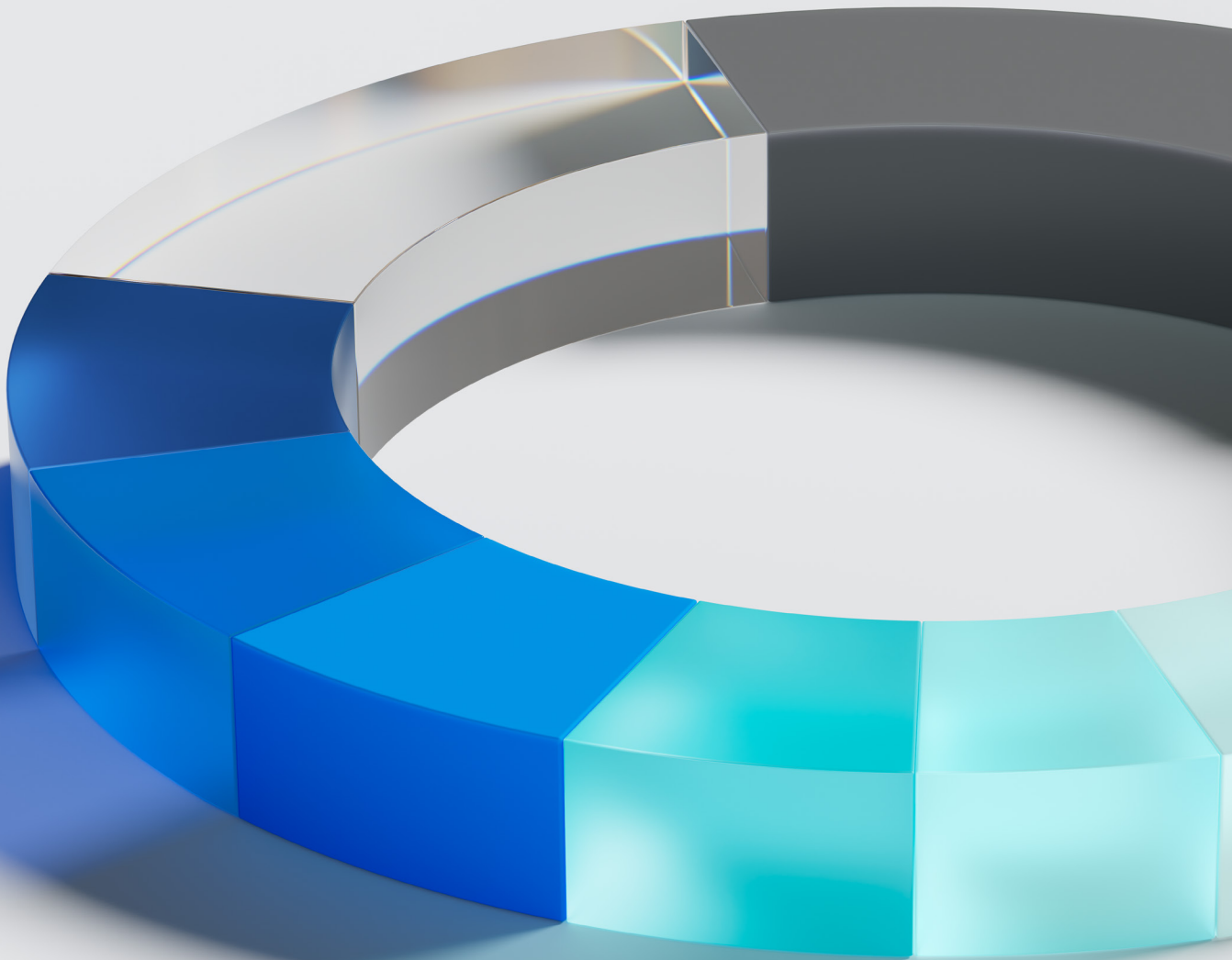


28th annual edition

2024 Long-Term Capital Market Assumptions

Time-tested projections to build
stronger portfolios



Foreword



Shock waves from the defining events of the decade thus far – the global pandemic, the invasion of Ukraine, profound shifts in monetary policy, and, more recently, the terrible attack on Israel – continue to reverberate. Even so, we can begin to see the outlines of a changed investing environment. It's a moment of transition, challenging long-established norms and recalibrating risk-reward frameworks.

At this interesting juncture, we are pleased to launch the 2024 edition of J.P. Morgan Asset Management's Long-Term Capital Market Assumptions (LTCMAs). In our 28th year of producing capital market estimates, we incorporate more than 200 asset and strategy classes; our return assumptions are available in 17 base currencies. Over the years, many investors and advisors have come to depend on our assumptions to inform their strategic asset allocation, build more resilient portfolios and establish reasonable expectations for risks and returns over a 10- to 15-year time frame. Additionally, with each passing year, we aim to readjust our long-run approximations, incorporating new information presented by markets, policymakers and economic data.

In this edition of our LTCMAs, our economic and asset class forecasts generally hold steady. While the 60/40 stock-bond portfolio remains at the core, it requires extension, expansion and enhancement. The insights presented here aim to help clients identify the right adaptations for their risk and return objectives as they build smarter portfolios for a world in transition.

We hope our analysis helps guide your long-term strategic perspective and active asset allocation. On behalf of J.P. Morgan Asset Management, we look forward to working with you to make the best use of our assumptions in setting, and achieving, your own investment goals. Thank you for your continued trust and confidence. As always, we welcome your feedback.

A handwritten signature in black ink, appearing to read 'G. Gatch', written in a cursive style.

George Gatch
Chief Executive Officer
Asset Management

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Executive summary

Smarter portfolios for a world in transition

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In brief

We publish our 2024 Long-Term Capital Market Assumptions at a time of significant economic transition. We are moving from a world of disinflation, ultra-easy monetary policy and fiscal reticence to one with two-way inflation risk, conventional monetary policy and greater use of fiscal tools. The energy transition and emergence of new technologies complicate the picture but also offer investment opportunities.

Our global growth forecast rises slightly to 2.4%. Developed market (DM) inflation forecasts rise 10 basis points (bps) to 2.3%, reflecting reflation in Europe and Japan and higher prevailing inflation levels – enabling central banks to meet their inflation targets more easily. High prevailing policy rates support our fixed income forecasts: USD cash rising 40bps to 2.9% and global Aggregate bond forecasts rising 40bps to 5.1%.

The rally in stocks means lower equity forecasts. Although modestly better margin and dilution assumptions provide a partial offset, our forecast for global equities dips 70bps to 7.8%. The gap between developed market and emerging market equity returns narrows this year, while the outlook for non-U.S. DM markets remains attractive.

Alternative assets are arguably the brightest spot in an attractive universe of returns this year. The case for stepping beyond public markets comes both from the inflation resilience demonstrated by alternatives and now by improving returns. In real assets, core U.S. real estate improves 180bps to 7.5%. In financial alts, private equity dips modestly, following equity beta, and the venture capital and direct lending forecasts both rise.

If our forecasts last year highlighted the jump in return outlook in core public markets, this year's numbers show this trend broadening out. Forecasts across almost 80% of our coverage universe sit above realized returns of the last 10 years.

The 60/40 stock-bond portfolio in USD offers 7.0% returns. That is a dip of 20bps from last year, but still a great starting point from which to extend out of cash and into a wide opportunity set, expand deeper into the alternatives universe and enhance with active alpha. In sum, our LTCMAs send a hopeful message, empowering investors to build smarter portfolios for a world in transition.

A world in transition

As we publish our 2024 Long-Term Capital Market Assumptions, much of what defines the economic environment is in transition. Coming in the wake of two seismic events, the global pandemic and the invasion of Ukraine, the transition marks a shift with far-reaching implications for investors. Essentially, it is a move from a world of persistent disinflation, ultra-easy monetary policy and fiscal restraint to one with two-way inflation risk, more conventional monetary policy and greater fiscal activism.

This changing environment demands that we revisit not only asset return assumptions but also the assumptions underpinning diversification and portfolio construction. Our forecast for the iconic USD 60/40 stock-bond portfolio dips 20bps from last year to 7.0%, but the forecast remains 100bps above the 25-year average return and 410bps above our expected return for cash. The 60/40 continues to be a great basis for portfolio construction, but in a world in transition there are many ways to build up from the 60/40 starting point. For instance, simply adding a 25% alt allocation to the 60/40 boosts forecasts 60bps and improves the Sharpe ratio by 12%.

Our forecasts for long-term growth in developed markets rise slightly this year, which might seem remarkable following the pandemic and energy crises. Nevertheless, the positive productivity impact of automation and artificial intelligence cannot be overlooked. Our global growth forecast moves up marginally to 2.4% (**Exhibit 1**).

It may also be surprising, in a year in which equity markets have rallied strongly, that we haven't taken an axe to our asset return projections: Bond returns rise a little, given higher starting yields, and equity returns fall, but by less than the sharp rally of 2023 might imply.

Return forecasts for hedge funds and private equity hold up very well, while forecasts for real asset returns rebound strongly. In part, this reflects real assets resetting lower after their resilience in 2022, but the forecast Sharpe ratios for many segments of the real asset complex now sit well above those for public markets.

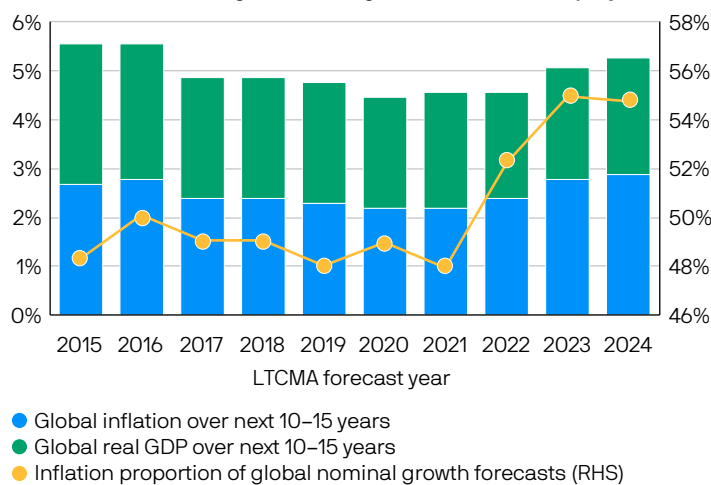
Across asset classes, our inflation view is central to our LTCMAs (**Exhibit 2**). Globally, our forecast moves up slightly, driven by upward revisions to Europe and Japan, but we see no signs of 1970s-style inflation-induced turbulence, and the long-term real return outlook remains stable. Nevertheless, we anticipate greater inflation uncertainty over a 10- to 15-year horizon.

Inflation risk is now two-way, with a meaningful impact on portfolio construction: Bonds continue to do a good job of protecting risky asset portfolios against disinflationary growth shocks but, as 2022 proved, a poor job protecting them against inflation shocks. Using the full investing toolkit to embed new angles of diversification into core portfolios will be a key success factor in the years ahead.

To build smarter portfolios for a world in transition, we recommend that investors develop the next generation of 60/40 by turning to private as well as public markets, focusing on the importance of manager selection and finding diversification not just from bonds but also from alternatives, factors, thematic investing and other approaches. From a 60/40 foundation, extending beyond the temptation of high prevailing cash yields, expanding the opportunity set and enhancing returns through manager selection and active allocation can all help to strengthen portfolio resilience.

Global nominal growth picks up modestly, driven both by slightly better real growth and slightly higher inflation

Exhibit 1: Evolution of global trend growth and inflation projections



Source: J.P. Morgan Asset Management; data as of September 30, 2023.

Growth – slightly better, despite recent challenges

Today, as we publish, many governments still have their foot on the fiscal accelerator as industrial policy¹ has come back in fashion. The need to combat climate change and bolster economic and military security has overwhelmed concerns about elevated debt.

¹ Industrial policy refers to government efforts to shape the economy by targeting specific industries, firms or economic activities.

The jury is still out on whether governments playing a greater economic role will over the long term boost or retard productivity, but we do see promising signs for the impact of artificial intelligence. Meanwhile, for initiatives such as the energy transition, where the economic rationale is avoidance of negative externalities,² state involvement is essential. In any case, there may be underappreciated upside risks to growth via the investment channel, and possibly from productivity.

Larger economies will be first to feel the impact of technology adoption; our forecast for global growth rises to 2.4%, driven by a 20bps increase in developed market

growth to 1.60%. Changing global trade patterns are influencing growth in different regions (**Exhibit 2**). Re-shoring will likely serve as a marginal boost to growth in some regions and a modest drag in others.

The emerging world will see winners and losers from changing trade patterns, but most will be affected by slower Chinese growth as the deflating property bubble weighs on the economy. We again mark down Chinese growth this year, from 4.00% to 3.80%, in turn pulling emerging market (EM) growth down 10bps to 3.5% and closing the EM-DM growth differential by a total of 30bps.

Our 2024 assumptions anticipate mostly stable real GDP growth and higher – but not dramatically higher – inflation

Exhibit 2: 2024 Long-Term Capital Market Macroeconomic Assumptions (% , annual average)

	Real GDP			Inflation		
	2024	2023	Change	2024	2023	Change
Developed markets	1.6	1.4	0.2	2.3	2.2	0.1
United States	1.8	1.6	0.2	2.5	2.6	-0.1
Euro area	1.3	1.1	0.2	2.2	1.8	0.4
Japan	0.8	0.7	0.1	1.4	0.9	0.5
United Kingdom	1.4	1.3	0.1	2.4	2.4	0.0
Australia	2.2	2.1	0.1	2.4	2.4	0.0
Canada	1.7	1.6	0.1	2.2	2.3	-0.1
Sweden	1.9	1.8	0.1	2.4	2.1	0.3
Switzerland	1.5	1.4	0.1	1.4	1.0	0.4
Emerging markets	3.5	3.6	-0.1	3.8	3.6	0.2
China	3.8	4.0	-0.2	2.2	2.2	0.0
India	5.7	5.7	0.0	4.5	4.5	0.0
Russia	0.3	0.4	-0.1	8.0	8.0	0.0
Brazil	2.0	2.0	0.0	4.6	4.6	0.0
Korea	2.0	2.0	0.0	2.0	2.0	0.0
Taiwan	1.6	1.7	-0.1	1.3	1.3	0.0
Mexico	2.0	2.0	0.0	3.7	3.9	-0.2
South Africa	1.8	2.1	-0.3	5.5	5.5	0.0
Turkey	3.0	3.1	-0.1	20.0	16.0	4.0
Global	2.4	2.3	0.1	2.9	2.8	0.1

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023. Previous year's real GDP forecasts shown include cyclical bonuses. Given depressed post-shock starting points, in last year's edition we added cyclical bonuses to our 2021 trend growth projections. This year, our 2024 forecasting returns to trend rates alone. In comparing 2023 with 2024 trend rates here, we do not use last year's rate-plus-cyclical-bonus figure but only the trend rate. Composite GDP and inflation numbers for DM, EM and global aggregates are calculated by assigning weights to individual economies that are proportional to projected nominal GDP over the forecast horizon. This updated methodology also results in revised aggregates for the 2023 LTCMAs, although individual economy forecasts remain unchanged from last year.

² An externality is a cost or benefit of an economic activity experienced by an unrelated third party.

Inflation – no longer acute, but uncertainty lingers

This year, we upgrade our inflation estimates for Europe and Japan to 2.20% and 1.40%, respectively – increasing our developed market inflation forecast to 2.30%. Our assessment of cycle-neutral U.S. inflation is unchanged, but average U.S. inflation falls from 2.60% to 2.50% due to a lower starting level than last year.

Nevertheless, the disinflationary forces of the 2010s are moderating, and topside risks to inflation are becoming apparent (**Exhibit 3**). Today, upside and downside forces may be acting on inflation with roughly equal force, but at various points over our forecast horizon forces in either direction may become more dominant for a time – pointing to persistently higher inflation uncertainty.

Even as the pendulum periodically swings between inflationary and disinflationary forces, investors will still need to pay attention to the corrosive nature of inflation on real returns as well as the implications for portfolio construction. Simply put, inflation is the enemy of both stock and bond returns.

Policy – life after ZIRP

Central banks have certainly not enjoyed the recent bout of very high inflation. But as inflation recedes to levels that are more moderately above target, they may recognize the beneficial side effect of a reduced need for unconventional monetary policy such as negative rates and quantitative easing (QE). These tools are likely to be reconsigned to the emergency, rather than standard, toolkit.

A consensus may be forming that such unconventional policies operate quite differently from conventional rate policy. Given the influence of negative rates and QE on both short and long rates, this new consensus takes markets from a “lower for longer” regime back to what, 20 years ago, were “normal” bond yields.

We note another, more subtle but equally important, implication of this shift in policy dominance from monetary to fiscal. In the QE era, central banks could not appear to be influencing the direction of capital. Hence, their asset purchases adhered to the principle of sector neutrality. However, the massive size of these purchases likely interfered with the efficient functioning of markets and specifically the reallocation of capital from weaker to stronger firms. It seems plausible that such a large “passive” buyer supported the performance of passive markets.

By contrast, fiscal authorities, with a democratic mandate to invest public funds, are actively picking winners by supporting activity in their strategic areas of focus. Investors that can actively allocate alongside these trends stand to be significant beneficiaries.

After a decade of disinflation, topside risks to inflation are emerging

Exhibit 3: Impact of key secular drivers on inflation trends

Economic forces	Impact on inflation	
	Last global expansion (2008–19)	Next 10–15 years
Income distribution	-	0
Globalization/deglobalization	-	0
Sustainability	0	++
Fiscal policy	-	0
Online markets and information availability	--	--
Artificial intelligence and automation	0	--
Inflation expectations	-	+
Union membership	-	-
Commodity prices	-	0

Key: -- disinflationary / - modestly disinflationary / 0 neutral / + modestly inflationary / ++ inflationary

Source: J.P. Morgan Asset Management; data as of September 30, 2023.

Fixed income – bonds go back to their boring best

Bond investing is generally seen to be a sober affair rather than the high octane path of the last year or so. As the recent inflation shock and spike in bond market volatility fade into the rearview mirror, we anticipate a welcome calming of the gyrations in the fixed income market. The journey of the last two years leaves return forecasts for cash and sovereign bonds modestly higher, due to higher starting rates, even though our cycle-neutral yield and spread assumptions are broadly unchanged (**Exhibit 4**).

At an equilibrium, we expect yield curves will have steepened meaningfully from today’s inverted shape, but on average through the cycle we anticipate that curves will be flatter than their historical average. With curves inverted, investors need to consider negative carry when holding bonds, but we expect this hurdle to ease, and eventually reverse, as inflation normalizes in the next year or two.

Higher inflation assumptions lift cash rate forecasts

Exhibit 4: Building-block fixed income return projections for G4 economies

	USD		GBP		EUR		JPY	
	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return
Inflation	2.5%		2.4%		2.2%		1.4%	
Cash	2.5%	2.9%	2.3%	2.8%	1.9%	2.2%	1.2%	0.9%
10-year bond	3.4%	4.6%	2.8%	4.2%	2.6%	3.5%	1.7%	1.2%
Long bond index*	3.7%	5.2%	2.9%	6.1%	2.8%	4.4%	2.0%	1.1%
Investment grade credit	4.9%	5.8%	4.6%	5.4%	3.8%	4.0%	2.1%	1.6%
High yield	8.0%	6.5%			6.3%	5.7%		
Emerging market debt**	7.1%	6.8%						

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023.

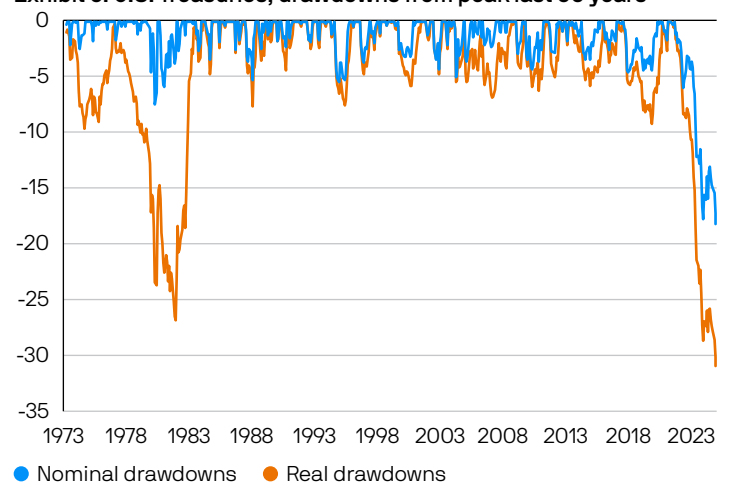
* EUR: 15y+ index; JPY: JGB Bond Index; GBP: 15y+ index; USD: 20y+ index. ** EMD hard currency debt.

The journey from “lower for longer” proved painful for existing bondholders (**Exhibit 5**). But following the reset in yields, real bond returns should be positive going forward, and investors can again rely on bonds both for income and diversification from disinflationary growth shocks.

Bond yields reset swiftly, but it may take longer for the broader financial system to adjust to higher rates. We could see some turbulence in the lowest quality segments of the credit complex, particularly where business models relied on cheap financing. The wider corporate bond market, however, shows few signs of refinancing stresses just now. And while we expect defaults to rise modestly back toward their long-term average, credit markets are, by and large, healthy.

An inflation shock sparked the steepest bond market sell-off in 50 years

Exhibit 5: U.S. Treasuries, drawdowns from peak last 50 years



Source: Bank of America, Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2023.

Higher riskless rates support credit returns, but tight prevailing spreads present a headwind. Still, returns for investment grade (IG) and high yield (HY) offer good pickup over sovereign bonds, even allowing for tight spreads that might amplify left tail risks inherent in credit in the event of market turbulence. The levels of rates and spreads, alongside other economic indicators, such as employment, are consistent with an economy in late cycle. However, the absence of forced borrowing tells a mid-cycle story.

We find more evidence of stress in loan markets, but overall credit offers fair pickup over sovereigns. Emerging market debt also provides reasonable returns, particularly when adjusted for the higher quality and longer duration of EM debt indices.

FX – growing structural support for EUR and JPY

Policy transitions and the subsequent reset in yields also affect currencies. As global central banks followed the Federal Reserve and hiked their own domestic rates, the dollar began to fall. USD remains overvalued and looks set to decline against most crosses (**Exhibit 6**) over our forecast horizon. However, over the longer term, we think that shifts in capital flows, rather than pure rate and growth differentials, will dictate the path of currencies.

Globally, a combination of friction in supply chains and greater aggregate demand from OECD³ governments and households after a decade of deleveraging has permanently lifted the global economy from its period of extraordinary low inflation and interest rates.

In the eurozone and Japan, we see the clearest evidence of this change. The turnaround marks the end of the period of stark underperformance in nominal growth, interest rates and equity markets.⁴

As capital flows shift back toward these regions – driven as much by domestic capital remaining in local assets as by international inflows – EUR and JPY will likely strengthen and compound the dollar decline. Higher inflation forecasts in Europe and Japan may eventually cap the appreciation of the currencies; nevertheless, we see a compelling case for upside in EUR and JPY from depressed levels. Ultimately, we think that EUR and JPY appreciation is now less about an overvalued greenback and more about Europe's and Japan's structural advances.

We continue to have conviction in a secular, more gradual USD depreciation trend

Exhibit 6: Forecasts for major currencies, 2023–24

	Current spot	Terminal spot forecast (10–15 years out)			
		2024	2023	Chg	Chg %
Australian dollar	0.64	0.75	0.78	-0.03	-4.30%
Brazilian real	5.01	6.88	6.79	0.08	1.25%
Canadian dollar	1.35	1.15	1.16	-0.01	0.52%
Swiss franc	0.91	0.78	0.75	0.03	3.82%
Chinese renminbi	7.30	5.77	5.35	0.41	7.74%
Euro	1.06	1.31	1.27	0.03	2.70%
British pound	1.22	1.49	1.40	0.08	5.91%
Japanese yen	149.37	108	105	3.36	3.20%
Mexican peso	17.39	27.49	24.30	3.19	13.12%
Swedish krona	10.91	8.21	8.06	0.15	1.81%

Source: J.P. Morgan Asset Management; data and forecasts as of September 2023. All exchange rates are quoted in market conventional format.

