Global Management, Inc. "Apollo Asset-Backed Finance Overview," March 2024.

Disclosure

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The capital market assumptions are BNY Advisors' estimates based upon historical market performance and the current market environment. References to future expected returns are not promises of actual returns that may be realized and should not be relied upon. Actual returns may vary significantly. In addition, the historical returns used as a basis for this analysis are based on information gathered by BNY or from third-party sources and have not been independently verified.

The forecasts contained herein are for illustrative purposes only and are not guarantees of performance. The forecasts have inherent limitations because they are not based on actual transactions. The forecasts are based upon historical returns of the selected investments and subjective estimates and assumptions about circumstances and events that may not have taken place and may never do so.

Some of the factors that could impact these forecasts include, but are not limited to:

- General economic conditions
- Financial market performance
- Interest rate levels
- Changes to current laws or regulations, and
- Future geopolitical conditions

Asset class returns are not reflective of anticipated returns for associated indexes.

The results do not represent, and are not necessarily indicative of, the results that may be achieved in the future.

Robust Strategic Asset Allocation (RSAA) is a framework for classifying the market environment with a combination of macroeconomic and market indicators with judgment. BNY Advisors has defined historical regimes for the period starting in May 1973.

The asset classes referenced in our capital market assumptions are represented by broad-based indices which have been selected because they are well known and are easily recognizable by investors. Indices have limitations because indices have volatility and other material characteristics that may differ from an actual portfolio. For example, investments made for a portfolio may differ significantly in terms of security holdings, industry weightings and asset allocation from those of the index. Also, the indices noted in this presentation are unmanaged, are not available for direct investment, and are not subject to management fees, transaction costs or other types of expenses that a portfolio may incur. Finally, the performance of the indices reflects reinvestment of dividends and, where applicable, capital gain distributions. Therefore, investors should carefully consider these limitations and differences when evaluating the index performance.

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Asset allocation and diversification cannot assure a profit or protect against loss.

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