³ Organization for Economic Cooperation and Development.

⁴ The trajectory of currencies is discussed at length in "Currency exchange rate assumptions," *2024 Long-Term Capital Market Assumptions*.

Equities – keep ahead of changing winds

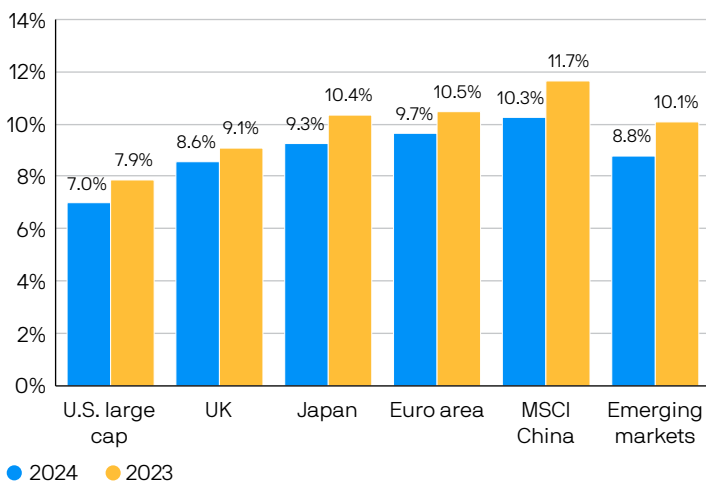
In aggregate, our equity return forecasts fall due to the 2023 rally, but not as far as might be expected.

Greater confidence in margins, adjustments to our dilution assumptions and improving corporate financial discipline, even as the cost of capital rises, blunt the worst of the impact of indices' higher starting points (**Exhibit 7**).

Following the equity market rout of 2022, our forecasts for global equities in our previous edition jumped to the highest level in over a decade. In the last year, stocks have rallied 20%, yet our forecast this year for global equities dips only 70bps, to 7.8% – signaling our continued confidence in the outlook for corporate earnings.

Equity forecasts dip as valuation support shrinks for stocks this year while the headwind from elevated margins remains

Exhibit 7: LTCMA forecasts, 2024 vs. 2023, USD terms

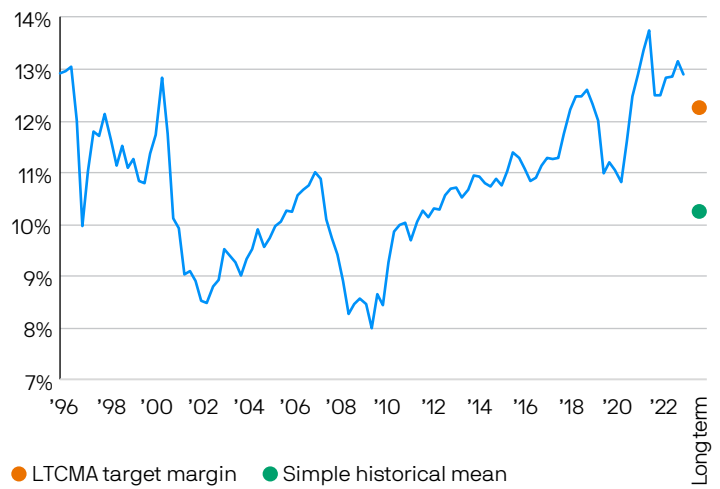


Source: Bloomberg, Factset, J.P. Morgan Asset Management; data as of September 30, 2023.

While margins in many markets are elevated relative to their likely through-cycle average, we expect them to settle at a higher level than implied by simple mean reversion (**Exhibit 8**). This partly reflects shifts in the sector mix, but it also testifies to improved corporate discipline and a focus on margin stability.

Secular changes in corporate profitability suggest U.S. margins will not simply mean revert

Exhibit 8: U.S. large cap margins history, average and terminal LTCMA target



Source: Bloomberg, Factset, J.P. Morgan Asset Management; data as of September 30, 2023.

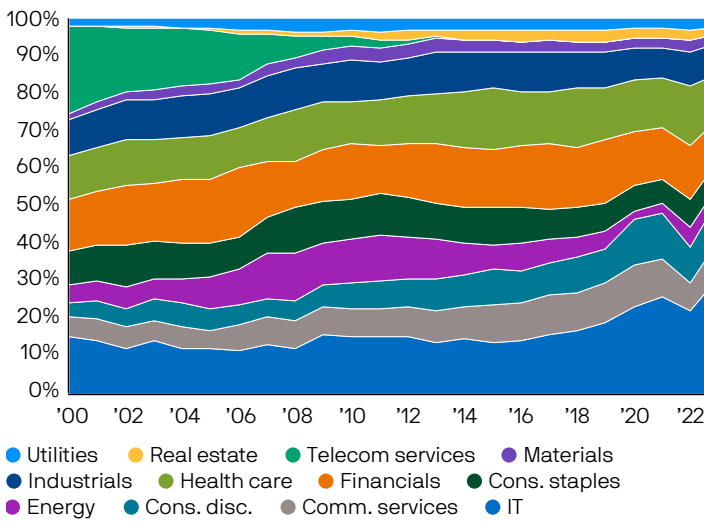
Some might argue that indices are becoming overly concentrated in the technology sector and that this poses a risk to future equity returns. Further, given recent hype over artificial intelligence, such concentrations risk the formation of market bubbles. If we classify every Silicon Valley firm as tech, indices do look quite concentrated – indeed, more so than in the pre-global financial crisis era of bank concentration (**Exhibit 9A**). However, if we classify firms not based on whether they leverage innovation but instead based on where they sit in the value chain, or the end industries they support, the concentration may be less pronounced.

In other words, the evolution of sector classifications is an ongoing process, which needs to reflect the underlying business classifications in the wider U.S. economy (**Exhibit 9B**). We also note that as ever more industries become reliant upon technology, it is reasonable to expect to see a large bedrock of public firms supplying the critical hardware, software and innovation demanded by the wider economy.

Ultimately, investors may underestimate the margin and free cash flow resiliency of firms with a tech signature and overstate the risks from concentration. As rival trading blocs are emerging globally, innovation, technology and data are increasingly viewed as strategic assets. Governments seem to have less appetite to break up market-leading big-tech firms, leaving the sector to operate as a “tolerated monopoly” – able to collect monopoly rents and thus command superior valuations.

The impact of technology is felt across sectors, even as index classifications evolve and market cap weights shift in the S&P 500

Exhibit 9A: Evolution of sector weight in S&P 500



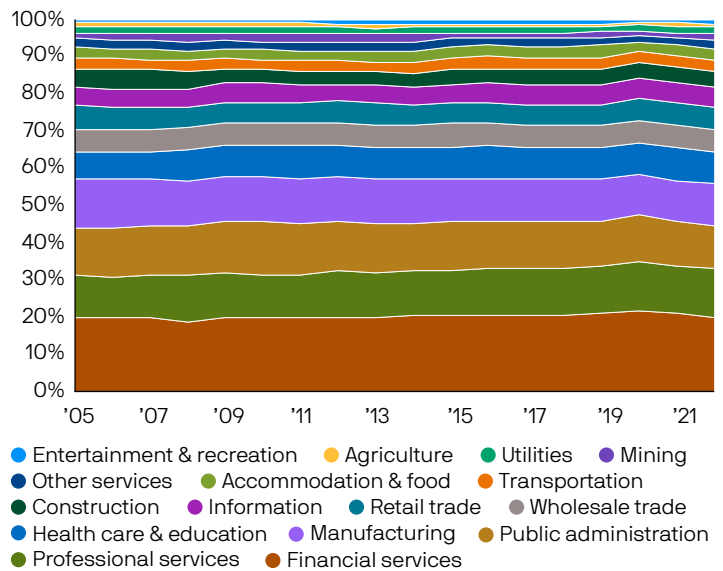
Source: Bloomberg; data as of August 31, 2023.

Even if U.S. margins prove resilient, returns available in other developed markets remain attractive by comparison. The market dominance that U.S. firms enjoyed through the 2010s faces competition from Europe and Japan in particular.

Europe has long since emerged from the shadow cast by the eurozone crisis. While the impact on corporate confidence was meaningful, the region remains home to 15% of the world's most valuable brands. Moreover, the financial ecosystem is evolving to become more coordinated and, in our view, more equity friendly. Meanwhile, Japanese return on equity (RoE) is recovering as the corporate torpor and excess savings of two lost decades are consigned to history.

By contrast, the outlook for emerging market equity has moderated. Investors are increasingly skeptical about the outlook for China and unwilling to pay high multiples. Chinese stocks did not participate in the 2023 rally, and thus a lower starting point supports expected returns. Still, the return premium of EM over DM equity narrows by 40bps in USD terms this year.

Exhibit 9B: History of industrial sector contribution to U.S. economic activity (GVA)



Source: Haver Analytics; data as of December 2022.

Alts – returns catch up to liquid assets, alpha potential persists

Lower equity returns exert downward pressure on forecast returns for private equity (PE) and some classes of hedge funds. Meanwhile, expected returns for real assets, including real estate, infrastructure and transportation, as well as for private credit and venture capital (VC), are higher this year. The detail behind these moves bears scrutiny as it highlights the attractive alpha-generating and diversification properties of alternative assets.

The dip in PE forecasts shows up at the aggregate level, with the cap-weighted forecast falling 20bps to 9.7%. But this is driven entirely by the 50bps decline in forecasts for large cap PE to 9.70%. Small and mid cap PE, like VC, post modest increases – reflecting ongoing demand for growth financing and a lower sensitivity to the increase in mezzanine financing costs that is weighing on large cap PE.

Last year, our forecast for financial alternatives applied a penalty for anticipated asset markdowns that more than offset an improving alpha outlook. This year, markdowns are largely baked in, and alpha expectations remain stable – the sum of these effects serves to offset some of the drag from public market beta (Exhibit 10).

Across all alternative sectors and strategies, future performance may exhibit wider dispersion of returns

Exhibit 10: Selected alternative strategies – return assumptions (levered,* net of fees, %)

Real assets	2024	2023	Financial alternatives	2024	2023
Private real estate equity (local currency)			Private equity (USD)[†]		
U.S. core	7.5	5.7	Cap-weighted composite	9.7	9.9
U.S. value-added	9.7	7.7	Private equity - small cap	9.7	9.5
European core	5.6	4.7	Private equity - mid cap	9.5	9.4
European value-added	7.5	6.7	Private equity - large/mega cap	9.7	10.2
Asia-Pacific core	7.1	6.1	Private debt (USD)		
REITs (local currency)			Direct lending	8.5	7.8
U.S. REITs	8.2	6.8	Venture capital (USD)		
European REITs	8.0	6.1	Venture capital	9.2	8.5
Asia-Pacific REITs	7.0	5.1	Hedge funds (USD)		
Global REITs**	7.9	6.4	Equity long bias	4.7	5.0
Commercial mortgage loans (local currency)			Event-driven	5.0	5.4
U.S.	6.3	n/a	Relative value	4.9	4.9
Global infrastructure (USD)			Macro	3.6	4.1
Core	6.8	6.3	Diversified ^{††}	5.0	5.0
Global transport (USD)			Conservative [‡]	3.7	3.7
Core	7.7	7.5			
Global timber (USD)					
Global timber	6.2	6.7			
Commodities (USD)					
Commodities	3.8	3.1			
Gold	4.1	3.5			

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022, and September 30, 2023.

* All return assumptions incorporate leverage, except for commodities, where it does not apply.

** The global composite is built assuming the following weights: roughly 70% U.S., 10% Europe and 20% Asia-Pacific.

† The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

†† The Diversified assumption represents the projected return for multi-strategy hedge funds.

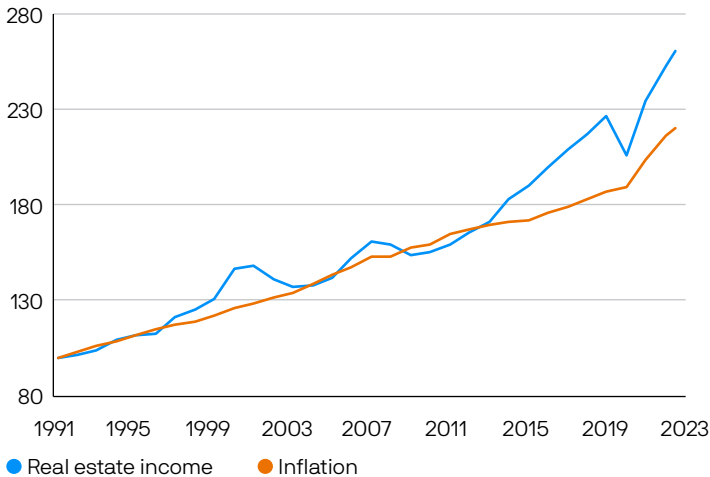
‡ The Conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage. The 2024 Conservative assumption uses a 0.70 beta to Diversified.

In 2022, the diversification offered by real assets against inflation shocks offered a welcome harbor as bond and equity markets tumbled. Critics argue that real assets were partly protected by a slower mark-to-market cycle, but real assets have natural inflation resilience and held up well during earlier inflationary periods (**Exhibit 11**).

Real estate income has generally outpaced inflation over the past 30 years

Exhibit 11: Real estate income vs. inflation

Starting value = 100



Source: J.P. Morgan Asset Management GRA Research, NCREIF, Bureau of Labor Statistics; data as of June 30, 2023.

This year, we have seen adjustments across real assets, which bring the return forecasts more in line with those in public markets. Despite some well-flagged issues in some segments of U.S. commercial real estate and persistent weakness in China, we believe that the outlook for core real estate is strong. In the wider real assets complex, the return outlook remains resilient, with core transport forecasts rising 20bps to 7.7% and core infrastructure up 50bps to 6.8%. In addition to attractive returns, real assets offer a diversifying potential that is especially welcome, given the greater volatility in inflation that we anticipate over our forecast horizon.

Smarter portfolios for a world in transition

Over the next 10 to 15 years, we believe that we face the challenges of a world in transition but equally the opportunity to build portfolios that are robust to these challenges. The transition from disinflation to two-sided inflation risks, and from policy accommodation to higher costs of capital, means we must insulate portfolios against more than just growth shocks. At the same time, seizing emerging investment themes relating especially to the energy transition and technology adoption will be important.

The 60/40 portfolio has stood the test of time, but the attractive return outlook today across much of the asset markets empowers investors to build upon the 60/40 in new and innovative ways. Building smarter portfolios for a world in transition demands that investors extend out of cash and benchmarks to harvest better returns within existing opportunity sets. Expanding opportunity sets, particularly into alternatives and through greater international diversification, can open up new axes of both return and diversification. And with greater two-way inflation risk and a shift in the sources of capital, we see increasing opportunity for investors to enhance returns through active alpha and manager selection.

The starkest transition of the last year is in monetary policy. Higher policy rates make cash more attractive as an asset, while higher rates penalize holders of other assets via cost of carry. But cash rates are unlikely to stay elevated for long, and that carry hurdle will quickly fall. Our estimate of cycle-neutral real cash rates rises slightly, but on average the forecast Sharpe ratios and risk premia (**Exhibits 12A** and **12B**) of other assets are not particularly affected by high starting cash rates. Nevertheless, inverted curves and high starting cash rates present a tactical challenge that investors need to navigate in the short term.

High starting cash rates have a relatively modest impact on risk-adjusted returns over the long term

Exhibit 12A: Return uplift (premia)

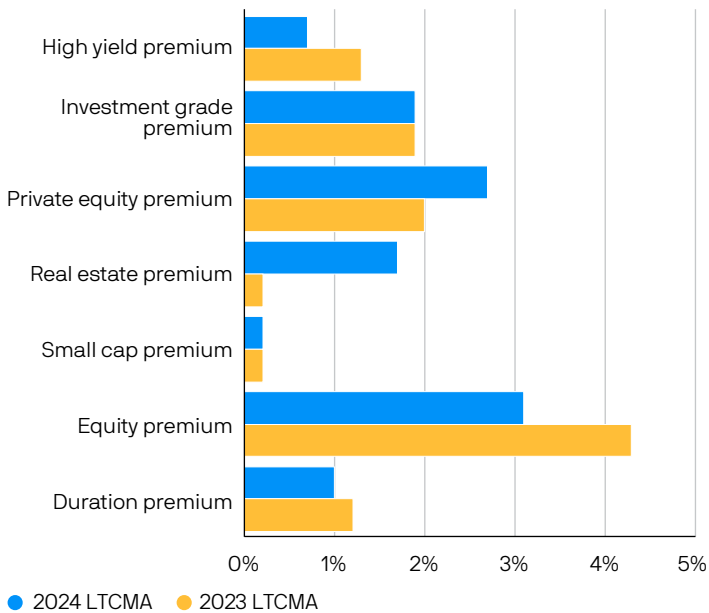
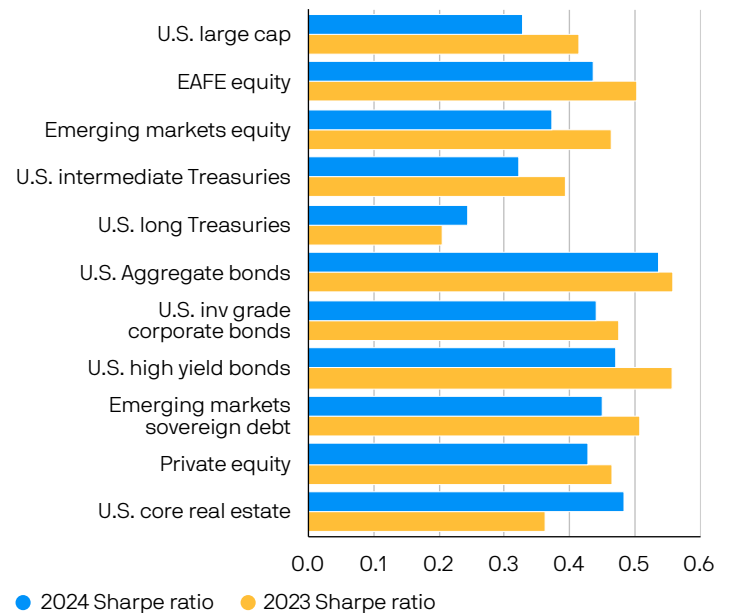


Exhibit 12B: Sharpe ratios



Source: J.P. Morgan Asset Management; data as of September 30, 2023.

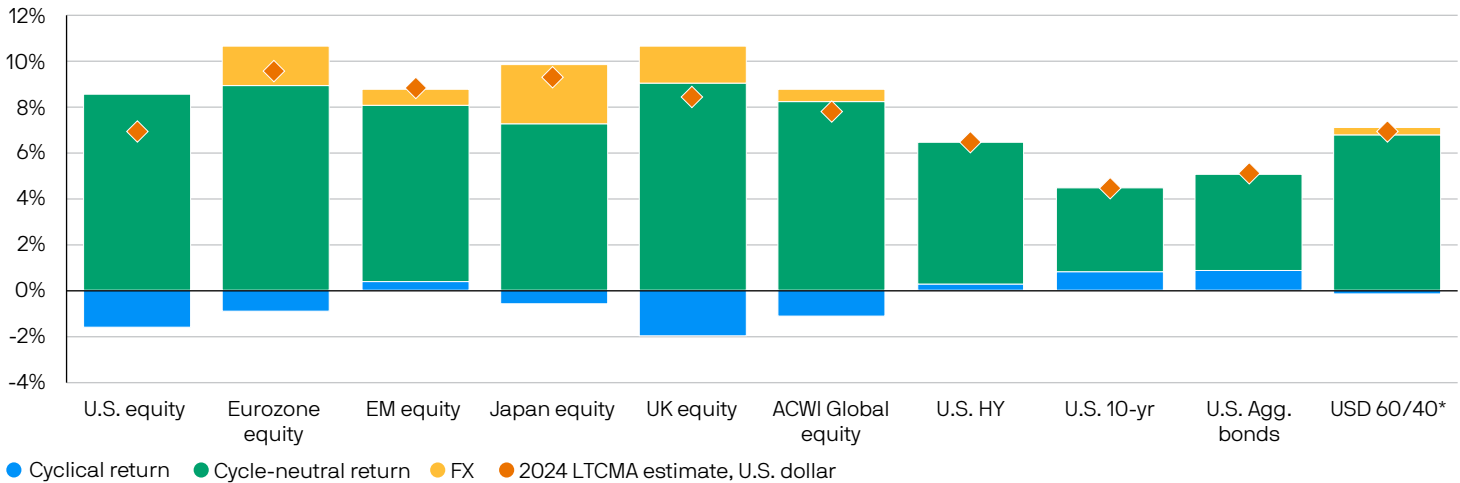
While high cash rates appear compelling, investors should remember that sitting in Treasury bills might mean collecting 5% for limited risk today, but it misses out on compounding of returns over the longer run. In short, extending out of cash is imperative. We estimate that a dollar invested in cash will be worth, in real terms, USD 1.04 a decade from now, whereas in a simple public market 60/40 it would grow to USD 1.54, and in a 60/40 with 25% alts it would be worth over USD 1.60.

Over the long run, the asset stack⁵ generally moves in line with cash rates as expected returns from various assets move up and down, roughly in line with their risk profile. So for investors that have already extended out of cash, the capacity to extend further within their asset opportunity set – factor allocation, international diversification, currency overlays, etc. – is not constrained by higher cash rates. Compared with last year, equity valuations are higher and translate to a modest cyclical headwind for stocks. By contrast, elevated starting yields are a cyclical tailwind for bonds. Overall, however, the cyclical element of returns remains relatively small (Exhibit 13).

⁵ The capital structure of asset markets according to risk and return levels: equity at the bottom, followed by credit and sovereign debt, with cash at the top.

Modest cyclical headwinds from margins are apparent in equities, while high starting yields provide a cyclical tailwind to many fixed income asset classes

Exhibit 13: Cyclical and cycle-neutral return drivers for key assets in USD

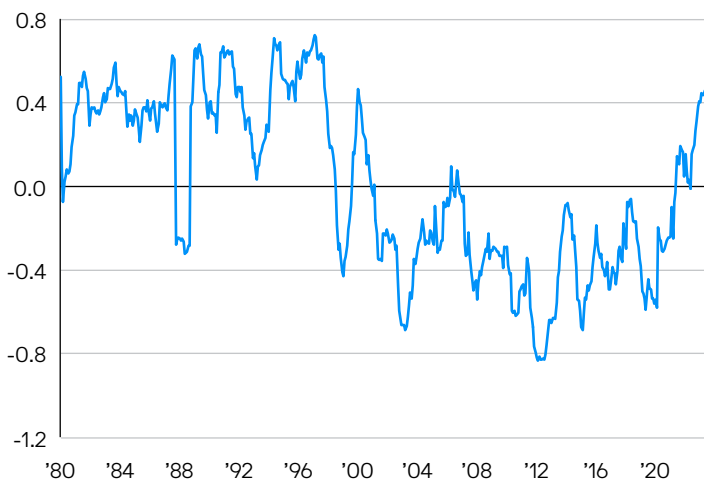


Source: J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 2023.
 * USD 60/40 refers to a portfolio of 60% MSCI AC World Equity and 40% Bloomberg US Aggregate Bonds in USD terms.

If our message last year was largely focused on the jump in forecast return outlook for the core set of public market assets, this year it is more about the breadth of opportunity available across the wider asset markets. When inflation risk is two-way and stock-bond correlation is no longer reliably negative (**Exhibit 14**), investors will need to expand their opportunity set to include different axes of diversification to protect portfolios and boost potential returns.

Positive, or unreliably negative, correlation increases the need for new dimensions of portfolio diversification

Exhibit 14: S&P 500/U.S. 10-year Treasury correlations



Source: LSEG Datastream, S&P Global, J.P. Morgan Asset Management. Past performance is not a reliable indicator of current and future results.

A wider opportunity set may well include alternative assets, which proved their worth as an inflation diversifier in 2022. The objection to alternatives is often their illiquidity, but we believe that liquidity remains an underutilized risk premium in many portfolios. Moreover, opportunities for alpha from manager selection in alternatives can often assuage concerns about illiquidity.

The environment for enhancing portfolios through manager selection and active alpha has shifted with the transition away from ultra-easy policy. Central banks are no longer providing limitless cheap capital; instead, higher cash rates are drawing in private sources of capital. Today, capital is not necessarily scarce, but it is no longer free. Simply put, when capital is provided by asset buyers with a financial stability objective, they buy indiscriminately, but when capital is provided by investors with a return objective, they buy selectively. More selective investment means more differentiated asset performance and greater potential for active styles of investing.

Naturally, there are risks to our outlook (**Exhibit 15**). But we believe that today’s asset markets offer many opportunities to build diversified returns into portfolios and in doing so improve the robustness of those portfolios to shocks.

Over our 10- to 15-year horizon, we look through some of the cyclical risks and instead home in on risks that might alter trend growth or inflation, or leave a lasting imprint on long-term asset returns

Exhibit 15: Key structural risks affecting our long-term forecasts and asset return assumptions

Risk	Upside or downside?	Description	Macro or asset class implications
Fiscal largesse and debt sustainability concerns	Downside	More activist fiscal policy, on top of structural fiscal challenges from an aging population give rise to concerns about debt sustainability	Fiscal activism would be met with monetary restraint. Negative for bonds and eventually stocks as need for fiscal retrenchment is realized. Significant currency ramifications if concerns are isolated to one economy or region.
Worsening climate or environmental situation	Downside	More frequent or more extreme weather events leading to destruction of productive assets and disruptions to food and basic materials supply	Supply disruption in short run and then pressure on scarce resources during rebuild lead to higher inflation: positive for commodities and real assets, negative for bonds, stocks, credit
Russia-Ukraine war accelerates or expands	Downside	War of attrition spills over into hot conflict with nearby NATO members or leads to aggressive cyberattacks on U.S.	Renewed supply chain shocks and risk of retaliatory sanctions further disrupting trade. Positive for bonds and USD, supports commodities, negative for stocks, hits Europe hardest
Trade tensions between U.S. and China reignited	Downside	Washington and Beijing find themselves in a renewed trade dispute with tit-for-tat tariffs and sanctions on a wide range of goods	Further retrenchment to regional blocs damages growth and is inflationary at the margin. Commodity prices remain elevated, industrial sectors under pressure as supply chains compromised, meanwhile ASEAN nations and India may be beneficiaries
European energy independence through renewables investment	Upside	European countries double down on investments after reducing reliance on Russian gas to speed up adoption of renewable energy sources and sustainable infrastructure	Uncertainty removed from European energy grid, skills deepening from investment a positive boost to productivity, while infrastructure improvements add a further positive support; EUR and EU equities net winners
Accelerated adoption of artificial intelligence	Upside	Labor scarcity that is limiting growth in some regions mitigated, scope for productivity to rebound, strongly improving trend growth	Positive for real GDP while limits inflation; supportive for developed market stocks, credit and other risk assets; mitigates some right tail inflation risks
Stronger than expected investment and capex cycle	Upside	Surge in fiscal spending and upswing in capex that followed pandemic lead to building of productive capacity and upskilling in labor	Positive for real GDP while limits inflation; supportive for stocks, credit and other risk assets; mitigates some right tail inflation risks from bond markets; may favor DM over EM
Debt default by U.S.	Downside	Debt ceiling and other budget issues in U.S. reach stalemate, leading to default; debt repayments consume too much from budget to be politically palatable	Deeply negative for risk assets; risks causing liquidity crunch as uncertainty around definitions for riskless assets are challenged. Initially positive for bonds but may rapidly see non-U.S. bonds outperform; gold, CHF and JPY positive
Rapid abandonment of USD as key reserve currency	Downside	Challenger to USD (from either crypto or an alternative fiat currency) emerges and pulls reserve assets away from USD; diminishes demand for U.S. assets and refocuses attention on U.S. deficit	Negative for growth, USD, bonds, credit and stocks; positive for real assets and commodities
Secondary pandemics or emergence of vaccine-resistant strains	Downside	Vaccine-resistant strain of current pandemic or entirely new pathogen emerges, necessitating rolling lockdowns and creating disruption to supply chains globally	Negative for growth but likely leads to further stimulus, leading to cyclical volatility and risking further expansion of deficits; positive for bonds in short run, but risks longer period of financial repression in longer term; increases volatility in equities
Embedded inflation expectations force persistently tight policy	Downside	Central banks overshoot reasonable levels of financial conditions due to embedded consumer inflation expectations; growth is stifled and investment discouraged due to high interest rates and uncertainty over prices	Bonds yields higher, equity multiples contract further; growth equities under pressure, and margins suffer across the board. Positive stock-bond correlations become entrenched; real assets and infrastructure hold up better
Quantitative tightening causes major market dislocations	Downside	Central banks pursue aggressive balance sheet reduction, and private buyers are unable to absorb the incremental supply on top of structurally higher bond issuance	Negative for all assets as higher bond yields threaten valuations on all other asset classes
Financial dislocations in aftermath of shift from zero interest rates	Downside	Contagion risks grow in some parts of the financial system. Certain private markets potentially most vulnerable, given less regulatory scrutiny than systemic banking system. Commercial real estate also a concern area.	Fire sale of assets to meet margin calls may precipitate sharp fall in credit supply, not initially noted due to limited refinancing wall; however, over longer run, levered companies and sectors come under significant pressure

Source: J.P. Morgan Asset Management; data as of October 2023.

Summarizing our return outlook, we see that stock-bond frontiers are flatter (**Exhibits 16A** and **16B**) – reflecting a later cycle starting point with elevated rates – but the level of returns available to equity holders still sits near the long-term average. As inflation retreats to its long-run cycle-neutral level, the real returns available across assets make for a reasonably attractive investing environment. We also see a richer hunting ground for active investors as new sources of capital force more differentiation across assets.

This much is clear: In a world in transition, capital will be in motion. Sitting on the sidelines is not an option, and over the long run we believe that the asset markets continue to provide investors of all risk appetites a decent return outlook.

Even as the stock-bond frontier flattens, real return potential looks attractive and differentiation across assets provides a richer hunting ground for active investors

Exhibit 16A: USD stock-bond frontiers and 60/40 portfolios based on 2024 vs. 2023 LTCMAs for risk and return (%)

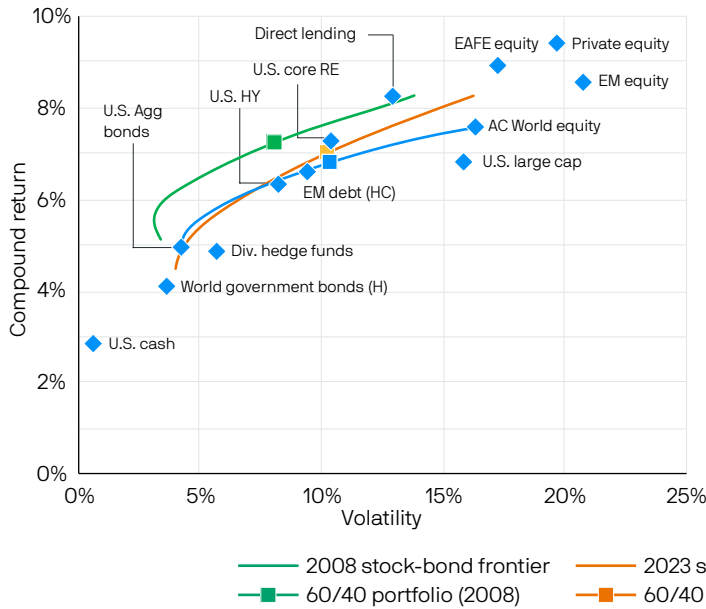
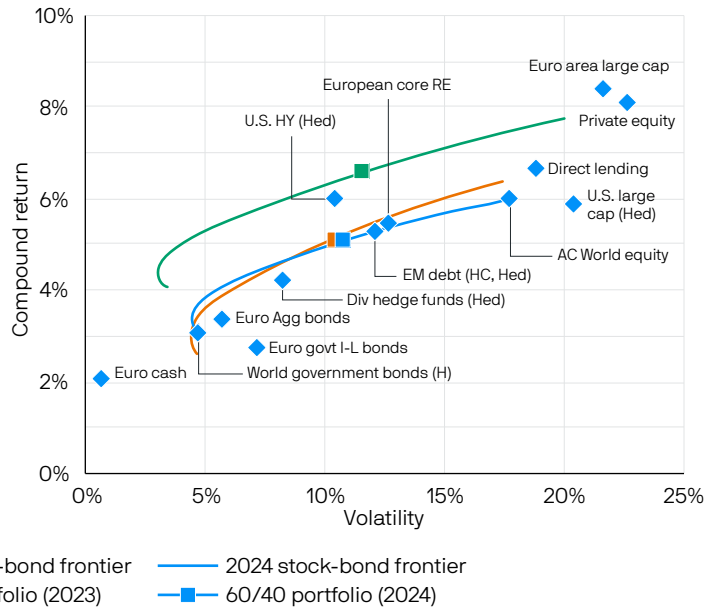


Exhibit 16B: EUR stock-bond frontiers and 60/40 portfolios based on 2024 vs. 2023 LTCMAs for risk and return (%)



Source: J.P. Morgan Asset Management; data as of September 30, 2023.



Macroeconomic assumptions

A world in transition: Changing tides of growth and inflation

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In brief

- Improved labor force growth in the U.S., increased investment in the energy transition in Europe and the productivity-enhancing impacts of artificial intelligence (AI) technology combine to add to our forecast of developed market (DM) growth.
- Emerging market (EM) growth slips a little as China's decades-long expansion continues to slow.
- DM inflation expectations remain higher than in the pre-pandemic era: Stronger wage growth in Europe and Japan modestly boosts their inflation forecasts, and a faster than expected decline in U.S. inflation allows us to slightly lower our long-term forecast.
- Our EM inflation outlook sees little change.
- Public investment to combat climate change and mitigate its social impacts could boost economic growth and productivity but should also be mildly inflationary.
- Accelerating investment spending on AI could provide a boost to productivity and be broadly deflationary. However, we recognize this with only a modest boost to our DM growth forecasts at this stage, as we continue to assess AI's potential long-term impact.

Over the past few years, as the initial growth shocks associated with the pandemic have eased, inflation has come to dominate conversations about the economic outlook. In each of the last two editions of our Long-Term Capital Market Assumptions (LTCMAs), after an extended period of stability we raised our inflation projections significantly. We made two judgments: first, that some of the observed surge in inflation would probably persist for many years, and second, that the global economy was unlikely to enter a 1970s-like atmosphere of runaway price increases. We think developments since then have broadly corroborated those views.

This year, as a result, changes to our forecasts are more nuanced. In a few major economies, most notably Europe and Japan, we continue to raise inflation projections.

In these economies, the post-pandemic upward shifts in inflation took longer to materialize and become entrenched, but we now feel more confident that the change is genuine. By contrast, we trim our U.S. inflation forecast from last year's edition, not because we have downgraded our longer-term expected inflation trend rate but simply to take account of a lower starting point.

Also, after two years of little change to our long-term growth expectations, we modestly raise our developed market growth forecast and lower our emerging market projections. Some of the DM adjustments are in response to recent breakthroughs in artificial intelligence, the implications of which are extremely difficult to forecast at the moment but could potentially be very large.

Our 2024 assumptions anticipate mostly stable real GDP growth and higher – but not dramatically higher – inflation

Exhibit 1: 2024 Long-Term Capital Market Macroeconomic Assumptions (% , annual average)

	Real GDP			Inflation		
	2024	2023	Change	2024	2023	Change
Developed markets	1.6	1.4	0.2	2.3	2.2	0.1
United States	1.8	1.6	0.2	2.5	2.6	-0.1
Euro area	1.3	1.1	0.2	2.2	1.8	0.4
Japan	0.8	0.7	0.1	1.4	0.9	0.5
United Kingdom	1.4	1.3	0.1	2.4	2.4	0.0
Australia	2.2	2.1	0.1	2.4	2.4	0.0
Canada	1.7	1.6	0.1	2.2	2.3	-0.1
Sweden	1.9	1.8	0.1	2.4	2.1	0.3
Switzerland	1.5	1.4	0.1	1.4	1.0	0.4
Emerging markets	3.5	3.6	-0.1	3.8	3.6	0.2
China	3.8	4.0	-0.2	2.2	2.2	0.0
India	5.7	5.7	0.0	4.5	4.5	0.0
Russia	0.3	0.4	-0.1	8.0	8.0	0.0
Brazil	2.0	2.0	0.0	4.6	4.6	0.0
Korea	2.0	2.0	0.0	2.0	2.0	0.0
Taiwan	1.6	1.7	-0.1	1.3	1.3	0.0
Mexico	2.0	2.0	0.0	3.7	3.9	-0.2
South Africa	1.8	2.1	-0.3	5.5	5.5	0.0
Turkey	3.0	3.1	-0.1	20.0	16.0	4.0
Global	2.4	2.3	0.1	2.9	2.8	0.1

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023. Previous year's real GDP forecasts shown include cyclical bonuses. Given depressed post-shock starting points, in last year's edition we added cyclical bonuses to our 2021 trend growth projections. This year, our 2024 forecasting returns to trend rates alone. In comparing 2023 with 2024 trend rates here, we do not use last year's rate-plus-cyclical-bonus figure but only the trend rate. Composite GDP and inflation numbers for DM, EM and global aggregates are calculated by assigning weights to individual economies that are proportional to projected nominal GDP over the forecast horizon. This updated methodology also results in revised aggregates for the 2023 LTCMAs, although individual economy forecasts remain unchanged from last year.

Our changes also reflect other secular forces, including a ramp-up of investment spending in Europe, in large part on the energy transition (see box, “**Climate: What might the transition to a low carbon economy mean for LTCMAs?**”), and an apparent return to pre-pandemic migration patterns. This migration primarily boosts expected population growth in a handful of rich economies, such as the U.S. and Australia, after a few years in which it seemed that mobility might be permanently reduced. Our revised forecasts are summarized in **Exhibit 1**.

GDP: More growth but less convergence

We build our long-term growth forecasts by assessing the prospects for three major inputs: labor, capital and total factor productivity (TFP). The number of people employed represents the bulk of the labor input; we start from projections of the working-age population in each economy, making judgments about likely changes in labor force participation over time. We also adjust for changes in labor quality – mostly reflecting trends in education – and fluctuations in average hours worked per person. (For example, an aging population tends to feature more part-time workers than a younger one.)

The contribution of capital to growth rises broadly in line with the expansion of the capital stock (the machinery, equipment, intellectual property and so on used in business production processes), which in turn depends on each economy’s investment rate. Finally, TFP captures the economic growth that cannot be attributed to labor or capital in isolation. Over the long term, we think TFP primarily reflects the pace of technological change – both the global technological frontier and each economy’s position relative to that standard.

Three reasons for our modest upgrade to DM economies’ growth

This year, we modestly increase our developed market growth forecasts, owing to changes across each of the three sets of inputs, but trim our emerging market projections. In DM economies, all told, our real GDP growth forecast moves up to 1.6% this year, from 1.4% in 2023. We see three reasons for a bit more optimism:

Rapid advances in AI should enhance total factor productivity

AI’s potential implications are very broad but could impact the economy most powerfully by boosting TFP. We do recognize, however, that the most significant impacts should manifest themselves later in our forecast period. This year, we allot to DM economies a uniform 0.1 percentage point (ppt) boost to TFP growth, and by extension GDP growth, from advances in AI, since a greater share of jobs in DM economies seem susceptible to AI automation and developed economies are hosting the majority of AI research and early deployment. For now, we keep our TFP assumptions unchanged across EM economies, where a higher share of tasks are harder to automate.

The fact that our forecast for AI’s impact on productivity is modest, relative to academic and industry estimates, reflects our uncertainty about the ultimate scope and speed of AI advancement and adoption. However, we recognize that its productivity impact could also be much more significant than our base case. Because this technology has not yet been incorporated in the capital stock or most businesses’ work practices, judgments at this point are largely speculative.

Unlike past forms of AI, generative AI produces novel, human-like output in the form of text, images and three-dimensional models – and can match or even beat a range of human benchmarks¹ (see box, “**Artificial intelligence: What is generative AI’s productivity potential?**”). Private investment in AI totaled USD 125 billion globally in 2021, up more than sevenfold from five years prior.² If investment were to continue at the more modest pace of software in the 1990s, investment in AI in the U.S. could approach 1% of U.S. GDP by 2030.³

¹ Max Roser, “The brief history of artificial intelligence: The world has changed fast – what might be next?” *Our World in Data*, December 6, 2022.

² Netbase Quid companies dataset, 2022, as cited in “The 2023 AI Index Report,” Stanford Institute for Human-Centered Artificial Intelligence, 2023.

³ For a more extended discussion of AI, see Michael Albrecht and Stephanie Aliaga, “The transformative power of generative AI: Supercharged productivity or mass joblessness?” J.P. Morgan Asset Management, August 25, 2023.

The boost to annual U.S. real GDP growth over 10 years could range from 0.3% to 3.0%, studies estimate. In our view, such gains skew optimistic but underscore the wide range of possible scenarios. We will refine our own estimates over time as evidence becomes available.

Revived immigration boosts our U.S. employment outlook

After a sharp slowdown during the pandemic, immigration to the U.S. has reaccelerated. This change leads us to reverse a cut we made in the 2023 edition, when immigration flows looked weak. The recent uptick in arrivals is occurring alongside evidence that an earlier downtrend in the prime working-age participation is fading. Together, these shifts imply less-binding constraints on the workforce. Our U.S. growth projection rises to reflect this better outlook for employment.

Public investment to enable the energy transition should boost European demand

A ramping up of publicly led investment in Europe, including capital spending to support the energy transition away from carbon-intensive fuels, will likely boost growth in the euro area and help counter drags in the UK. We raise our euro area growth projection by 0.2ppt, half of which reflects an upward revision to our expectation for the capital stock, which is set to receive persistent support from public investment, and Europe's leading role in preparing for the energy transition. The AI effect accounts for the other half of the upgrade.

DM growth forecasts rise and EM projections slip; the DM-EM gap continues to narrow

Our DM growth forecasts outside the U.S. and the eurozone rise by 0.1ppt, thanks to the AI adjustment, with other growth drivers largely unchanged. In the UK, we see roughly offsetting influences from stepped-up public investment, similar to the euro area, and what looks like a productivity drag associated with Brexit and its influence on foreign trade flows, alongside weakening labor force participation.

We continue to see Australia as the fastest growing of the major developed economies, thanks to its relatively favorable demographics. Japan continues to stand out on the low side, given its shrinking population, although we once again expect some offset from older citizens' increased engagement with the labor market.

Our EM growth forecast slips to 3.5%, vs. 3.6% last edition. Emerging markets retain their growth premium relative to developed economies, but this gap has been narrowing steadily. Continuing a multiyear trend, much of this downgrade owes to China, where we trim the growth projection to 3.8%, from 4.0% in 2023. Demographics are working against China, as the prime working-age population is now shrinking and much of the growth lift from rural-to-urban migration has been realized.

Moreover, China's impressive growth performance over the past 20 years has raised its economy to middle income country status, narrowing the room for continued convergence with DM standards of living. Geopolitical tensions, by inhibiting technology transfer, may complicate the completion of that transition. China nonetheless continues to boast the second-highest growth forecast in our sample, behind only India, which has a younger population and a much lower starting point in per capita GDP.

The biggest change to our growth projections this year comes in South Africa, which slips to 1.8%, from 2.1% in 2023. South Africa benefits from one of the younger populations in our sample, as well as rising educational achievement. But several factors that have inhibited its growth for a decade, including an inconsistent energy supply and inefficient investment, seem likely to continue. We also modestly trim our projections for Taiwan, where demographic trends are worsening gradually, and for Turkey, given the unpredictability of its macroeconomic policymaking.

Diverging trends in inflation outlook

Economic analysis over the past two years has been dominated by attempts to forecast inflation and to understand what's driving it. However, most economists would agree that, in the long run, inflation is essentially a policy choice. While monetary policy remains a blunt and clumsy instrument, monetary authorities should have the ability to boost or lower inflation by running expansionary or contractionary policies, albeit at the risk of periods of recession.

Consequently, our analysis of global inflation for the next 10 to 15 years starts with a review of the inflation targets of central banks across the major DM and EM economies.

We also acknowledge, however, that certain forces tend to push inflation above or below these targets. While central banks may have an inflation goal, they are unlikely to pursue that goal so zealously as to ignore the real-world consequences of trying to achieve success too quickly. It is important to consider these forces in estimating the extent to which long-run inflation exceeds or falls short of central banks' goals.

It should also be recognized that while these forces generally operate in the same direction across economies, one force – expected changes in the exchange rate – will have quite different effects across economies.

Finally, while the inflation surge of the past two years is ebbing, there should still be a period of transition as inflation gradually approaches its long-term trend. This transition to the trend generally adds to average expected inflation over our 10- to 15-year forecast window.

Central bank inflation targets

Exhibit 2 and **Exhibit 3** outline the current stated policies of the major developed and developing economy central banks. Generally, DM central banks have an official target centered around 2%, with only a small range in nuance between, for example, the Swiss, who would prefer to maintain an inflation rate below 2%, and the Australians, who target inflation of 2%–3%. Emerging market central targets are generally somewhat higher.

However, while the last two years have clearly seen much tougher rhetoric from central bankers regarding inflation, policymakers have generally been unwilling to move their targets. Lifting targets could raise inflation expectations, which would be counterproductive, and lowering them in an environment where inflation is already exceeding them could be seen as being out of touch with reality.

DM central banks generally have official inflation targets around 2%; differences are small and nuanced

Exhibit 2: Current stated inflation-targeting policies of major developed economy central banks

Central bank (CB)	CB inflation target	Current policy	Source
U.S. Federal Reserve	Headline PCE	Average inflation targeting: will allow for inflation to overshoot 2% for a period to make up for periods where inflation undershoots 2%	Statement on Longer-Run Goals and Monetary Policy Strategy (January 2023)
European Central Bank	HICP	Aiming for 2% inflation over the medium term	Monetary policy decisions (May 2023)
Bank of England	Headline CPI	Sets policy to meet 2% inflation target while helping sustain growth and employment	Letter to the Chancellor (March 2023)
Bank of Japan	Core CPI (ex-fresh food)	Inflation-overshooting commitment: Continue to expand the monetary base until y/y observed CPI rise (excluding fresh food) exceeds, and remains above, 2%	Statement on Monetary Policy (December 2022)
Bank of Canada	Headline CPI	Aims to keep inflation at the 2% midpoint, measured by 12-month rate of change in CPI, of a target range of 1% to 3%	Monetary policy framework (renewed December 2021)
Reserve Bank of Australia	Headline CPI	Aims to achieve a medium-term average rate of inflation within 2%–3%.	Statement on Monetary Policy (September 2016)
Swiss National Bank	Headline CPI	Aims to achieve positive rates of inflation below 2%	Monetary policy strategy (January 2000)
Swedish Central Bank	CPIF	Aims to achieve 2% inflation, with a tolerance range of 1%–3%	Inflation target (September 2017)

Source: J.P. Morgan Asset Management; data and forecasts as of September 2023. PCE: personal consumption expenditures; CPIF: CPI with a fixed interest rate; HICP: Harmonised Index of Consumer Prices; CPI: consumer price index.

Emerging market central bank inflation targets are generally higher than those in DM economies

Exhibit 3: Current stated inflation-targeting policies of major developing economy central banks

Central bank (CB)	CB inflation target	Current inflation policy	Source
People's Bank of China	CPI	Set its 2023 target at around 3%. The PBoC does not publish a long-term inflation target.	2023 Government Work Report of the Chinese State Council (March 2023)
Reserve Bank of India	CPI	Targets 4% for 2021–26, with upper/lower tolerance limits of 6% and 2%.	Reserve Bank of India monetary policy (March 2021)
Bank of Brazil	CPI	Targets 3.25% for 2023 and 3.00% for 2024–25; 1.50% tolerance margin on either side.	Bank of Brazil Inflation Report (March 2022)
Bank of Mexico	CPI	Targets 3%, with a 1 percentage point tolerance range above and below that level.	Banxico Quarterly Report (1Q 2022)
Bank of Korea	CPI	Targets 2% over the medium term.	Bank of Korea Monetary Policy Report (2019)
Taiwan's Central Bank	CPI	No inflation target; uses a money supply growth target to stabilize prices.	Taiwan's Central Bank (N/A)
South African Reserve Bank	CPI	Targets 3%–6%, not an average rate. Since 2017, has emphasized its goal is the midpoint, 4.5%.	SARB Statement of Monetary Policy Committee (March 2022)
Central Bank of the Republic of Turkey	CPI	Targets 5% y/y as of year-end, with 2% uncertainty band on either side. Targets set jointly with government for three-year periods.	Inflation targets (2012)

Source: J.P. Morgan Asset Management; data and forecasts as of September 2023. PCE: personal consumption expenditures; CPIF: CPI with a fixed interest rate; HICP: Harmonised Index of Consumer Prices; CPI: consumer price index.

Exchange rate effects

One factor that will clearly be different across economies is the impact of changes in exchange rates. **Exhibit 4** outlines the changes we expect over the forecast horizon, along with their inflation impact, which is roughly proportional to the import share of GDP across economies and regions.

Evolving exchange rates should have differing impacts – likely adding to U.S. inflation and subtracting elsewhere

Exhibit 4: Impact on inflation of changes in exchange rates

	Import share of GDP (2022)	Expected annual change in trade-weighted exchange rate	Crude annual impact on inflation of change in exchange rate
U.S. dollar	19.4	-0.2	0.04
Euro	25.0	0.7	-0.16
British pound	36.2	0.1	-0.02
Japanese yen	20.1	1.4	-0.28
Canadian dollar	33.5	0.8	-0.28
Chinese yuan	17.5	1.2	-0.20
Australian dollar	19.9	-0.8	0.16
Swiss franc	62.7	0.1	-0.03
Swedish krona	50.2	0.6	-0.31
Brazilian real	19.3	0.8	-0.16
Mexican peso	46.1	-2.9	1.31

Source: World Bank; data as of September 30, 2023. Trade-weighted exchange rates are J.P. Morgan Asset Management estimates.

Long-term forces

So how hard might it be to achieve those inflation targets?

- Income distribution** – A more unequal income distribution has tended to suppress inflation in recent decades as the richest households diverted income toward the purchase of assets and away from goods and services. Tight labor markets following the pandemic suggested a possible turning of this tide. However, in the U.S., a moderation in wage growth over the past 18 months, and a political debate once again focused on cultural rather than economic issues, suggest little progress will be made in reducing inequality in the years ahead. In contrast, tight labor markets in other developed economies may result in somewhat less inequality and thus somewhat more demand and inflation.
- Globalization/deglobalization** – As we concluded in a chapter on globalization in our 2023 edition,⁴ on balance we expect less build-out of globalization over the next 10 to 15 years, with some risk of partial deglobalization. In recent decades, globalization has generally been a disinflationary force, for several reasons: declining tariff

levels; the cost savings achieved by tapping cheaper labor markets around the world; and the indirect effect of global competition, which has forced domestic firms to be more efficient. The globalization tide has stalled since the global financial crisis, and if it reverses in the years ahead, it could intensify inflation pressures, especially for goods.

- Sustainability** – A growing global focus on sustainability could also add to inflation, at least in the short run. The cheapest methods of producing, distributing and consuming food, energy and other commodities are generally not friendly to the planet. To the extent that governments try to push against these practices, inflationary pressures could be higher. However, in the very long run, sustainability should have disinflationary effects, as it counteracts practices that are contributing to drought, soil erosion, deforestation and global warming, which all tend to raise prices.

⁴ David Kelly, Stephanie Aliaga, Kerry Craig, et al., "The future of globalization: Globalization will evolve – but not unravel," *2023 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2022.

- Fiscal policy** – While fiscal stimulus going forward will generally pale in comparison to the huge deficits of the pandemic years, some divergent trends are emerging. In the U.S., the deficit declined dramatically, from USD 2.4 trillion in fiscal 2021 to USD 1.4 trillion in fiscal 2022 –the biggest deficit decline as a percentage of GDP since the demobilization following World War II. The overall federal deficit is likely to rise relative to GDP in the years ahead, primarily due to higher interest costs. However, the primary deficit – that is, the deficit excluding interest payments – should be relatively steady despite the CHIPS Act, the Inflation Reduction Act, the Infrastructure Act and a probable partial extension of the 2017 tax cuts. It should be noted that it is primary deficits, rather than net interest costs, that are likely to have the most stimulative effect on the economy. Europe should see modest fiscal stimulus, partly to fund the green transition, as governments eschew the widely unpopular austerity policies of the last decade. Meanwhile, China is likely to focus on efforts to boost consumer spending as it tries to bolster economic growth without worsening overbuilding in the real estate sector.
- Online markets and information availability** – One of the most potent forces depressing inflation in recent decades has been the ability to buy an increasing variety of goods and services online. This lets buyers compare prices and switch easily between sellers. We see this phenomenon as one aspect of the technology adoption story, which might both boost real growth and restrain inflation.
- Inflation expectations** – At least in the early years of our 10- to 15-year horizon, elevated inflation expectations could add to actual inflation. As economists frequently note, expectations play an important role in setting prices. The high inflation seen around the world as the pandemic’s impact has eased is encouraging workers to demand higher wages and companies to raise their prices. This effect could fade out entirely in the aftermath of a recession. For now, it is pushing inflation higher. In the U.S., inflation expectations are likely to exert an upward influence on U.S. inflation over the next 10 to 15 years (**Exhibit 5**).
- Commodity prices** – At the start of our forecast period, global commodity prices have returned to relatively normal levels, having fallen following the surge triggered by Russia’s invasion of Ukraine in 2022. This is particularly the case when measured in currencies other than the U.S. dollar, as the trade-weighted dollar has fallen substantially over the past year. We expect real commodity prices to drift sideways over the forecast horizon, on average, having less impact on the inflation outlook than they did a year ago.
- Union membership** – Trade union membership has generally declined in recent decades, and despite some recent high profile strikes, we expect this trend to continue, providing some further downward impetus to inflation.

Inflation expectations and sustainability will likely propel U.S. inflation higher over the LTCMA forecast horizon

Exhibit 5: Influences on U.S. inflation

Economic forces	Impact on U.S. inflation	
	Last global expansion (2008–19)	Next 10–15 years
Income distribution	-	0
Globalization/deglobalization	-	0
Sustainability	0	+
Fiscal policy	-	0
Online markets and information availability	-	-
Inflation expectations	-	+
Commodity prices	-	0
Union membership	-	-

Source: J.P. Morgan Asset Management; data and forecasts as of September 2023.

Exhibit 5 describes eight broad economic forces that could impact the ease with which central banks could achieve their forecasts, the direction by which these forces operate and any change in our views of these forces since last year.

It is nearly impossible to estimate precisely most of these forces’ impacts on inflation over the next 10 to 15 years. However, on balance, we believe that for most economies they will tend to cause inflation to slightly overshoot central bank targets.

For a very rough estimate of the inflation impact of changing exchange rates, we multiply each economy's import share of GDP in 2022 by the expected annual change in its currency. By this measure, a rising euro over the forecast period will reduce eurozone inflation, while a falling dollar will add something to U.S. inflation. Because the U.S. dollar has fallen significantly over the past year, the expected further decline in the dollar and corresponding rise in most other currencies over the next 10 to 15 years is somewhat milder than we expected a year ago. Still, on average, our assumptions are for evolving exchange rates to add to U.S. inflation and subtract from inflation in most other economies.

Transitional effects

Finally, there is the issue of our starting point. After a major bout of inflation from 2021 to 2023, we expect inflation to stay generally above its long-run expected trend rate in our forecast's first year (ending September 2024).

However, this gap should be far less than the gap between actual and long-run trend inflation was in September 2023 (**Exhibit 6**). Moreover, as an approximation, we assume that the remaining gap will close in the second year of our forecast. Consequently, we only have to assess the impact of a one-year inflation overshoot on our 10- to 15-year forecasts.

Inflation transition effects are much smaller than a year ago

Exhibit 6: Impact of transition on expected inflation over 12.5 years

Central bank	Central bank CPI target*	Expected CPI long-run trend	Expected year-over-year CPI inflation in Sept. 2023	Expected year-over-year CPI inflation in Sept. 2024	Gap	Months of transition**	Transition impact over 12.5 years	Expected actual CPI inflation over 12.5 years
U.S. (Fed)	2.3%	2.5%	3.6%	2.1%	-0.4%	12	0.0%	2.5%
Eurozone (ECB)	2.0%	2.2%	4.6%	2.5%	0.3%	12	0.0%	2.2%
Japan (BoJ)	2.2%	1.3%	3.4%	2.9%	1.6%	12	0.1%	1.4%
UK (BoE)	2.0%	2.4%	6.4%	2.2%	-0.2%	12	0.0%	2.4%
Australia (RBA)	2.5%	2.3%	5.2%	3.5%	1.2%	12	0.1%	2.4%
Canada (BoC)	2.0%	2.2%	3.6%	2.1%	-0.1%	12	0.0%	2.2%
Sweden (SCB)	2.0%	2.3%	7.6%	3.5%	1.2%	12	0.1%	2.4%
Switzerland (SNB)	1.9%	1.4%	1.6%	1.5%	0.1%	12	0.0%	1.4%
China (PBoC)	3.0%	2.2%	0.1%	2.7%	0.5%	12	0.0%	2.2%
India (RBI)	4.0%	4.4%	5.7%	5.3%	0.9%	12	0.1%	4.5%
Brazil (BoB)	3.5%	4.6%	4.2%	4.0%	-0.6%	12	0.0%	4.6%
Korea (BoK)	2.0%	2.0%	3.0%	1.9%	-0.1%	12	0.0%	2.0%
Mexico (Banxico)	3.0%	3.3%	4.8%	3.9%	0.6%	12	0.0%	3.3%
Taiwan (CBC)	3.1%	1.3%	2.5%	1.5%	0.2%	12	0.0%	1.3%
South Africa (SARB)	4.5%	5.5%	5.2%	5.0%	-0.5%	12	0.0%	5.5%
Turkey (CBRT)	5.0%	18.0%	60.0%	43.0%	25.0%	12	2.0%	20.0%

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023.

* All central bank targets refer to headline CPI except for: the Fed targets headline PCE, the ECB targets the Harmonised Index of Consumer Prices (HICP), the BoJ targets core CPI excluding food, and the SCB targets CPI with a fixed interest rate (CPIF).

** We assume that all inflation rates hit their long-term trend in the second year of the forecast and then average that trend for the rest of the forecast. The impact of a transition year boosts actual inflation by 1/12.5 times the first-year overshoot/(undershoot)

Climate: What might the transition to a low carbon economy mean for LTCMAs?

While the levels of carbon in the atmosphere have been growing since the industrial revolution, the rise in atmospheric CO₂ has accelerated in recent decades – by 29% from the 1970s to the decade ended in 2022 (**Exhibit A**). Carbon emissions have contributed to a hotter planet, with average global surface temperatures climbing by 0.87° C over the same period. The process is clearly accelerating, threatening the world with rising sea levels and more extreme weather events, among other effects.

To combat the threat, more than 70 economies have set a target of net-zero greenhouse gas emissions by 2050. Achieving this will require huge investments in clean energy technology and infrastructure, and governments have responded with substantial policy packages with the potential to impact economic growth and inflation over our forecast horizon:

GDP: In theory, a carbon budget introduces an additional constraint to the economic growth optimization problem, reducing potential GDP unless growth is decoupled from emissions.* In practice, expansionary fiscal packages, such as the 2022 Inflation Reduction Act, should boost aggregate demand and output in the short term if economies are

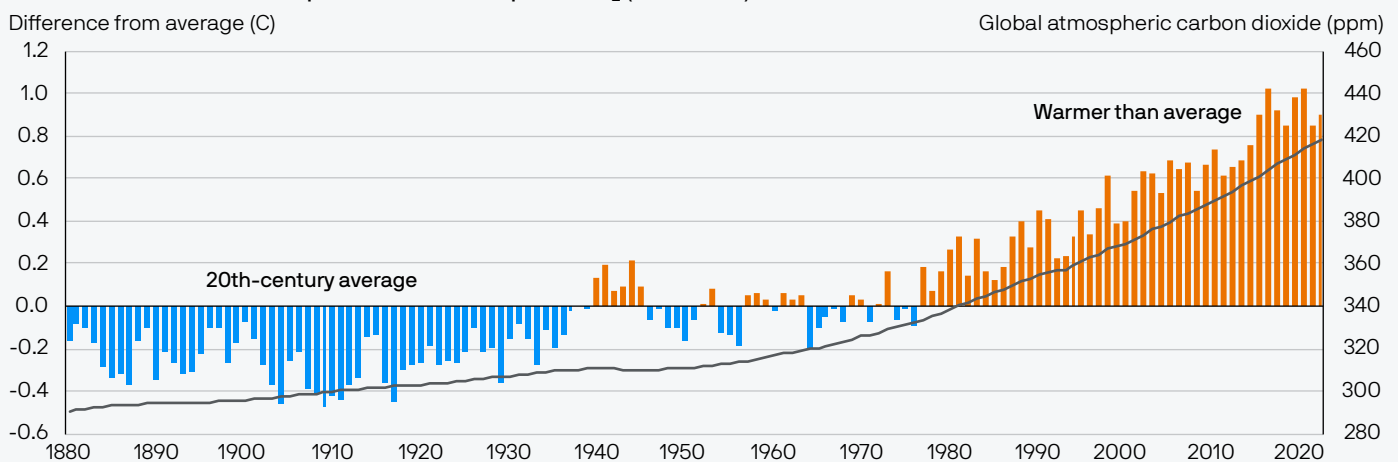
operating below full capacity. Some experts estimate that “green” government spending has multiplier effects twice as large as those of “brown” spending.** On the supply side, total labor is unlikely to change in response to net-zero policies. Instead, workers will likely be reallocated from brown to green activities. Therefore, GDP growth via labor force expansion would be limited.

Greater investment in green technologies should lead to a faster-rising capital stock, boosting labor productivity. Green technologies could also help reduce productivity losses linked to pollution, which a 2016 study estimated could reach USD 2 trillion annually by 2030.† Historically, concerted government-led research and development programs have catalyzed radical innovation (radar, computers and penicillin all emerged from World War II).

Such an outward shift of the global technology frontier would boost potential TFP. Of course, to achieve this, large economies must follow through on their net-zero pledges. While Europe’s commitment is legally binding, the U.S. and China – the world’s largest emitters – have not followed suit.

Carbon emissions have contributed to a hotter planet – a process that is accelerating

Exhibit A: Global surface temperature and atmospheric CO₂ (1850–2022)



Source: National Oceanic and Atmospheric Administration; data as of 2022.

* Organization for Economic Cooperation and Development, May 2022.

** Nicoletta Batini, Mario di Serio, Matteo Fragetta, et al., “Building Back Better: How Big Are Green Spending Multipliers?” IMF Working Papers, International Monetary Fund, March 19, 2021.

† Tord Kjellstrom, David Briggs, Chris Freyberg, et al., “Heat, Human Performance, and Occupational Health: A Key Issue for the Assessment of Global Climate Change Impacts,” *Annual Review of Public Health*, 2016.

Inflation: The net-zero transition should be achieved primarily through a relative price adjustment between green and brown energy.^{††} Several transitory effects could prove inflationary. These include: divestment from fossil fuels, permitting restrictions on the expansion of renewable energy grids, and a shortfall in the supply of necessary metals for the energy transition.

However, a gradual transition to green energy could keep aggregate changes in price levels small, meaning the transition's price adjustment need not

be inflationary.[‡] Ultimately, the impact on aggregate inflation will be determined by central banks' tolerance, which we predict will rise modestly.

In sum, the low carbon transition will likely have a small impact on macroeconomic variables over our forecast horizon. However, in the decades that follow, the impacts of climate change and attempts to slow it will increasingly matter for economic growth and inflation. They will also immeasurably impact the quality of life for future generations.

Artificial Intelligence: What is generative AI's productivity potential?

Artificial intelligence has made rapid progress in recent years and can now produce human-like output and match or beat a range of human benchmarks (**Exhibit B**). Excitement has recently focused on generative AI technologies, including ChatGPT and Stable Diffusion.

We believe that generative AI may follow the steam engine, electricity and computers in transforming the production of goods and services, and in boosting output and human welfare. This promise owes to its pervasiveness (generative AI can be integrated into different contexts to supplement or replace human activities); its capacity for exponential improvement (AI computing workload has been doubling every three to four months since 2012, and this will likely continue); and its propensity to spawn complementary technologies. Companies across industries have already rushed to introduce new machines and work practices leveraging AI's productivity benefits.

Yet hurdles lie ahead. AI's ability to raise productivity growth faces two categories of challenges:

Some notable technological advances (such as smartphones and social media) have not enhanced measured productivity significantly, despite their social impact, because their considerable value to consumers has had little quantifiable impact on GDP.^{‡‡} Moreover, some newer products and services are often not appropriately accounted for in national economic statistics. Yet since generative AI has the potential to automate and accelerate existing services, quantification and accounting may be less of a problem.

Transformative industrial and post-industrial breakthrough technologies often peak in economic impact only after 20 to 30 years, once businesses have built complementary innovations and capital stock (personal computers' impact took more than a decade to show up). But tech adoption rates have been accelerating, and because AI is so accessible, requiring minimal capital investment from end users, it could take hold faster. And unlike autonomous vehicle development,[°] where delivering a minimum viable product has taken longer than many anticipated, we think generative AI is already economically useful, which will likely make further progress more straightforward.

^{††} Jennifer Wu, Caspar Siegert, Nicolas Aguirre, et al., "Weighing the investment implications of climate change policy," *2021 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2020.

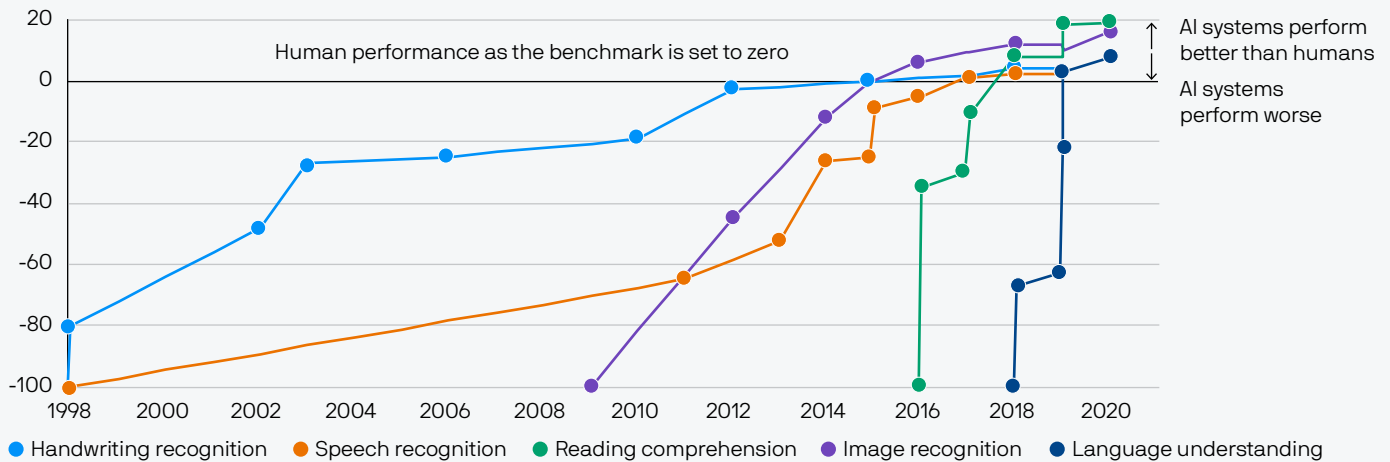
[‡] Indeed, should carbon pricing instruments – which adjust *relative* prices – come to play an important role in the transition, there is little empirical evidence that they cause price-level rises to be sustained over time.

^{‡‡} As Robert Solow famously quipped in 1987, "You can see the computer age everywhere but in the productivity statistics." Smartphones and social media, by distracting and delivering information overload, may even detract from worker productivity.

[°] For more on autonomous cars, see John Bilton, Shrenick Shah, Michael Albrecht et al., "Technology, Productivity and the Labor Force: The impact of technology on long-term potential economic growth," *2018 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2017.

AI's ability to recognize speech, writing and images has improved dramatically

Exhibit B: Test score performance, AI vs. humans



Source: Douwe Kiela, Max Bartolo, Yixin Nie, et al., "Dynabench: Rethinking Benchmarking in NLP," *Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*, Association for Computational Linguistics, June 2021.

Generative AI has impacts beyond productivity

AI could, of course, be highly disruptive for labor. As even higher skilled work becomes increasingly automatable, experts' skills may be devalued. Labor demand will be reshaped toward labor's comparative advantage relative to artificial intelligence, and if this shift occurs rapidly, it could cause unemployment in the near term but not, in our view, over the LTCMA horizon. Indeed, the long history of innovation has coincided with increased employment, as new job creation has employed most displaced workers. Moreover, AI could alleviate two key challenges facing most DM economies: aging demographics and skills shortages.

Generative AI may also worsen inequality if a greater income share accrues to the owners of AI capital. Labor competing with cheaper AI could also exert downward pressure on wages. Partially offsetting this effect may be AI's ability to narrow the skills gap between novice and higher skilled workers, as some studies have found, as technology lends expertise to those lacking lived experience.[∞] Ultimately, worsening income inequality, if it occurs, could reduce aggregate demand.

Generative AI is also likely to place downward pressure on inflation, since automation means producing the same level of outputs with fewer inputs. Higher productivity that fuels aggregate demand may provide a countervailing force to prices, but economic history suggests that massive technological transformation tends to be a deflationary rather than inflationary force.

Generative AI has triggered strong sentiments. The excitement about its potential to advance living standards, and about the investment opportunities, is very real. However, the fear is real as well – of potential mass joblessness and the potential for manipulation and misuse should this technology fall into the wrong hands. On balance, we believe recent advances point to a new frontier for productivity, though proper regulation and oversight will be crucial to realize AI's full potential in a safe manner.

[∞] Customer service workers' use of ChatGPT was associated with a 14% average increase in productivity: Erik Brynjolfsson, Danielle Li and Lindsay R. Raymond, "Generative AI at Work," Working Paper No. 31161, National Bureau of Economic Research, April 2023. Writers using ChatGPT were 37% faster without sacrificing quality: Shakked Noy and Whitney Zhang, "Experimental evidence on the productivity effects of generative artificial intelligence," *Science*, July 13, 2023.



The background consists of several overlapping, curved, semi-transparent blue shapes in various shades of blue, creating a dynamic, layered effect. The shapes are primarily circular or semi-circular, with some straight edges, and they overlap in a way that creates a sense of depth and movement. The colors range from a light, pale blue to a deep, rich blue.

I Thematic articles



The state's role in the economy

How investors can assess the rise of industrial policy

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In brief

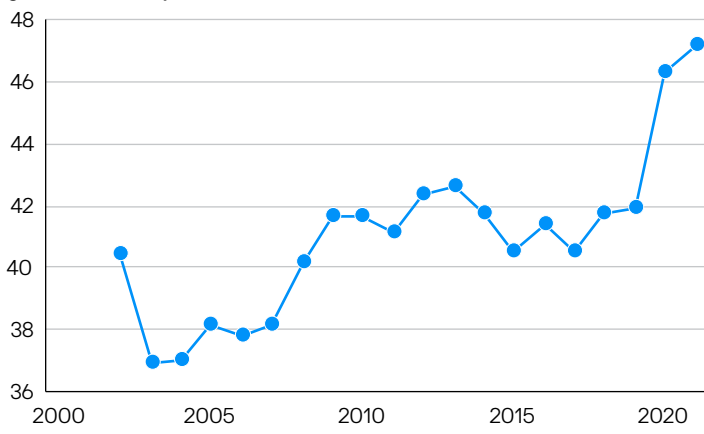
- Industrial policy, and state intervention more broadly, are on the rise. They will likely deliver short-term and long-term macro and market impacts over the forecast horizon of our Long-Term Capital Market Assumptions.
- State intervention has accelerated in part because many of today's challenges are difficult for uncoordinated private markets to solve. These include long-standing environmental strains, growing social tensions and greater focus on military and economic national security.
- Drawing on past and present examples, we crafted a framework for evaluating the effectiveness of state intervention, asking three key questions: Is the policy well designed to address the defined problem? Can the policy lead to a sustainable end state? Are the necessary tools and/or political will in place to make the transition to that end state?
- Many of the policies introduced globally are well designed to meet their respective problems. Yet the risk around implementation is substantial. We believe growing state intervention will present an upside risk to inflation and an upside risk to economic output in the short term; increase economic uncertainty; and lead to a modestly higher cost of capital.
- Across companies, investors may find the biggest beneficiaries of the rise in state intervention in the "real economy" sectors – notably, industrials, utilities and energy. Subsectors within technology also stand to benefit. Private capital will have a substantial role to play. Among alternative assets, real assets look set to be the primary beneficiary, especially infrastructure (regulated distribution and contracted power companies), real estate (energy-efficient real estate) and private debt and equity.

For the better part of 30 years, from the Ronald Reagan-Margaret Thatcher era of the 1980s to the global financial crisis (GFC) of 2008, developed market governments took a largely hands-off approach to the economy. Direct intervention was more the exception than the rule. Then came the GFC and, later, the shock of the pandemic, forcing governments to reimagine – and in some cases dramatically redefine – their role in the economy.

Today, “industrial policy” (defined as state-directed support for particular industries) and “state intervention” (defined more broadly to include social policy) are very much on the rise (**Exhibit 1**). In a marked departure from recent trends, this change includes the U.S. As a result, we expect increased use of industrial policy by other governments, especially in the West. In some respects, this is a controversial change, and readers will approach the subject from different political and economic perspectives. But certain urgent challenges – notably, climate change, social strains and geopolitical tensions – likely require public sector as well as private sector commitment and capital.

State intervention is on the rise

Exhibit 1: Global subsidies and other transfers as % of government expense



Source: World Bank, Haver Analytics; data as of 2021.

In this paper, we explore the reemergence of state intervention and industrial policy, why it is on the rise and where it might be headed. Drawing on past and present examples, we present a framework for evaluating those policies’ effectiveness, asking three key questions:

- Is the policy well designed to address the defined problem?
- Can the policy lead to a sustainable end state?
- Are the necessary tools and/or political will in place to make the transition to that end state?

The targeted problems may not be purely economic and may include lowering carbon emissions to net zero, reducing social tensions and reshoring supply chains to boost national security.

Whatever the goals, the rise of state intervention will likely deliver short-term and long-term macro and market impacts over the forecast horizon of our Long-Term Capital Market Assumptions (LTCMAs). We believe growing state intervention will present an upside risk to inflation, increase economic uncertainty and lead to a higher cost of capital.

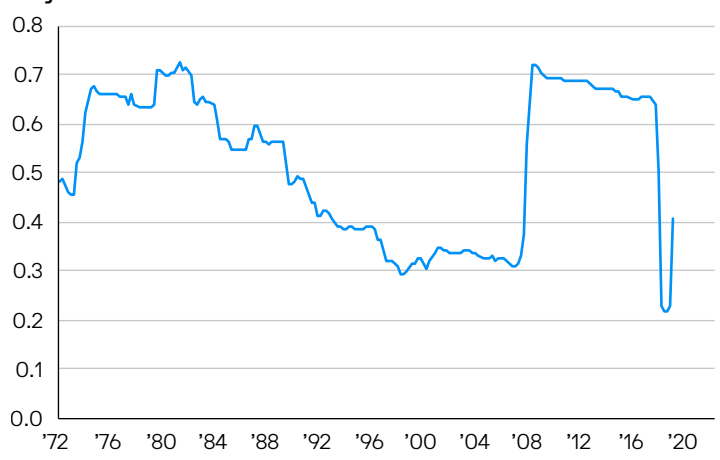
Along the way, new winners and losers will emerge across sectors and asset classes. The biggest beneficiaries of the rise in state intervention will likely be found in the “real economy” (although subsectors within technology also stand to benefit). Some companies will flourish while others may struggle to survive.

How we got here

From 1980 through 2008, the global economy experienced a period of historically low volatility (**Exhibit 2**). Sound policy – such as widespread adoption of central bank inflation targets and the removal of currency pegs by many countries that had them – played a part. But other forces were equally or even more influential: the end of the Cold War, China’s entry into the World Trade Organization and the increasing influence of technology.

Prior to the global pandemic, economic volatility trended downward

Exhibit 2: Standard deviation of OECD GDP, quarter-over-quarter, 10-year



Source: OECD; data as of 1Q 2020.

Classical free-enterprise policies, which feature diffuse decision-making across many individual actors, were well suited to this period of stability. Private actors, given a profit incentive, are often best positioned to identify and solve defined economic problems. Within an iterative problem-solving process, they benefit from a light government touch. In this era, industrial policy declined.

Why state intervention is on the rise

This trend is now reversing. That is largely because many of today's challenges are difficult for uncoordinated private markets to solve. Some challenges are caused by failures of the market itself. Others are new, and some are long-standing challenges that have become more pressing. We highlight three:

- Long-standing environmental strains, which have become increasingly urgent
- Growing social tensions, partly attributable to increased inequality, which is inevitable in a laissez-faire system
- Greater focus on military and economic national security, driven by rising geopolitical tensions and the pandemic's spotlight on supply chain fragility

Undirected private actors following their own self-interest cannot successfully address large-scale, borderless problems that affect entire populations. Historically, as such problems have become more acute, economies have tended to become less liberalized.

To reframe the issue in the language of externalities (an economic activity's side effects that are not reflected in the activity's cost): Markets fail when they either underproduce good externalities (e.g., public infrastructure) or overproduce bad externalities (e.g., pollution).

Environmental strains: Climate change and negative externalities

Today, many would regard climate change as the global economy's most important negative externality. Economic activities generate greenhouse gas emissions, but absent government intervention, polluters have little or no economic incentive to take responsibility for those emissions. In short, the market fails. The impact of this failure is widely spread spatially and temporally, affecting people living in different economies and across generations.

The growing economic losses from weather-related natural disasters over the past 50 years total USD 4.3 trillion (**Exhibit 3A**),¹ although this might be an underestimation.² Some portion of those were insured, but certainly not all: Over the past decade, the "protection gap," the gap between insured and uninsured losses globally, is estimated at 61% of total losses from weather-related natural disasters.³ In the UK, the gap is 25%; in the U.S. 43%; in Germany 58%; and in China 95%.⁴ This means that governments need to step in to financially support recovery efforts. Additionally, several central banks have been incorporating climate risk into their risk management assessments of financial institutions.

While not all natural disasters can be linked to climate change,⁵ attribution studies⁶ show that current levels of global warming have substantially increased the likelihood and intensity of many of these events, contributing to the overall average cost of natural disasters (**Exhibit 3B**). As global warming worsens, the likelihood and severity of these events are expected to increase significantly.⁷

¹ "Economic costs of weather-related disasters soars but early warnings save lives," World Meteorological Organization, May 22, 2023. This cumulative figure does not take into account any subsequent rebuild or investment in structures that may occur after natural disasters and which can boost GDP in the subsequent period.

² Cumulative losses from anthropogenic extreme heat alone between 1993 and 2013 are estimated between USD 5 trillion and USD 29.3 trillion globally. Christopher W. Callahan and Justin S. Mankin, "Globally unequal effect of extreme heat on economic growth," *Science Advances*, Vol. 8, no. 43, 2022.

³ Chandan Banerjee, Lucia Bevere, Thierry Corti, et al., "Natural catastrophes and inflation in 2022: a perfect storm," Swiss Re Institute Sigma Research, March 2023.

⁴ "How big is the protection gap from natural catastrophes where you are?" Swiss Re, March 22, 2023. Data covers 2013–22.

⁵ Roger Pielke, "Economic 'normalisation' of disaster losses 1998–2020: a literature review and assessment," *Environmental Hazards* 20, no. 2 2021.

⁶ For example, attribution studies conducted by the World Weather Attribution initiative.

⁷ The actual impacts of meteorological natural disasters, such as life loss or damage to infrastructure, depend on several factors. Although these events have caused 2 million deaths since the 1970s, the mortality rates have decreased in recent decades, in part thanks to early warning signals. Developing countries continue to be most at risk, accounting for over 90% of deaths. At the same time, a higher concentration of infrastructure in developed countries is a likely driver of cost there: "Economic costs of weather-related disasters soar, but early warnings save lives," World Meteorological Organization, May 22, 2023.

While intensifying climate change will likely have major economic consequences, future economic impact projections are subject to significant uncertainties, driven by data and modeling complexities, including the type of climate risks modeled (chronic vs. acute).

Researchers have made vastly different estimates of what the potential economic impact of global warming of 3°C or higher would be if left unaddressed. The estimates range from over 70% of GDP loss by 2100 to no GDP loss at all.⁸

The economic toll of meteorological natural disasters has been steadily growing

Exhibit 3A: Cost of meteorological natural disasters as a % of GDP

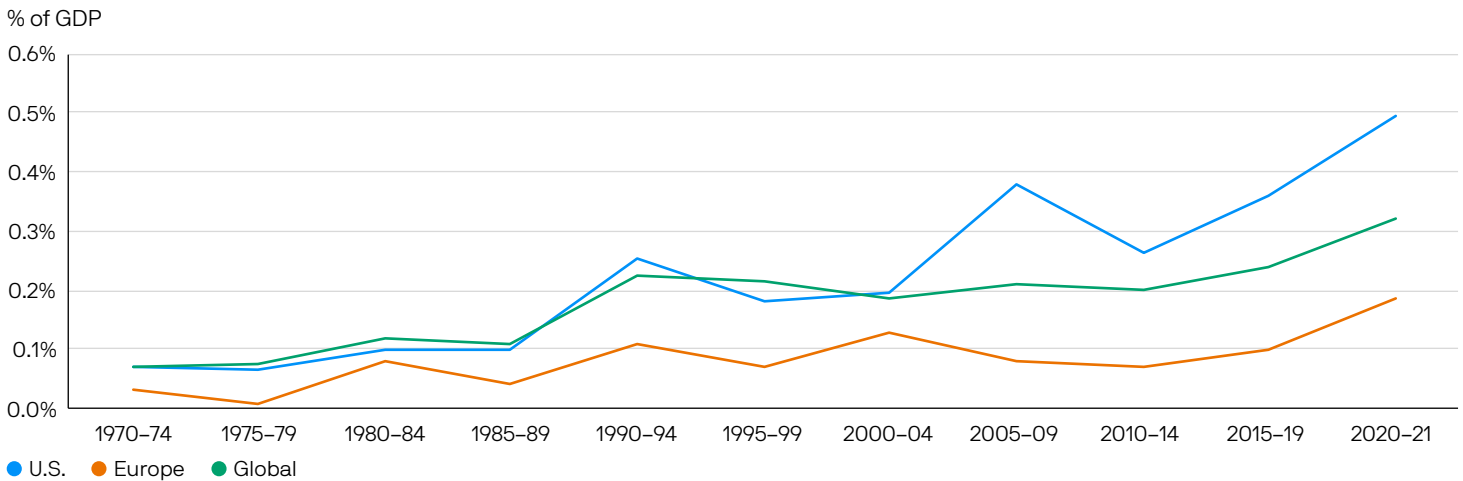
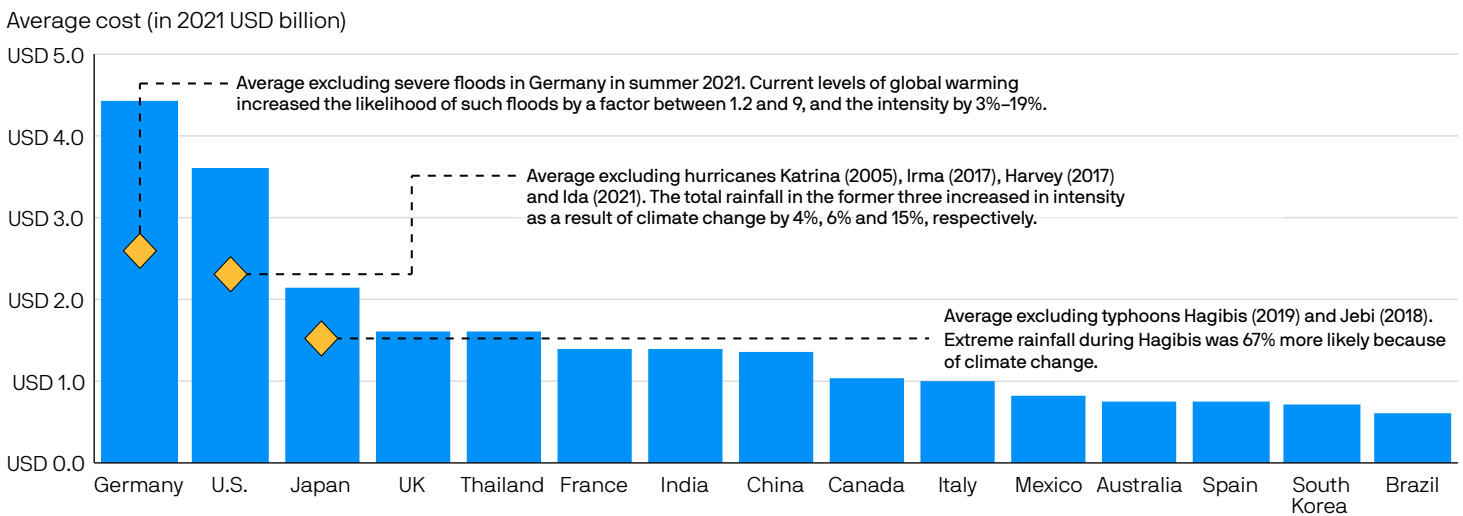


Exhibit 3B: Average cost of meteorological natural disasters by country since 2000



Source: J.P. Morgan Asset Management. Data from the Centre for Research on the Epidemiology of Disasters (CRED), Catholic University of Louvain, World Bank, World Weather Attribution.

Note: A, B: The natural disaster data is sourced from EM-DAT dataset from CRED, Catholic University of Louvain. Dataset includes major natural disasters, if they meet one of the following criteria: 10 or more people died in the event, 100 or more people were impacted, a state of emergency was declared, or a call for international assistance was made. We selected the natural disasters that are weather-related, such as extreme temperatures, floods, cyclones, storms and wildfires. In cases where the economic cost of a natural disaster is unknown, we used the number of people affected and the Human Development Index (HDI) of the country of occurrence to derive an estimate of disaster cost, using a regression technique. However, large disasters are already well covered in the data set, and estimates make up only a relatively small portion (< 20%) of the total economic cost. There is a possible reporting bias across time and geographies. In emerging markets, some disasters might go unreported due to the lack of coverage from international sources. Besides the increase in their frequency, the increase in the count of disasters over time might also be partly attributable to improved reporting and data collection. The GDP data are sourced from the World Bank open data repository. We adjust it for inflation in 2021 USD terms, using deflators provided by EM-DAT. In A, Europe includes France, UK, Germany, Italy, Spain, Finland, Sweden, Norway, Netherlands, Belgium, Portugal, Denmark, Austria and Ireland.

⁸ Sandy Trust, Sanjay Joshi, Tim Lenton, et al., "The Emperor's New Climate Scenarios: Limitations and assumptions of commonly used climate-change scenarios in financial services," Institute and Faculty of Actuaries and University of Exeter, July 2023.

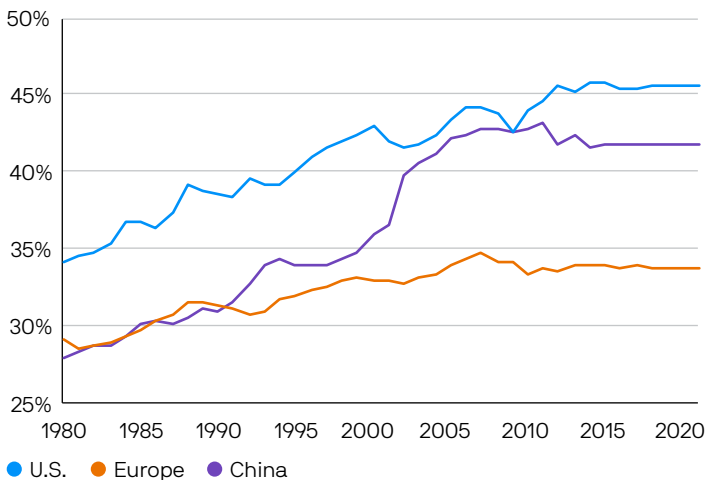
Social tensions: Rising inequality, aging populations

Social tensions may also create the need for greater state intervention.

While free markets can lead to an efficient allocation of resources, they do not ensure that the benefits of those resources are distributed evenly (**Exhibit 4**). State intervention may be needed to address economic inequality, and particularly at times of transition – like today, as industrial policy is phased in – to mitigate the pain that change can cause.

Inequality has risen notably since the 1980s

Exhibit 4: Top 10% share of income



Source: World Inequality Report 2022. Europe uses a simple average of France, Germany, the UK, Italy, Spain and Sweden.

Economic inequality has been increasing in developed economies for many years, and since the GFC it has become a more pressing issue for policymakers. Many factors have driven its rise, including post-GFC quantitative easing, fiscal austerity and the sluggishness of pre-pandemic wage growth.⁹

The pandemic highlighted underlying inequality and the absence or fragility of social safety nets. In response, governments around the world engaged in direct income transfers and expanded social safety nets, including access to health care. While most of these pandemic-related policies have ended, there is growing recognition of the need to address income inequality.

That need may grow if the rise of artificial intelligence (AI) exacerbates inequality through an uneven distribution of income among workers with different skill sets and widens the gap between capital owners and labor to the point that political unease could lead to suboptimal economic policymaking.

National security focus: Reshoring key supply chains

The third challenge we examine, countries' greater focus on national security, is a multifaceted issue for governments.

For decades, international trade seemed to pose no threat to national security and, indeed, greater economic connections may have enhanced national security by increasing the cost of conflict with trading partners. During this period, countries allowed free markets to organize supply chains around the lowest cost options.

However, globalization (defined as the openness of markets and economies) has been on the wane since the financial crisis.

Crucially, the pandemic and Russia's invasion of Ukraine have more recently sparked a dramatic change in how countries view the relationship between national security and trade. Nations are now racing to secure their own production of crucial inputs: vaccines, critical minerals needed for the energy transition and semiconductors that fuel the modern military and economy.

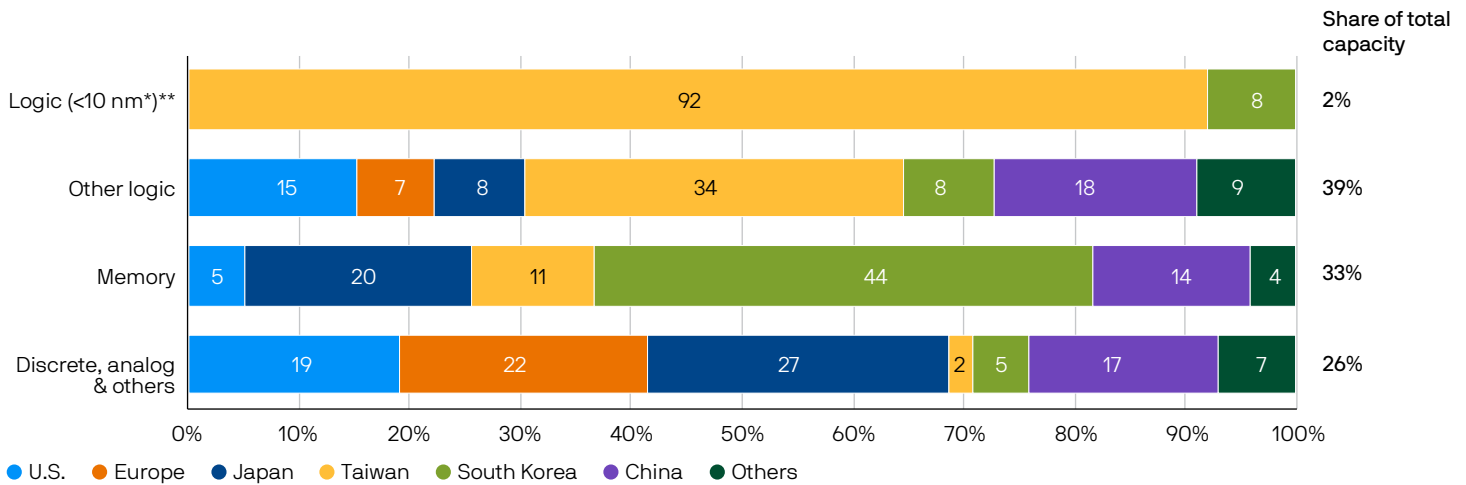
Pandemic-induced supply chain bottlenecks and growing geopolitical friction have highlighted how much the global economy has become reliant on a handful of producers. Semiconductor manufacturing is at the center of this discussion, as computing power (and the semiconductors that enable it) fuel the modern economy. Linking semiconductors to national security is not new, but the analysis now also includes their production.

Whereas in the past companies had optimized semiconductor production mostly on their own, governments are now providing incentives to boost domestic chip production to ensure their supply. As a result, countries are hoping to gain market share from other countries (**Exhibit 5**).

⁹ 2020 marked the steepest increase in global billionaires' share of wealth on record. Source: World Inequality Report 2022.

Production of semiconductors is concentrated in certain producers

Exhibit 5: % share of global semiconductor wafer fabrication (fab) capacity, by type and location, 2019



Source: Boston Consulting Group, SEMI fab database.

* Nanometer.

** Newest generations of computing/processing wafers (since 2016), which are smaller, faster and more power-efficient.

Does not add up to 100 due to rounding.

A framework for assessing the effectiveness of state intervention

The depth and complexity of these challenges suggest that the rise of state intervention and industrial policy is all but inevitable. Its trajectory may not be linear – we may well see a series of starts and stops – but we believe that we have entered a new era.

How, then, can investors evaluate the potential economic impacts of state intervention? Three questions can provide a useful framework:

Is the policy well designed to address the defined problem?

For an answer, first identify the problem targeted by state intervention. The goal may or may not be economic (or it may be only partly economic). For example, state intervention may aim to lower carbon emissions, improve social cohesion or bolster supply chain resiliency. Next, consider the government’s strategy and approach. Policymakers may opt to use a heavy hand (capital controls, tariffs, industry regulations) or they may choose lighter-touch options (incentive programs, subsidies, direct spending).

Investors should consider if the proposed policy mechanisms are well matched to the problem at hand. In the U.S., for example, the Defense Advanced Research Projects Agency (DARPA) is widely seen as a successful use of incentive programs to encourage the development of technologies for national security. In contrast, partly due to political constraints, the 2009 U.S. stimulus package, the American Recovery and Reinvestment Act, may have been overreliant on tax incentives and too modestly sized to meet the scale of the problem it targeted – the worst downturn since the Great Depression.

Can the policy lead to a sustainable end state?

A foundational idea in industrial policy is that an economy’s growth trajectory is path dependent, meaning that the end state is affected by decisions made earlier in history. Investors should distinguish policies that lead to new and sustainable social and economic configurations from those that likely would fail to survive on their own. For example, in the U.S., many policies implemented under the New Deal of the 1930s remain in place today.¹⁰ Some signature elements (Social Security, Medicare) form the core of the country’s social safety net. Alternatively, many past policies (price controls, for example) had little chance of being sustained in the long run.¹¹

¹⁰ Examples: the Social Security Act of 1935 and the Fair Labor Standards Act of 1938.

¹¹ This is particularly evident in the case of many broken exchange rate pegs.

Are the necessary tools and/or political will in place to make the transition to the targeted end state?

Successful design and implementation are important, but then comes the hard part – living with the adjustment process. Changes in policy that alter the structure of an economy are often followed by periods where households and businesses rearrange their affairs to accommodate the changes. This may entail large moves in relative prices, changes in the industry mix of production and shifts in the allocation of national income and productive resources. Inevitably, the changes will help some and hurt others, creating difficult political challenges and risks.

An assessment of current policies and their macroeconomic implications

Climate change policies: No more business as usual

The number and stringency of climate policies have increased in recent decades, most often taking the form of economic and regulatory instruments. Renewable energy subsidies have lowered technology costs to an unprecedented degree and spurred growth in renewable energy generation, dramatically outstripping historical projections.¹² However, experts believe these efforts do not yet match the scale of the challenge: to reduce emissions to net zero by mid-21st century and keep global temperature to well below 2°C, thereby limiting the adverse effects of climate change on the economy and planet.¹³

Recent developments in the U.S., European Union (EU) and China signal more ambitious climate policy goals (**Sidebar, Exhibit A**), a necessity for climate change mitigation. Embedded in many of these policies is the related goal of improving national energy security.

How should the environmental effectiveness of climate policy measures be judged? They should be assessed on whether they help achieve the goals of the 2015 Paris Agreement – reducing the adverse impacts of climate change by limiting global warming to well below 2°C, and preferably to 1.5°C, compared with pre-industrial levels.

The planet has already warmed 1.14°C,¹⁴ and if emission levels continue on their current trajectory, under current policies, the median global temperature rise at the end of the century could reach 2.7°C.¹⁵ The world is plainly not on track to meet the objectives of the Paris Agreement.

However, if all the government pledges, net-zero targets and policy announcements made to date do materialize, global warming could be held to below 2°C.¹⁶ Arguably, timely implementation of more ambitious climate policies could make a real difference.

Potential economic impact

How can we think about the economic impact of these moves? Climate policies can affect GDP growth through several channels: by reducing the physical impact of climate change (as we have discussed) and through the economic impact of the policies themselves.

For governments that institute carbon pricing schemes – to date, 39 national and 33 subnational jurisdictions have done so¹⁷ – empirical evidence is mixed, often pointing to no significant impact on GDP.¹⁸ Theoretical analyses conclude that climate change policies involving sudden hikes in carbon prices lead to a temporary rise in inflation and a decrease in GDP.¹⁹ Policies that are announced in advance and phased in gradually are thought to be less costly.

¹² In the EU alone, renewable energy subsidies totaled over EUR 500 billion between 2015 and 2021. Source: “Study on energy subsidies and other government interventions in the European Union,” Enerdata and Trinomics, European Commission, 2022.

¹³ Less than a quarter of global emissions are currently covered by carbon taxes or emissions trading systems (ETS). Carbon permits reached a record high under the EU ETS in February 2023 (EUR 100 per tCO₂), driven by cold weather and low wind power output. However, historically carbon prices have been low, falling dramatically short of the levels required (with a mid-range estimate of EUR 120 per tCO₂e) to drive the decarbonization of the global economy by mid-century. Source: Carbon Pricing Dashboard, World Bank, 2023; “Pricing Greenhouse Gas Emissions: Turning Climate Targets into Climate Action,” OECD Series on Carbon Pricing and Energy Taxation, 2022.

¹⁴ Piers Maxwell Forster, Christopher J. Smith, Tristram Walsh, et al., “Indicators of Global Climate Change 2022: Annual update of large-scale indicators of the state of the climate system and the human influence,” *Earth System Science Data* 15, no. 6, May, June 8, 2023.

¹⁵ Climate Action Tracker, the CAT Thermometer, November 2022.

¹⁶ Climate Action Tracker, the CAT Thermometer, November 2022; “World Energy Outlook 2022,” International Energy Agency, October 2022.

¹⁷ World Bank, Carbon Pricing Dashboard 2023.

¹⁸ Based on the literature review by Diego R. Känzig, “The Unequal Economic Consequences of Carbon Pricing,” National Bureau of Economic Research Working Paper No. 31221, May 2023; “Climate: What might the transition to a low carbon economy mean for LTCMAs?, Macroeconomic Assumptions,” 2024 Long-Term Capital Market Assumptions.

¹⁹ E.g., “Carbon tax could temporarily raise inflation and lower GDP in most OECD economies, NIESR study shows,” National Institute of Economic and Social Research, November 5, 2021.

Under the right circumstances, climate policies have the potential to drive economic growth. For example, “green” stimulus packages during the pandemic aimed to deliver large economic multipliers and shift the economy away from fossil fuels.²⁰ The actual impact was less impressive than it might have been. While empirical evidence suggests green investments could generate such multipliers,²¹ G20 governments opted to go small: They spent only 6% of USD 14 trillion recovery packages on emission reduction measures.²²

Innovation in green technologies can also boost total factor productivity through faster-growing capital stock and adaptation to physical impacts of climate change. However, this is subject to policies successfully driving innovation and countries following through with their decarbonization pledges.²³

Finally, timely climate policies can limit future economic volatility. Reducing emissions and addressing climate change through gradually phasing in climate policies over the medium term should eliminate (or diminish) the need for a more stringent and potentially disruptive climate action in the long term.

Social policies: Labor rights and inequality

Income inequality varies across the global economy, leading to greater or lesser degrees of social tension. Governments’ social policies similarly run the gamut, with greater or lesser effectiveness. We have more confidence in these policies’ durability in Europe and China relative to the U.S. In the current environment, at least, there seems to be little political will in the U.S. to enact the kind of significant, wide-reaching social policies that defined the New Deal.

As we consider the range of social policies adopted, we find that many governments seem to increasingly focus on protecting labor rights, including strengthening minimum wage laws and improving worker education and training (**Sidebar, Exhibit B**).

For example, the key objectives of the European Pillar of Social Rights, a set of guiding EU policy documents, address employment, training and poverty reduction. China’s Common Prosperity initiative, guiding policy since 2021, aims through regional pilot programs to boost labor’s income share of GDP and to narrow the gap between urban and rural residents’ income. In the U.S., social programs to combat the pandemic, such as the enhanced child tax credit, have also been used to tackle inequality, although these programs tend to wax and wane depending on the configuration of political power in Washington.²⁴

Potential economic impact

Lower levels of income inequality can potentially spur economic growth and also higher inflation. Policies that give labor greater protection and skills training can raise consumption and boost productivity, and thus potentially increase GDP growth rates.²⁵ More equal income distribution gives households at the lower end of the income spectrum more disposable income to spend. Typically, that increases overall consumption (lower income households have a higher propensity to spend their disposable income), in turn nudging inflation higher.

Reducing inequality can also help to promote social stability, which can create a more favorable environment for investment and economic growth. However, the aggregate economic impact may vary depending on the potential disincentives and restrictions embedded in the social policies.

Often, policymakers must weigh these competing claims for greater growth vs. diminished inequality. In China, for example, we believe the government’s current goal of “common prosperity” essentially aims to effect a rebalancing between equality on the one hand and efficiency and growth on the other. Instead of a sole emphasis on growth, in place since the 1980s, the government now incorporates building greater equality after decades of whirlwind economic progress. But the government certainly does not prioritize equality at the expense of growth.

²⁰ Cameron Hepburn, Brian O’Callaghan, Nicholas Stern, et al., “Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?” *Oxford Review of Economic Policy* 36, Supplement_1, May 2020.

²¹ Nicoletta Batini, Mario Di Serio, Matteo Fraggetta, et al., “Building back better: How big are green spending multipliers?” *Ecological Economics* 193, 2022.

²² Jonas Nahm, Scot M. Miller and Johannes Urpelainen, “G20’s US\$14-trillion economic stimulus reneges on emissions pledges,” *Nature*, March 2, 2022.

²³ “Climate: What might the transition to a low carbon economy mean for LTCMAs?, Macroeconomic Assumptions,” *2024 Long-Term Capital Market Assumptions*.

²⁴ While the minimum wage has become a feature of the regulatory landscape post-New Deal, this has been the longest consecutive period of no increase to the federal minimum wage since the program’s creation.

²⁵ Daniel Aaronson, Sumit Agarwal and Eric French, “The Spending and Debt Response to Minimum Wage Hikes,” *American Economic Review* 102, no. 7 (December 2012): 3111–39; Ernest Dautović, Harald Hau and Yi Huang, “Consumption Response to Minimum Wages: Evidence from Chinese Households,” Working Paper Series 2333, European Central Bank, 2019.

National security policies: Focus on semiconductor manufacturing

For over 60 years, semiconductor supply chains have become increasingly interwoven and complex. In the process, the U.S. and Europe have lost significant market share in global chip manufacturing (from a combined 81% in 1990 to 21% today). South Korea, Taiwan and China gained market share, and Japan maintained its share.²⁶

In the current environment, securing semiconductor supply has become a national security issue. In countries across the global economy, policies aim to increase domestic chip manufacturing (**Sidebar, Exhibit C**).

As policymakers well know, semiconductor manufacturing is expensive.²⁷ Most policies provide government incentives that offset some capital expenditures and operating expenses. We note that new incentives recently announced in the U.S., Europe and Japan offer an uptick in government support but still lag incentives already granted to top producers in Asia.²⁸

Providing any manufacturing support at all is a marked departure for the U.S., which for decades targeted chip innovation rather than production. While these policies may increase the manufacturing share of U.S., European and Japanese companies, complete supply chain autonomy is not a feasible goal.

The types of semiconductors in policymakers' sights vary by economy. The U.S. government looks to reshore the production of logic leading-edge chips. That reflects the important role they play in the modern military and economy (precision weapons, artificial intelligence, cellphones) and that their production is concentrated in Taiwan. According to some analysts, Taiwan produces 92% of the most advanced logic chips.²⁹

However, that 92% share may be elevated, as Intel has upgraded its production to 7nm chips and below, leaving Taiwan's share closer to 75% (based on J.P. Morgan Asset Management U.S. Equity team analysis). This figure may decline: Taiwan Semiconductor has announced its intention to reduce its production in Taiwan from 90% to 80% in three to five years' time, with new fabs in the U.S., Japan and Germany.

Meanwhile, China focuses on discrete/analog trailing-edge chips, given their use in electric vehicles and solar energy – industries of strategic focus for Beijing. In addition, as the U.S. now restricts certain Chinese companies from accessing U.S.-sourced leading-edge chips, equipment and technology, Beijing looks to harness the power of older technology used in trailing-edge chips.

Potential economic impact

The current state of play in chip manufacturing is quite different from that of recent decades.

For many years, U.S. and European technology companies outsourced manufacturing to Asia, which allowed them to lower their costs and concentrate on chip innovation. The reshoring of chip manufacturing to the U.S. and Europe may thus lead to a higher marginal cost of production. That higher cost would reflect higher manufacturing wages and utility and construction costs, along with lower government subsidies and less cheap state/bank capital compared with those provided by Taiwan and China.

However, the global race for building domestic chip manufacturing capacity should eventually lead to excess capacity of chips, with the U.S. supplying leading-edge chips and China supplying trailing-edge chips. As a result, the steady decline in semiconductor manufacturing costs since 1990³⁰ may reassert itself (outside of cyclical ups and downs). The rapid pace of innovation may persist – all at low costs for end consumers.

²⁶ South Korea, Taiwan and China have increased their shares from 0% to 21%, 0% to 22% and 0% to 15%, respectively. Japan has maintained its share largely unchanged, from 19% to 15%. Source: VLSI Research Projection; SEMI second-quarter 2020 update; Boston Consulting Group analysis.

²⁷ The semiconductor industry is a very capital-intensive industry: It has an over 20% ratio of capital expenditures/revenues in 2019 (comparable to power and utilities). In addition, cash operating expenses (labor, utilities, materials, taxes) need to be added to the total cost of ownership. Source: Antonio Varas, Raj Varadarajan, Jimmy Goodrich, et al., "Government Incentives and US Competitiveness in Semiconductor Manufacturing," Boston Consulting Group and Semiconductor Industry Association, September 16, 2020.

²⁸ Depending on the economy, government incentives can offset between 15%–40% of total operating costs. The Asia ex-China average government incentive covers about 25% of overall cost (23%–30% in South Korea, Taiwan and Singapore), 30%–40% in China and 30% in Israel. Source: Antonio Varas, et al., "Government Incentives and US Competitiveness."

²⁹ Antonio Varas, Raj Varadarajan, Ramiro Palma, et al., "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," Boston Consulting Group and Semiconductor Industry Association, April 1, 2021.

³⁰ The Producer Price Index of semiconductor and other electronic component manufacturing has fallen 47% since 1990. Source: St. Louis Federal Reserve Bank database as of June 2023.

In the near term, policies aimed at domestic chip manufacturing are already driving higher economic growth through higher real investment in new manufacturing structures and equipment. Longer term, it remains to be seen whether there is a productivity boost, given the potential for misallocation of capital and as comparative advantages are unwound, leading to potentially less efficient outcomes.

We note another economic benefit of reshoring: More resilient supply chains may potentially lead to lower macroeconomic volatility, as stronger supply chains can mitigate the economic fallout from natural disasters or geopolitical disruptions.³¹

For China, if U.S. restrictions on leading-edge chips were to impact the country's broader technology industry, that could constrain productivity gains and thus pose a risk to future economic growth.

Macroeconomic implications of rising state intervention

We conclude that many of the industrial and social policies introduced globally have been designed thoughtfully and are well placed to address their respective problems. Yet we believe the risk around implementation is substantial, increasing the uncertainty around inflation and output. We think inflation risks are largely to the upside, while the risks around output appear tilted to the upside in the near term as investment accelerates, but are more balanced in the long run.

Overall, we expect that the new interventionist stance of state actors will likely apply modest upward pressure to the cost of capital for firms and governments, both in the short run through higher demand for capital and in the long run through higher risk premiums.

On a net basis, a tendency toward higher inflation

It's helpful to take a step back here and briefly consider the laissez-faire era that prevailed (more or less) from the 1980s until the financial crisis. During this period, costs steadily declined through compounding efficiencies in trade, logistics and production. This applied downward pressure to inflation, particularly in tradable goods, delivering a clear benefit to consumers.

Fast forward to the new era of state intervention. Many of the new industrial policies will lead to higher costs in certain sectors, producing shifts in relative prices. We expect downward pressure on tradable goods prices to continue. But this could occur alongside growing state intervention that, on a net basis, will tend to increase inflation, particularly over the LTCMA time horizon, in which the transition to an industry policy's end state may unfold.³²

In the long run, the aggregate rate of inflation is essentially a policy decision made by central banks. Over the next 10–15 years, central banks may take a more tolerant approach to inflation,³³ which could help to smooth the transition to a greener economy with a more equal distribution. Allowing a slightly higher path for inflation during the transition period would permit higher nominal growth and arguably prevent consumers from needing to abruptly shift their spending patterns as, for example, higher energy prices consume a higher proportion of household income.

Greater uncertainty in macroeconomic outcomes

Transitioning to green economic production, moving toward a more equal distribution of income and establishing domestic supply chains are paths that would not be taken by purely free markets. While state intervention looks to forge a new path, this could introduce new risks and greater uncertainty into the economic outlook.

³¹ Rhodium Group estimates about USD 1.6 trillion in lost annual revenue by semiconductor-related companies from a blockade of Taiwan. Additional economic impacts could add trillions more in impact. Source: Charlie Vest, Agatha Kratz and Reva Goujon, "The Global Economic Disruptions from a Taiwan Conflict," Rhodium Group, December 14, 2022.

³² See "Macroeconomic Assumptions," *2024 Long-Term Capital Market Assumptions*, for a broader discussion of different variables' impact on inflation over the next 10 to 15 years.

³³ In principle, it would be possible for central banks to take a harsh approach to achieving their inflation targets over short time horizons. But we think that major central banks may well tolerate modestly above-target inflation over short horizons, with the expectation that the inevitable cyclical downturns and their associated disinflation will allow central banks to hit their inflation targets, on average and over time. We do not expect that central banks will entertain changes to their inflation targets in the near term.

While free markets generally do well making changes in production processes – typically, the initial change occurs at a small enough scale to limit the damage to the broader economy – state intervention shifts that dynamic. When governments implement national or international programs to reorient the elements of a production process, any errors in design or implementation can have large-scale effects.

In addition, governments implementing favored policies may be less inclined to respond to feedback and thus fail to make needed adjustments in a timely fashion. For example, policies encouraging domestic semiconductor production may lead to overproduction of certain types of uneconomical chips. Free-market actors would likely discover and address the problem fairly quickly, but government actors may be slow to respond.

In the short term, the implementation of various industrial policies is already boosting growth through higher investment. Longer term, we see potential for productivity gains, but they will depend on the effectiveness of industrial policy implementation and the extent of the misallocation of capital.

Higher investment demand and higher cost of capital

The transition to greener production³⁴ and more resilient supply chains for strategic goods³⁵ will require substantial public and private investment over the next decade. This increased demand for capital could put upward pressure on interest rates and the cost of capital generally.

Additionally, if the degree of economic inequality were to decline – not our base case, but a nonnegligible probability – it could place some additional upward pressure on interest rates and the cost of capital.

Finally, higher uncertainty about the macroeconomic outlook will likely cause investors to require higher risk premiums on financial investments, particularly longer-term investments. Investors will be less willing to commit long-term capital at low interest rates and low ex ante risk premiums.

Investment implications: Winners and losers from the rise in industrial policy

The rise of state intervention through social and industrial policies can create new winners and losers across sectors and asset classes. What are the investment implications of the new era of state intervention?

We first note more uncertainty about the outlook for corporate margins.³⁶ Social policies (in particular those aimed at improving labor rights and boosting the labor share of the economy, especially outside the U.S.) and national security policies aimed at reshoring supply chains can increase labor costs. As a result, they can have a negative impact on corporate profit margins. In addition, given the significant public capital involved in these efforts, governments may look to increase corporate taxes to ease the pressure on fiscal deficits, another potential headwind for margins.

To the extent those higher labor costs can be passed on to consumers in the form of higher prices, the negative impact on margins will be mitigated.³⁷ In addition, if reduced inequality leads to increased consumer spending, it may help offset some of the damage to margins for certain companies. Lastly, the increasing use of AI may increase productivity, reducing costs for businesses.

To get a sense of the scale of the potential impact on margins: In a hypothetical scenario where all companies are subject to some form of regulated margins like a utilities company, profitability of the private-owned enterprises (POEs) could converge with that of the state-owned enterprises (SOEs). Bottom-up analysis of listed companies suggests the gap in return on equity between POEs and SOEs tends to be slightly over 1%, on average, in developed markets but could be negative in emerging markets.³⁸

³⁴ The capital required to combat climate change through resource efficiency and adaptation is estimated to be more than USD 1.8 trillion annually.

Source: "Climate Finance Markets and the Real Economy," Boston Consulting Group and the Global Financial Markets Association, December 2020.

Represents annual global investment required for resource efficiency and resiliency, excluding investments in renewables and conventional energy infrastructure. Estimates of the impact of government programs like the U.S. IRA vary but should be significant, given the multiplier impact of tax incentives.

³⁵ For semiconductors specifically, estimates suggest a doubling of the industry over the next decade – and place the associated capex required to achieve it at USD 825 billion. (Source: ASML, "EU Chips Act, Position Paper," February 2022). In order for the U.S. and EU to keep their share of global capacity (12% and 8%, respectively), they would need to spend USD 100 billion and USD 66 billion, respectively. But to bring their share of global capacity closer to the stated 20%, at a minimum a doubling of that investment would be required.

³⁶ "Equity Assumptions," 2024 Long-Term Capital Market Assumptions.

³⁷ Peter Harasztosi and Attila Lindner, "Who Pays for the Minimum Wage?" *American Economic Review* 109, no. 8 (August 2019): 2693-2727. They show around 75% of the minimum wage increase was paid by consumers and 25% by firm owners.

³⁸ Source: "2023 China Equity Outlook: Investing in a new political regime as China reopens," Goldman Sachs, November 18, 2022.

Recent policy changes in China shine a light on these issues. As the Chinese government seems to emphasize better support for labor through regulation, we see mixed implications for various sectors of the Chinese economy:

- Income redistribution could be positive for mass-market consumer products and services.
- Boosting labor salaries and protections will lift costs for private sector companies that were less stringent with labor protection (especially in the informal economy, such as ride hailing or food delivery).
- Tighter regulation aimed at lowering living costs could have a negative impact on the property, education and health care sectors.

Across global markets, the main beneficiaries of the rise in state intervention will likely be found in “real economy” sectors. Certain subsectors within technology could also reap substantial benefits.

As the name suggests, the biggest winners from the rise in industrial policy are industrials.

- **Industrials:** The tax incentives in the U.S. Inflation Reduction Act (IRA) support greener commercial buildings and more efficient air conditioning units, which will benefit U.S. electrical and air conditioning companies. Electricity providers will also benefit from reshoring supply chain policies, as electric grids need to be strengthened. More broadly, reshoring supply chains will stimulate the use of U.S.-made inputs across the U.S. industrial sector, potentially benefiting U.S. manufacturers relative to their competitors in Europe and China. In addition, reshoring should fuel global spending on factory automation to offset higher domestic production costs, a boon to global suppliers of factory-automation software. Finally, rising geopolitical tension is increasing global spending on combat readiness, a clear benefit to defense companies.

Regionally, U.S. companies may benefit more from the rise in U.S. industrial policy when compared with their foreign counterparts, in part because the IRA offers considerable support for the energy transition and the CHIPS and Science Act bolsters semiconductor manufacturers. But European industrial companies remain industry leaders. And Chinese industrials may continue to gain market share in Asia, especially in the still-growing area of factory automation.

- **Utilities:** The IRA provides incentives to the private sector to participate in renewable energy projects. These benefits are passed on to rate payers and as such improve affordability. Given lower utility bills, utility companies can apply to invest more capital and (if approved) grow their rate base faster than they had previously done. The IRA also opens up new opportunities for European utilities expanding into the U.S. market. In fact, most of the largest renewables developers in the U.S. are European.
- **Energy:** The IRA provides specific incentives for investment in carbon capture and storage (CCS),³⁹ although permitting bottlenecks vary by state.⁴⁰ Winners will likely include U.S. oil and gas companies, industrial gas producers and companies that provide equipment for future hydrogen and CCS projects. Refiners may end up long-term losers as the decline in demand for gasoline and diesel accelerates. However, those losses may be partially offset by conversions to renewable diesel and sustainable aviation fuel.
- **Technology:** U.S. semiconductor manufacturing companies may see an incremental benefit from capex subsidies included in the CHIPS Act (more so than their foreign counterparts looking to build in the U.S.). For memory chip companies building in the U.S., projects will likely remain uneconomical and noncompetitive vs. those of their larger-scale Asian counterparts, although production may not start for several years. Over the near term, expanding chip manufacturing should benefit the tech companies that provide the required equipment, software and design that support chip production. However, chip tech equipment companies may face competition in the longer term as Chinese companies are incentivized to develop their own equipment.

Based on the “real economy” sectoral winners, regional markets tilted more heavily toward these type of companies may benefit the most. This includes Europe, the UK, and Japan (which have an average weighting of 26% to industrials, utilities and energy) vs. the U.S. and emerging markets at only 15%.

³⁹ Increasing it from USD 50 per metric ton of CO₂ sequestered, or USD 35 per metric ton of CO₂ in the case of enhanced oil recovery (EOR) or utilization. Under IRA, incentives increase to USD 85 or USD 60 per metric ton, respectively.

⁴⁰ Some states requested primacy so that they can give permits locally (without need for a federal approval from the Environmental Protection Agency). As this happens, one can expect to see progress in many projects moving forward with construction.

However, sector exposure goes only so far, as the theme of rising industrial policy may benefit companies across different sectors.⁴¹ For example, the renewable energy theme includes global companies found in many sectors: utilities, technology, industrials, and energy. Encouragingly, the theme now has a better entry point, as overextended valuations built up from 2020 to 2021 have now been largely unwound.

State intervention can go only so far to meet the major challenges ahead. New policy initiatives will need more than government funding, giving private capital a significant role to play. This is particularly true when it comes to the energy transition and reshoring supply chains.

Among alternative assets, real assets look set to be the primary beneficiary, especially infrastructure (regulated distribution and contracted power companies), real estate (energy-efficient real estate), transportation (warehouses, truck terminals, rail cars) and timber investments. Allocating to these assets can also provide important diversification to the risk of more elevated inflation.

Further, especially given banks' post-GFC retreat from a wide range of corporate lending, private debt and private equity funds are likely to provide critical capital for both the physical assets and the new businesses that will be part of the broader story of rising state intervention.











The changes unfolding as industrial policy ushers in a new era are not without risk. But they also offer considerable promise over the coming decade.

⁴¹ "Expanding the diversification toolkit: A smarter portfolio to mitigate shocks in a less predictable world," *2024 Long-Term Capital Market Assumptions*.

Detailed analysis: Scoring current policies against our framework

Like the energy transition, climate policies have many moving parts. Will they work together – or come up short?

Exhibit A: Table of current climate change policies vs. framework

Policy	Framework criteria		
	Policy well designed for the problem?	Policy leads to a new sustainable end state?	Tools/political will to endure adjustment period?
EU Emissions Trading System (ETS) and Cross Border Adjustment Mechanism (CBAM)	 EU ETS linked to 35% emission reductions since 2005 ⁴² (although the causality between the policy and emission reduction is yet to be proven) CBAM addresses market failures resulting from increasing EU ETS: carbon leakage and consumers switching away from more expensive carbon-priced goods produced in the EU	 CBAM ensures that carbon prices of imports will be equivalent to those of domestically produced carbon-priced goods within the EU CBAM phase-in over the next decade complemented by the phase-out of free allowances, which in the past resulted in windfall profits in some sectors	 Gradual introduction of CBAM to limit economic volatility and allow time for methodology development and data collection ⁴³ Part of EUR 31 billion (as of 2021) EU ETS auctioning revenues are used by member states for climate and energy transition purposes ⁴⁴
	 Though EU ETS prices have risen recently, it is from a low starting point; ETS is not yet a material factor in decarbonization EU ETS has thus far resulted in higher electricity prices for consumers and higher profits for utilities (given their asset mix)	 Should other countries not exhibit similarly high carbon prices, the EU will be at a disadvantage	 CBAM expected to negatively affect developing countries for which EU is a big export market. A possible remedy: Use CBAM proceeds to assist least developed countries in decarbonization ⁴⁵
U.S. Inflation Reduction Act (IRA)	 Large (nearly USD 400 billion in climate and energy transition spending) and comprehensive policy package. It aims to simultaneously accelerate energy transition and improve energy security as well as support the development of nature-based solutions, including sustainable forest management Streamlined and easy-to-understand incentives	 Could lower clean technology costs globally through learning curve effects in the medium term Expected to diversify critical mineral supply chains toward U.S. and free trade agreement (FTA) partners to improve supply security	 Provides USD 5 billion to back USD 250 billion in low cost loans to support utilities' energy transition ⁴⁷ Provides USD 9.7 billion in financial assistance for rural electric cooperatives to shift to clean energy ⁴⁸ Lowers household energy costs, on average, by USD 500–USD 1,000 annually ⁴⁹
		 In the medium term, expected to reduce U.S. emissions by up to 42% by 2030 from 2005 levels, still falling short of U.S. target ⁴⁶ In the short term, could stifle competition and increase technology costs, slowing the low carbon transition	

⁴² European Commission, "EU Emissions Trading System (EU ETS)," July 2023.

⁴³ European Parliament, "Carbon border adjustment mechanism as part of the European Green Deal," Legislative Train, June 2023.

⁴⁴ European Environment Agency, "Use of auctioning revenues generated under the EU Emissions Trading System," February 3, 2023.

⁴⁵ European Parliament, "MEPs to G20: increase climate change targets before COP27," press releases, October 20, 2022.














⁴⁶ This falls short of the U.S. goal of 50%–52% emission reduction but is considerably higher than the reduction of up to 35% envisaged in the business as usual scenario. Source: John Larsen, et al., "A Turning Point for US Climate Progress: Assessing the Climate and Clean Energy Provisions in the Inflation Reduction Act," Rhodium Group, August 12, 2022.

⁴⁷ U.S. Department of Energy, "Inflation Reduction Act of 2022," Loan Programs Office.

⁴⁸ The White House, "Biden-Harris Administration Announces Largest Investment in Rural Electrification Since the New Deal," Briefing Room, statements and releases, May 17, 2023.

⁴⁹ International Energy Agency, "Inflation Reduction Act of 2022," April 26, 2023; U.S. Department of Energy, "Inflation Reduction Act of 2022 - What it Means for You," August 22, 2022.

Exhibit A: Table of current climate change policies vs. framework (continued)

Policy	Framework criteria		
	Policy well designed for the problem?	Policy leads to a new sustainable end state?	Tools/political will to endure adjustment period?
EU Green Deal Industrial Plan	<p></p> <p>Comprehensive policy package, spanning regulatory environment, access to funding, skills and trade. Includes three initiatives:</p> <ul style="list-style-type: none"> - Net Zero Industry Act - Critical Raw Materials Act (CRMA) - Electricity market reform <p></p> <p>Targets, such as meeting 40% of clean tech needs through domestic production, raise questions about feasibility and cost-efficiency⁵⁰</p> <p>Time lag compared to IRA in formulating and announcing new funding and financing mechanisms for Green Deal</p>	<p></p> <p>In the long term, CRMA expected to result in EU's greater self-sufficiency in critical mineral supply</p> <p></p> <p>In the short term, expected to lead to pressures on supply chain and skills availability</p> <p>Concerns over harmful competition and further economic divergence within the EU due to the relaxation of state aid rules for clean tech until 2025⁵¹</p>	<p></p> <p>Aims to enhance skills required for the net-zero transition and create high skilled jobs: 35%–40% of all jobs could be affected by the transition⁵²</p> <p></p> <p>Institutional strength should enable policymakers to execute on goals that are likely attainable</p> <p></p> <p>Cyclical economic performance presents a risk, as policymakers may use old-economy stimulus to encourage growth</p>
China's 14th five-year plan (FYP)	<p></p> <p>Focus on developing a “modern energy system” in reference to low carbon transition and diversification,⁵³ and energy security</p> <p>FYP includes key emissions and energy-related targets:</p> <ul style="list-style-type: none"> - Reduce energy and carbon intensity from 2020 levels by 13.5% and 18%, respectively - Achieve 20% share of nonfossil fuel energy in total energy consumption, and 39% in power generation, from current 34.6%⁵⁴ <p>Estimates show that reducing carbon intensity by 18%–20% during FYP will put China on a trajectory to achieve carbon neutrality by 2060⁵⁵</p> <p></p> <p>In the context of energy security, FYP emphasizes the role of coal to meet “basic energy needs” and the importance of oil and gas supplies</p> <p>Lack of targets on capping the share of coal in the energy mix and total consumption</p>	<p></p> <p>China's emission reduction to net zero by 2060 is key to limiting global warming</p> <p>The sooner China achieves emissions peak, the more time it will have to bring its emissions to net zero</p> <p></p> <p>Emphasis on the role of coal in the energy system raises concerns about slower decarbonization in China and the global economy broadly</p>	<p></p> <p>Institutional strength should enable policymakers to execute on goals that are likely attainable</p> <p></p> <p>Cyclical economic performance presents a risk, as policymakers may use old-economy stimulus to encourage growth</p>

⁵⁰ Source: Niclas Poitiers et al., “The EU Net Zero Industry Act and the risk of reviving past failures,” Bruegel, March 9, 2023.

⁵¹ European Commission, “State aid: Commission adopts Temporary Crisis and Transition Framework to further support transition towards net-zero economy,” March 9, 2023.

⁵² European Commission, “The Green Deal Industrial Plan: putting Europe's net-zero industry in the lead,” February 1, 2023.

⁵³ National Development and Reform Commission, “Relevant responsible comrades of the National Energy Administration answered questions from reporters on the ‘14th Five-Year Plan’ Modern Energy System Planning,” March 22, 2022.

⁵⁴ Carbon Brief, “China Briefing, March 24, 2022: 14FYP energy plan; More plans on energy storage and hydrogen; China's emissions analysis.”

⁵⁵ Carbon Brief, “Q&A: What does China's 14th ‘five year plan’ mean for climate change?” March 12, 2021.







Social policies in Europe and China may be more durable relative to the U.S.

Exhibit B: Table of current social policies vs. framework

Policy	Framework criteria		
	Policy well designed for the problem?	Policy leads to a new sustainable end state?	Tools/political will to endure adjustment period?
China: Common Prosperity initiative	<p>✔</p> <p>Policy aimed at improving the welfare of low to middle income households through better income distribution, improved public services and a stronger social safety net</p> <p>Targeting both income inequality and inequality of opportunities in education, health care and employment</p> <p>⚠</p> <p>Potential challenges in effective policy design and implementation, given regional and sectoral differences</p>	<p>✔</p> <p>Strong commitment from top leadership</p> <p>Long-term policy initiative to be achieved around 2050</p> <p>Clear targets laid out in regional pilot programs, such as labor income share of GDP, urban-rural residents' income ratio</p>	<p>✔</p> <p>Long-term goal to be achieved via a gradual and flexible approach, given the difficult and complex nature of the task</p> <p>Short-term policy focus will likely center on increasing household income and improving social welfare provision, while major income redistributive measures, such as property and inheritance tax, will likely be rolled out at a more calibrated pace</p>
European Pillar of Social Rights	<p>✔</p> <p>The policy framework includes 20 principles aimed at promoting social fairness and equal opportunities in the EU labor market. The Pillar proposes specific actions to achieve the headline targets by 2030</p> <p>The Pillar identifies education and training as a key focus</p>	<p>✔</p> <p>The action plan sets three key objectives by 2030, covering employment, training and poverty reduction</p> <p>The framework potentially can lead to a new equilibrium that is more labor-friendly, encourages career mobility and contributes to a more resilient society</p>	<p>✔</p> <p>The EU has developed a social scoreboard to track member states' progress in social policy</p> <p>The European Commission adopted the proposal for Directive on minimum wages, with dual objectives of ensuring adequate minimum wages and strengthening collective bargaining</p>

Building domestic semiconductor manufacturing won't be cheap or easy – but the will is there

Exhibit C: Table of current chip manufacturing policies vs. framework

Policy	Framework criteria		
	Policy well designed for the problem?	Policy leads to a new sustainable end state?	Tools/political will to endure adjustment period?
U.S. CHIPS and Science Act	<p></p> <p>Provides manufacturing incentives (USD 39 billion) and 25% tax credit (USD 24 billion) to offset some of total cost of fabrication plants</p> <p>Helps to reduce the gap with Asia ex-China for percentage of operating costs that government subsidies cover</p> <p>Policy tilted toward incentivizing local manufacturing of chips (85% of total subsidies are aimed at boosting physical plants vs. only 15% for R&D). Open to U.S. and foreign companies looking to produce in the U.S.</p> <p>Looks to provide incentives to unlock additional complementary private capital</p> <p></p> <p>Committee of industry investors decides the allocation of capital to specific companies based on a proven track record of semiconductor manufacturing</p> <p></p> <p>Currently incorporates incentives for logic, memory and discrete/analog trailing-edge chips, while the “national security” risk is geared toward logic. More productive use of subsidies would see capital allocated toward logic specifically</p>	<p></p> <p>Since early 2020, the semiconductor industry has announced USD 200 billion of new investments in U.S. chips manufacturing.⁵⁶ While there will be a lag with implementation, U.S. private construction spending on semiconductors (as a % of GDP) has already increased 5.5x since early 2020⁵⁷</p> <p></p> <p>Total scale of public/private commitment to build U.S. semiconductor manufacturing capacity depends on future company investment announcements and implementation as well as the availability of qualified labor</p> <p>Given the expense of semiconductor manufacturing, the higher cost of labor in the U.S. and the incentives provided by other governments, these incentives will need to be ongoing to direct manufacturing to the U.S. vs. other low cost producers</p> <p>Another option: Use regulatory tools to mandate use of U.S.-produced chips by U.S.-based companies or those seeking to do business in the U.S.</p>	<p></p> <p>Predictability of subsidies for the next 10 years should lead companies to build up excess capacity in the U.S., leading to lower semiconductor costs over time</p> <p>A transition period may occur as U.S. manufacturing capacity is approved and built – but a lack of restrictions on chip sourcing could lead to continued use of foreign-produced chips in the interim</p>

⁵⁶ Calculations of announcements done by the Semiconductor Industry Association, as of December 2022.

⁵⁷ Series includes computers, electronics and electrical products, but semiconductors specifically represent a large share. Source: U.S. Census Bureau, S&P Global Market Intelligence as of March 2023.

Exhibit C: Table of current chip manufacturing policies vs. framework (continued)

Policy	Framework criteria		
	Policy well designed for the problem?	Policy leads to a new sustainable end state?	Tools/political will to endure adjustment period?
European Chips Act, European Pillar of Social Rights	<p>☑</p> <p>Goal to double current EU production of semiconductors (from 10% to 20%) by 2030</p> <p>Three pillars: 1) support technology and innovation of leading-edge chips; 2) provide investments in manufacturing capacity in the EU; 3) improve supply chain continuity</p> <p>Overall funding in European Chips Act: About 70% of EUR 43 billion total policy investment is geared toward manufacturing fabs in the EU through combined state aid, EU and national funding</p> <p>Fast-tracked permitting for companies that are approved</p>	<p>☑</p> <p>Since introduction, U.S., Taiwanese and European companies have announced plans for manufacturing plants in Germany and France</p> <p>Aids EU in not staying too far behind the U.S. push to reshore some manufacturing of chips</p> <p>⚠</p> <p>Total scale of public/private commitment to build EU semiconductor manufacturing capacity depends on future company investment announcements and implementation, as well as the availability of qualified labor</p> <p>Given the expense of semiconductor manufacturing, the higher cost of labor in the EU and the incentives provided by other governments, these incentives will need to be ongoing to direct manufacturing to the EU vs. other low cost producers</p> <p>Another option: Use regulatory tools to mandate use of EU-produced chips by EU-based companies or those seeking to do business in the EU</p>	<p>⚠</p> <p>Uncertainty around continued political support for passage of European Chips Act and its ongoing support over time</p>

Exhibit C: Table of current chip manufacturing policies vs. framework (continued)

Policy	Framework criteria		
	Policy well designed for the problem?	Policy leads to a new sustainable end state?	Tools/political will to endure adjustment period?
<p>Made in China 2025 & 14th 5-year plan (FYP)</p>	<p>☑</p> <p>Focus on boosting domestic production of trailing-edge chips in line with goals to become dominant player in electric vehicles and solar energy</p> <p>Incentives include grants and tax credits (which make up 30%–40% of a new plant’s cost), lower manufacturing wages than in developed countries and cheap financing through credit and equity,⁵⁸ with estimates totaling USD 143 billion⁵⁹</p>	<p>☑</p> <p>Unprecedented boost to trailing-edge chip investment, with China now representing 50% of global trailing-edge equipment spending (or 25% of global overall chip equipment spending)⁶⁰</p> <p>China is likely to become a dominant producer of trailing-edge chips. But incentives will need to be ongoing</p> <p>Another option: Use regulatory tools to mandate use of China-produced chips by China-based companies or companies seeking to do business in China</p>	<p>☑</p> <p>Staying power of incentives and state capital, with potential to increase further, given U.S. export controls, despite potential misallocation of capital along the way</p> <p>May allow China to gain significant market share in chip production, making it more costly for foreign governments to restrict technology transfer</p>
	<p>☑</p> <p>Focus on gaining self-sufficiency in leading-edge chip design, tools and production through R&D spend, subsidies, cheap financing and technology transfer from foreign firms</p> <p>National Integrated Circuit Industry Investment Fund Co I and II – “venture capital”-like semiconductor investment funds, which, combined with local government investment funds, have raised USD 73 billion</p> <p>Made in China 2025 includes the goal of reducing China’s imported share of chip production from 85% in 2015 to 30% by 2025</p>	<p>⚠</p> <p>Uncertainty about China’s ability to become self-sufficient in leading-edge chips, given restrictions by the U.S. and its allies on some Chinese companies’ ability to continue partnering on logic leading-edge chips⁶¹</p> <p>Chinese chip production remains about one or two generations behind in leading-edge chips. Across the semiconductor supply chain, Chinese firms have only a 6% market share⁶²</p>	

⁵⁸ OECD estimates that government support to the four largest Chinese semiconductor companies from 2014–18 was between 20%–30% of their revenues.

⁵⁹ J.P. Morgan Strategic Research’s aggregation of media outlet announcements.

⁶⁰ Based on J.P. Morgan Asset Management U.S. equity team’s bottom-up analysis of corporate disclosures.

⁶¹ U.S. (and allies Europe, Japan, Australia and Netherlands) have used legislation and regulations to enact export and investment controls on U.S.-produced chips, equipment, software and technology. Thus far, restrictions have been focused on logic chips, quantum computing, some artificial intelligence and specific Chinese companies deemed a national security risk.

⁶² The semiconductor supply chain includes chip design, intellectual property, equipment and manufacturing. In comparison, the U.S., South Korea and Taiwan have 39%, 16% and 12% market shares, respectively. Source: Georgetown University’s Center for Security and Emerging Technology; Chris Miller, *Chip War* (New York: Scribner, 2022).



Expanding the diversification toolkit

A smarter portfolio to mitigate shocks in a less predictable world

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In brief

- 2022 challenged investors, revealing some of the shortcomings of traditional asset allocation models, as well as investors' complacency about inflation risks after years of falling inflation. Portfolio hedges were designed for growth shocks, not other shocks or macroeconomic regime changes.
- Sudden regime changes are generally hard to predict and may occur more frequently in the world we forecast over the next 10–15 years of higher macro volatility, two-sided inflation risks and less reliable stock-bond correlation. How might investors enhance the still-indispensable 60/40 stock-bond portfolio, drawing on the lessons learned in prior periods?
- While fixed income remains a relevant portfolio diversifier against growth shocks, we find that incorporating additional dimensions of diversification would help achieve more robust outcomes across a wider range of regimes.
- Beyond traditional market beta, investors should consider diversifiers, including actively managed equity, tactical asset allocation strategies, risk premia strategies, currency overlays and thematic investing.
- Alternative investments – particularly real assets, hedge funds and alternative credit – may play a crucial role in diversification, exhibiting low correlation to traditional assets and providing the opportunity for downside mitigation, enhanced returns and inflation resilience under various economic conditions.
- We recommend a more robust form of portfolio optimization that seeks to fill in the blind spots in the simple mean-variance approach. Incorporating uncertainty into portfolio design can help investors create a strategic allocation that considers a range of plausible outcomes and is more robust in different economic environments.

The lessons of a tough year in the markets

Traders have an old saying: When financial markets sell off, the only thing that goes up is correlation. That sums up 2022, a tough year for diversified investors, as the traditional 60% global equity and 40% fixed income (60/40 stock-bond portfolio) suffered when both markets fell in tandem. During this “stress test” set off by inflation, the mean-variance optimization (MVO) models we rely on at the heart of asset allocation let us down. They assumed negative stock-bond correlation – a common starting point, driven by recency bias. Many investors, grown complacent after 40-plus years of disinflation, assumed it, too.

It was a wake-up call and revealed opportunities to fix things.

Stocks and bonds sold off in just three of the past 50 years: 1969, when inflation doubled in two years; 1974, when inflation reached a record 12% around the energy crisis; and 2022, when the longest continuous period of disinflation (1982–2022) in modern history came to an end.

Regime shifts, like the one that led to the 2022 correlation spike, are hard – though not impossible – to forecast. And history tells us that once economic regime change happens, the change can be persistent. We can learn from prior history how to adapt our MVO model to be more robust as regimes shift.

Different assets and strategies tend to shine in different moments. Here, we identify ways to diversify portfolios that complement stock-bond diversification. Broadening out a standard 60/40 portfolio to include a collection of these exposures has proved beneficial historically but, more importantly, we believe it will be suited for constructing stronger portfolios in the world of heightened macroeconomic uncertainty that we forecast.

Diversification’s role in a portfolio

What is the purpose of diversification? Asset managers seek to harvest risk premia, and the most popular risk premia through time have been equity risk premia.

Stocks, broadly speaking, struggle when economic growth contracts, so we diversify with bonds, which tend to do well when growth weakens. Holding stocks and bonds together can soften the blow from growth risks – but not inflation risks.

Nor are inflation and growth the only shocks we want to mitigate against. Over our forecasting horizon, we expect greater macro uncertainty and two-sided inflation risks.¹ Other potential risks include possible exogenous shocks, such as liquidity shocks and geopolitical shocks. In such an environment, finding additional sources of risk diversification may be as important as finding sources of return.

We propose building additional dimensions of diversification to create an enhanced balanced portfolio, and end with model simulations, using our robust asset allocation model that incorporates parameter uncertainty to capture different regimes. Our work highlights how optimal portfolios differ as economic regimes change. Finally, we incorporate the full range of potential diversifiers to examine their performance in aggregate and provide an example of the new, smarter, more robust balanced portfolio.

Adding robustness by expanding into additional sources of diversification

Creating portfolios more robust to changing economic regimes and other risks may help generate wealth by minimizing value destruction. A 60/40 stock-bond portfolio remains a good starting point, offering the opportunity for support during growth shocks. But as we have learned, there is more than one kind of shock. **Exhibit 1** summarizes the expanded dimensions of diversification this chapter covers, with the goal of insulating portfolios from a range of different shocks.

¹ “Macroeconomic assumptions,” *2024 Long-Term Capital Market Assumptions*.

Opportunities for enhancing the 60/40 stock-bond portfolio for different macroeconomic regimes

Exhibit 1: Summary, sources of portfolio diversification

Diversifier	How it works	Diversifies against
Traditional 60% equity/ 40% fixed income portfolio	Government bonds can hedge risky assets, such as equities	Recession, weakening economic growth
1. Risk premia		
Risk premia strategies	Trend strategies; multi-risk premia strategies, including long-short factors (carry, value, quality, etc.); and arbitrage strategies (merger arbitrage, convertible arbitrage, fixed income arbitrage, etc.) may help provide uncorrelated return streams to mitigate beta risk	Declining economic growth, inflation
Select equity sectors and styles	Equity sectors such as energy or utilities and factors such as minimum volatility and value have generally outperformed in high inflation regimes	Rising economic growth, inflation
2. Active management		
Active equity	Active equity managers' excess returns over benchmarks can be seen as a portfolio diversifier, with near zero correlation to equity market returns for median managers.	All-weather, especially suited to periods when capital is scarce and markets are efficiently channeling capital
Global tactical asset allocation (GTAA)²	A GTAA approach may help add dynamism to a more statically managed strategic asset allocation	All-weather; return streams are most diversifying during periods of stress
Active alternatives	Active alternative strategies with higher intracategory dispersion add further diversification opportunities	Mitigate market-cycle risks
3. Currency		
Currency overlays	Currency overlay strategies give investors opportunities to benefit from the inefficiencies of FX markets, which have a low correlation with market beta	All-weather
4. Thematic diversification		
Thematic alpha	Exposure to thematic equity basket may capture performance from longer-term, less cyclical growth trends	All-weather, especially helpful in capex cycles when government-private partnerships/co-investment are in play
5. Alternatives		
Real assets	Cash flow-driven returns grow with inflation, providing ballast to a broader portfolio	All-weather; especially helpful during periods of high inflation, rising rates, public market stress
Hedge funds and alternative credit	Low correlation to traditional asset classes helps mitigate overall portfolio risk. Commodities help mitigate energy-related inflation shock	Rising volatility, market downturns, energy supply shocks

Source: J.P. Morgan Asset Management; information as of September 2023.

² Global tactical asset allocation is an investment strategy consisting of dynamic active asset allocation across major assets, commonly with the objective of creating an independent return stream to complement a core portfolio.

Five sources of diversification

Public markets exhibit significant intramarket dispersion that investors can utilize to add robustness to their portfolios. We believe investors should consider the following five dimensions of diversification for building a portfolio likely better able to withstand changing regimes and other exogenous shocks that could impact markets.

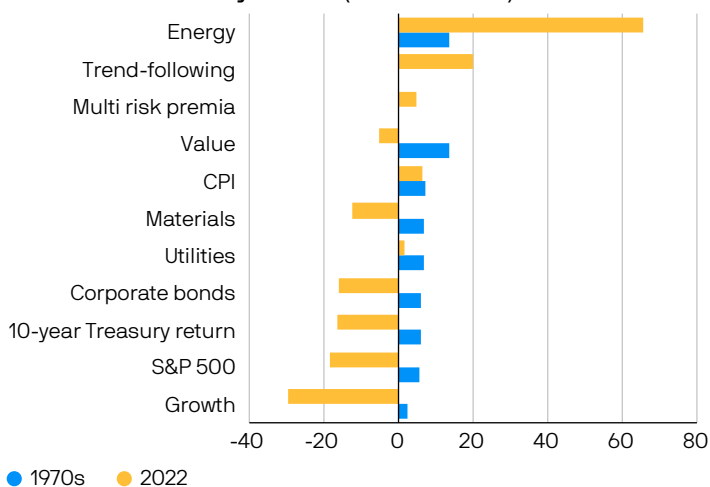
1. Harnessing risk premia for diversification

Risk premia strategies are investment strategies that focus on harvesting excess returns associated with different risk factors (such as carry, value, size and momentum) or market anomalies driven by behavioral biases or structural inefficiencies (such as merger arbitrage, index inclusion, over-extrapolation of trends and leverage aversion/constraints, etc.). Investment managers build market and sector neutrality into many of these long-short strategies, typically differentiating their returns from the market beta and the 60/40 stock-bond portfolio.

Risk premia strategies have performed well historically, and investors have opportunities to add these uncorrelated returns in their portfolios. Individual risk premia may underperform at times, but a basket approach – owning multiple risk premia strategies – has shown historical robustness. Multiple risk premia and trend-following strategies returned an impressive 4.8% and 27%, respectively, in 2022, when most assets struggled and delivered negative returns (**Exhibit 2**).

Risk premia and factors such as value have outperformed in difficult times

Exhibit 2: Returns across asset classes, sectors and styles when markets were tested by inflation (1970s and 2022)



Source: Bloomberg, Ibbotson, French, Refinitiv Datastream, J.P. Morgan Asset Management; data as of July 31, 2023. Sectors use French definition pre-2000, GICS L1 post-2000. NEIXMARP Index was used for multi risk premia; NEIXCTAT Index was used for trend-following.

There are a number of ways to incorporate risk premia and factors into portfolios:

- **Cross-asset strategies**, including momentum or trend-following and carry, have historically demonstrated low correlation to traditional asset classes. They offer the potential for added diversification during market sell-offs. Trend-following strategies (based on directional price moves) in particular have shown strong downside mitigation during major market declines.
- **Careful consideration of factor exposures such as value, momentum and quality within equities** can also help build robustness. The concentration of recent stock market gains in just a few stocks highlights the importance of balancing risk exposure and mitigating the risk of such concentration.
- **Traditional value exposures**, which favor sectors such as energy and materials, demonstrated their ability to provide positive returns amid high inflation in the 1970s and in 2022. However, there is value in adjusting these factor allocations dynamically – as, for example, changing views on the magnitude and duration of inflation could impact value and growth factor exposures.

2. Active management as a portfolio diversifier

Investors generally employ active management to improve returns through security selection. Less well appreciated but highly relevant in the current environment: History demonstrates that active management's security selection and tactical asset allocation have improved portfolio diversification over time.

This diversification effect may be underappreciated when broad beta is working well. But at times of positive stock-bond correlation, when investors have almost nowhere left to hide and diversification is most valuable, active management can play a multifaceted role in portfolios.

Relative to passive benchmarks and strategies, a bottom-up active manager’s differentiated positioning offers a modest diversification opportunity. We show the correlation of an active manager’s excess returns vs. the S&P 500, highlighting that single-name security selection (traditional active equity) adds differentiation (**Exhibit 3A**).

The typical active equity manager’s excess returns are negatively correlated to equity and bond betas – demonstrating that, on a securities level, active management can help diversify the return streams from simple market betas.

Diversification would not be particularly appealing if it required significant costs to achieve it. But it has not: The median active equity managers plotted in our study in **Exhibit 3B** delivered a positive average return of 7 basis points (bps)–9bps per month. Using a conservative assumption, an average U.S. large cap core manager (performance in the 25th to 75th percentile) would have an excess return around zero. Despite generating no additional return, from a portfolio construction perspective this is an attractive proposition – almost a “free” diversifier.

This opportunity can be accessed by adding active security selection but also by asset allocation. In Exhibit 3A, we highlighted how the cross-asset class approach of a global tactical asset allocation strategy can add further value in designing robust portfolios. The excess returns of GTAA managers show a low correlation, in the range of 0.2–0.3, with equity beta and with active equity managers’ excess returns. Beyond their historical performances, GTAA and active management more broadly can help add dynamism to a more statically managed strategic asset allocation – a very relevant consideration in a world with heightened uncertainty.

We reinforce this analysis by examining active equity funds’ excess returns across a time horizon that spans different economic environments. Using 36-month rolling correlations between each analyzed fund’s excess return with public equities, we demonstrate that the benefit of diversification (low correlation) is present across time, rarely if ever rising above zero (**Exhibit 4A**).

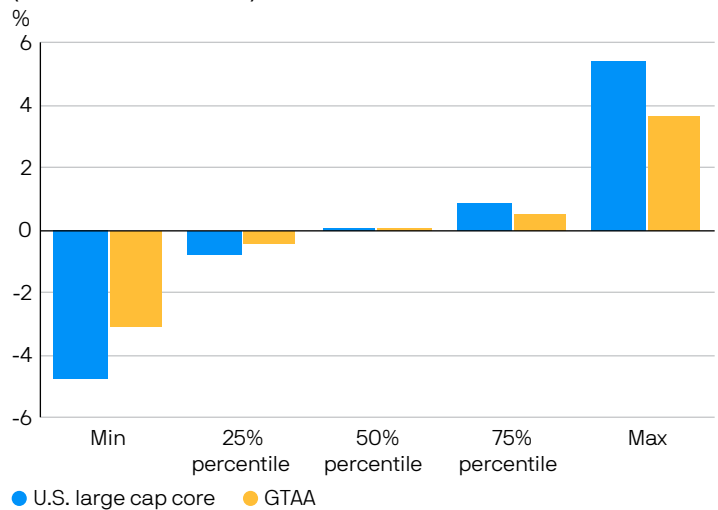
GTAA managers’ excess returns exhibit modestly positive correlations across time. For a strategy that allocated to beta dynamically to generate excess return, the rolling correlation is rather low. (Over time, correlation with the equity market remains below 0.5).³ Applied to a standard 60/40 stock-bond portfolio, GTAA’s low positive correlation offers a tangible level of risk diversification.

Active management’s security selection and tactical asset allocation have provided valuable portfolio diversification

Exhibit 3A: Correlation of active managers’ excess return with stock and bond market beta (Jan. 1990–March 2023)

	U.S. large cap equity	U.S. Agg	U.S. large cap core	GTAA - median
U.S. large cap equity	1	0.229	-0.331	0.212
U.S. Agg		1	-0.082	-0.019
U.S. large cap core			1	0.308
GTAA - median				1

Exhibit 3B: Average excess return of active funds by percentile (Jan. 1990–March 2023)



Source: eVestment, J.P. Morgan Asset Management; data as of March 2023. We use excess return time series, defined as the return in excess of the benchmark from eVestment. Exhibit uses eVestment for active equity funds database, tactical asset allocation category.

³ GTAA strategies tactically allocate to different market betas (at times with directionality) to generate their returns, and thus their correlations are not necessarily expected to be near zero at all times. The ranges shown in the analysis (-0.4 to 0.4), despite often being positive, are low in absolute magnitude and create the diversification opportunity.

Using both ingredients of active management at once – security selection and tactical asset allocation – offers an even stronger portfolio diversification opportunity. Together, they boost returns, lower volatility and achieve superior returns and lower risk at a level similar to a 60/40 portfolio historically (**Exhibit 4B**).

It seems clear that active management deserves to be understood as a valuable yet underutilized tool for introducing greater diversification to portfolios – and not simply as a source of potential alpha.

3. Considering currency for diversification⁴

Although currency markets are among the most liquid markets in the world, with total daily turnover of USD 7.5 trillion,⁵ they are not very efficient. More than one-third of foreign exchange (FX) market participants are transactional. They are hedging to manage cash for foreign purchases or sales (of goods, services or financial assets), not speculating to generate a profit.

There is thus a tremendous opportunity to capitalize on an inefficient market and generate a return through actively trading currencies. Currency overlays also provide the opportunity for diversification, given their low correlations with other asset classes. Because active currency portfolios are flexible, able to take positions in long-short currency pairs, they may also give investors meaningful exposure to non-G4 currencies.

Without a currency overlay, investors tend to be exposed to FX only via their underlying investments, which are often market cap weighted, making them G4 dominated. Investors that use an FX overlay can benefit from its long-short nature, which differentiates it as a source of portfolio returns and also broadens their exposure to other currency pairs.

Active equity managers and asset allocators can help create a more robust portfolio with better risk-adjusted return

Exhibit 4A: Rolling 36-month correlation between active manager excess return and public equity

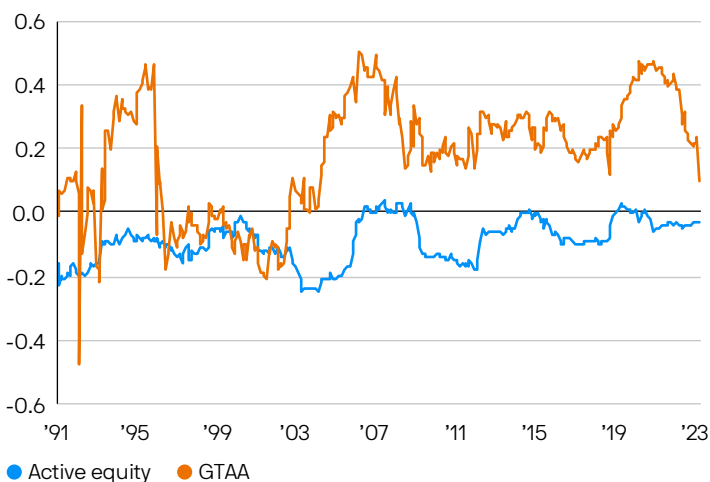
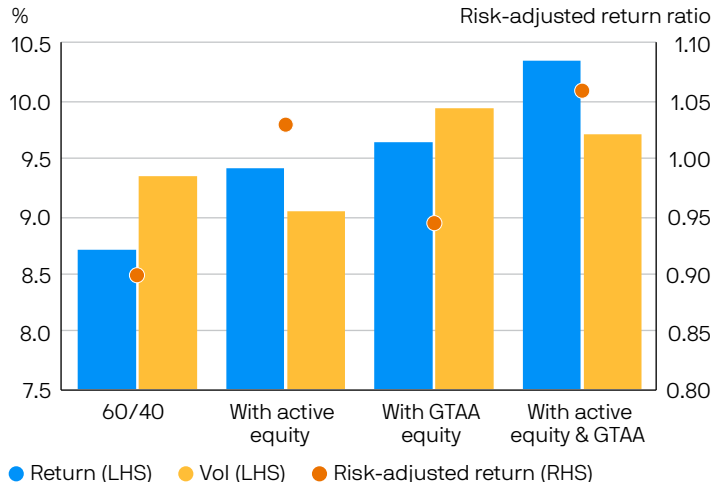


Exhibit 4B: The impact of active manager excess return on portfolio construction



Source: eVestment; data as of March 2023. Data are from eVestment’s Global Tactical Asset Allocation, US, EAFE, Global and ACWI large cap core categories. We use excess return time series, defined as the return in excess of the benchmark from eVestment. The correlation is run on a fund-by-fund basis.

⁴ For a fuller treatment, see Nigel Rayment and Neil Weller, “Considering active currency and the potential portfolio benefits,” J.P. Morgan Asset Management, January 2023.

⁵ Triennial Central Bank Survey, Bank for International Settlements, April 2022.

Exhibits 5A and 5B highlight FX markets’ low correlation with the underlying beta of major asset classes such as equities and developed and emerging market bonds. Over the past 10 years, the information ratio⁶ of the active currency strategy was 0.33. Its correlation to global equities was 0.14 and to global aggregate bonds 0.07. Like GTAA does, this positive but low correlation presents investors with another potential diversifier.

Historically, a currency overlay strategy has tended not to impose a cost on a portfolio but rather to deliver a positive return. This suggests a potentially diversified return stream, and a scalable one, given the FX market’s depth. The trade-offs: Returns can be lumpy, and skill is required in currency investing or in manager selection if the overlay is outsourced.

A currency overlay shows low correlation with stocks and bonds, highlighting its potential as a portfolio diversifier

Exhibit 5A: Illustrative currency overlay correlation with major asset classes

	5-year	10-year	2022	2023
Global equities	0.35	0.14	0.32	0.33
U.S. equities	0.34	0.15	0.26	0.20
EM local bonds	0.13	0.01	0.41	0.22
Global bonds	-0.05	-0.07	0.27	0.61
Commodities	0.37	0.11	0.13	0.09

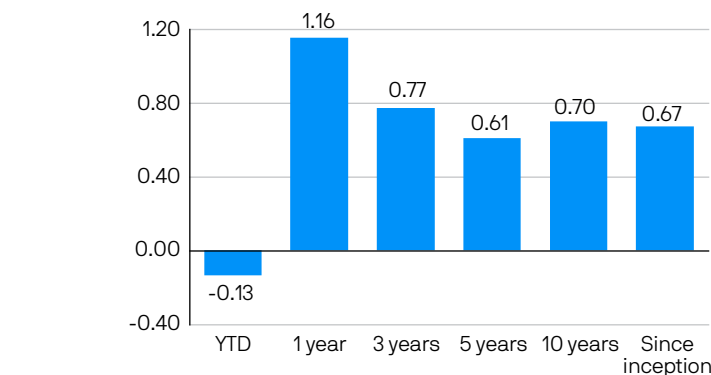
Source: J.P. Morgan Asset Management, Morgan Markets, Bloomberg; data as of August 31, 2023. Global equities: MSCI World; U.S. equities: S&P 500; EM local bonds: GBI EM Global-Government Bond Index-Emerging Market Diversified Composite Hedged; Global bonds: Bloomberg Global Aggregates; Commodities: S&P GSCI.

4. “Follow the money”: Capturing long-term trends to add thematic diversification

Identifying and investing in supercycle trends⁷ – such as energy efficiency, technology advancements, artificial intelligence (AI), genetics and potentially many others – may add robustness to portfolios. Building these recession-resilient spending trends into portfolios is another source of diversification and may mitigate cyclical risks during growth shocks.

“History doesn’t repeat itself but it often rhymes,” Mark Twain may have said. So next, we consider two long-term investment trends that have emerged again today and echo the past: Energy efficiency has driven global economic leadership historically and appears poised to do so again. And technology companies have generated sustained earnings during periods of slow growth.

Exhibit 5B: Illustrative currency overlay annualized excess returns (%)



	YTD	1 year	3 years	5 years	10 years	Since inception
Excess returns* (%)	-0.13	1.16	0.77	0.61	0.70	0.67
Tracking error (%)	-	1.42	1.48	1.94	1.90	1.77
Information ratio (IR)	-	0.82	0.52	0.32	0.37	0.38

Source: J.P. Morgan Asset Management, Morgan Markets, Bloomberg; data as of August 31, 2023.

Past performance is not a reliable indicator of current and future results.

⁶ The information ratio measures excess return over the benchmark per unit of observed risk.

⁷ A supercycle – a sustained expansion that originally referred to a commodity market boom – is now used for any period of outsize demand and the accompanying market rally for producers.

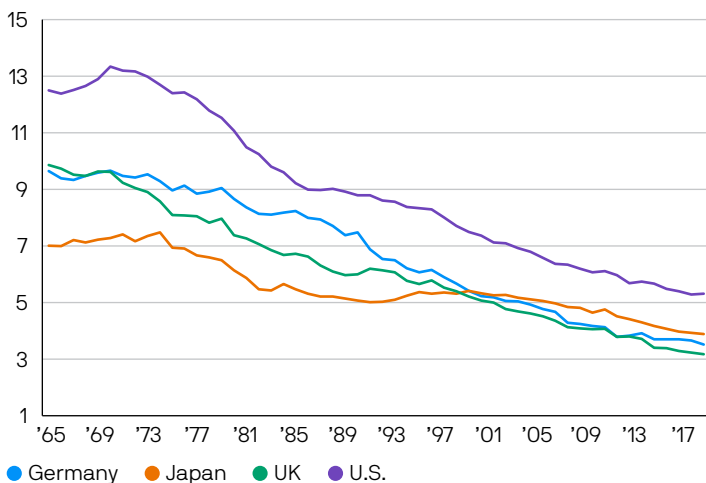
The energy theme: A history of creating new global economic and equity market leaders

Energy sector returns led equity markets in a troubled 2022 during an energy crisis, much as they did during the 1970s, driven by the energy crisis then. A lesson from the earlier era may apply today. The 1970s energy crisis differentiated countries' relative performance based on their energy intensity, with market impacts that lasted well beyond that decade. One example: Largely because Japan's energy intensity at the time was almost 50% lower than that of the U.S., the Japanese economy and equity market were among the main beneficiaries of that era's energy crisis (**Exhibit 6A**). The energy crisis boosted demand for Japanese industrial products, such as cars that were smaller and more fuel-efficient than those manufactured in the U.S. and Europe. That demand marked the start of two decades of outperformance by Japanese stocks and low correlation to global markets (**Exhibit 6B**).

Today, the shift to sustainable energy and lower carbon intensity may again be what differentiates the performance of major economies and markets. But instead of looking toward one market that stands to benefit, we think investors seeking exposure to the energy transition theme today should probably choose a global approach in equities. China is the global leader in the clean energy supply chain and adoption; our proprietary J.P. Morgan ThemeBot⁸ gives Japan and Europe high scores for equity indices aligned with emission reduction and renewables themes (**Exhibit 7**). In addition, investors can turn to alternative asset classes investing in the infrastructure (such as carbon capture, wind and solar) necessary for the energy transition globally, and in timberland and liquefied natural gas (LNG) transport.

Japan's economy thrived in the 1970s and '80s thanks to its relatively low energy intensity

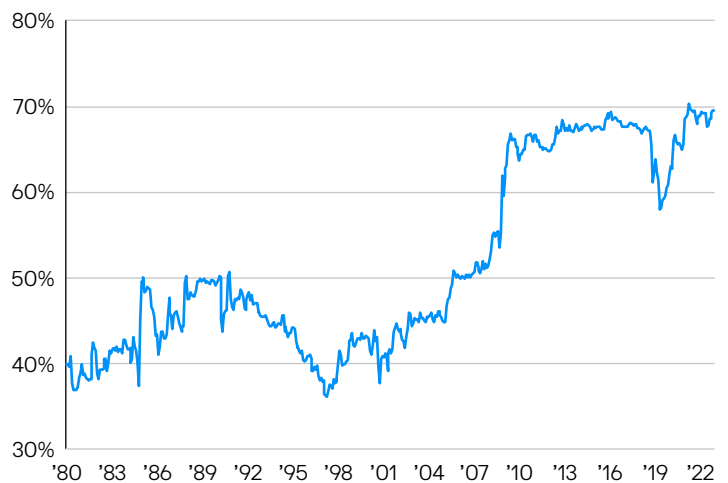
Exhibit 6A: Energy intensity (primary energy consumption/unit GDP)



Source: Our World in Data, U.S. Energy Information Administration, Energy Institute Statistical Review of World Energy, Gasunie unit converter; data as of September 30, 2023. Energy intensity is measured in megajoules per 2011 USD (purchaser price parity).

In the 1970s and '80s, the Nikkei 225 stock index showed a low correlation to global equities

Exhibit 6B: 10-year rolling correlation of monthly returns, Nikkei 225 index vs. MSCI World Index ex-Japan

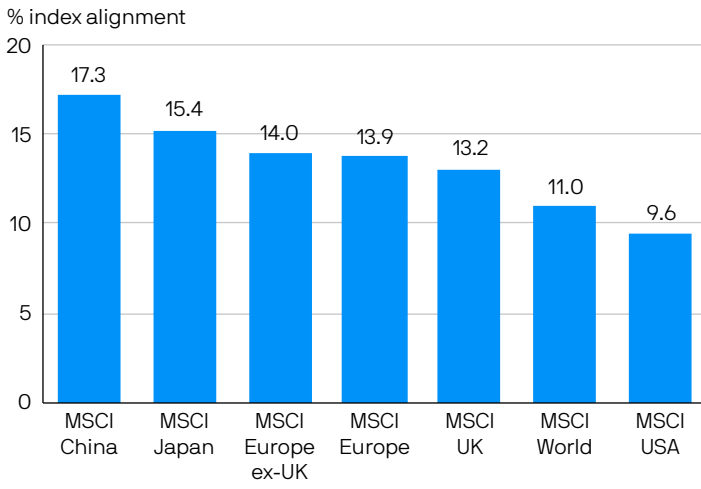


Source: Refinitiv Datastream; data as of December 31, 2022. The 1980 data point represents the end of the first rolling 10-year period and covers the 1970s.

⁸ The ThemeBot is a proprietary artificial intelligence tool built within J.P. Morgan Asset Management's end-to-end technology platform, Spectrum.™ ThemeBot uses natural language processing to create a mind map of words and phrases related to a theme, which are further curated by portfolio managers and research analysts to ensure we accurately capture the theme. ThemeBot rapidly analyzes hundreds of millions of data sources and ranks stocks based on textual relevance and revenue attribution.

The energy transition is a thematic opportunity best captured through global investing

Exhibit 7: Estimated index exposure to the energy transition (emissions reduction and renewables)



Source: J.P. Morgan Asset Management; data as of May 31, 2023. Estimated index exposure to the energy transition (emissions reduction and renewables) based on our ThemeBot’s output.

The tech theme: In the recent U.S. tech boom, secular demand helped mitigate a market downturn

The U.S. tech sector’s outperformance during the period of slow growth following the global financial crisis is another example of a secular demand trend that provided resilience to investors in the sector.

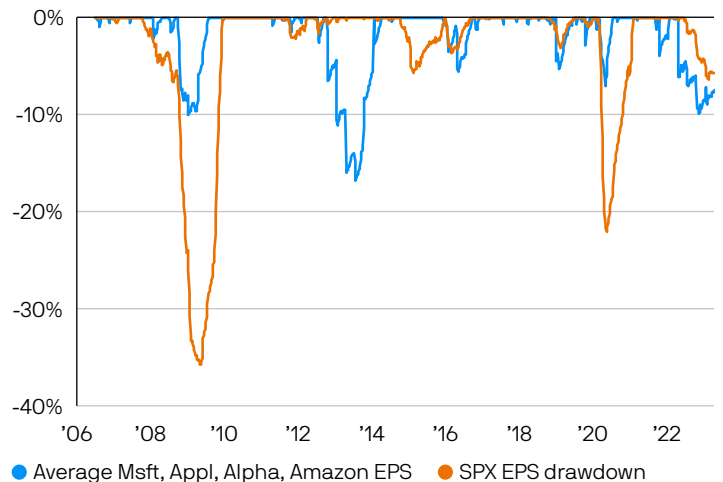
Post-crisis, well-timed innovation in key technology products (including smartphones, online advertising and advanced logistics) accelerated the growth rates of mega cap tech stocks, leading to sharp increases in their market capitalization and multiples. When a recession arrived in 2020, these companies proved to be well insulated. Secular demand for tech persisted despite the economic environment, and the relevant mega large cap tech stocks suffered a more moderate earnings drawdown (Exhibit 8) than the overall index – and investors saw the benefit in their portfolios.

Looking ahead, we expect new secular demand themes will provide diversification in times of economic stress and/or recession, potentially delivering resilient and less cycle-aware revenue streams. Over our forecasting horizon, we believe the proliferation of artificial intelligence technology will continue to support the relative resilience of selected technology companies’ earnings, and of private equity returns (for strategies that invest in AI-focused companies).

The energy transition and the technology/AI themes are just two examples of thematic alpha that investors can potentially use to diversify their portfolios. Today, the development of AI tools in asset management, such as our proprietary ThemeBot, allows asset managers to screen vast numbers of stocks to quantify their alignment with promising themes, such as genetic therapies, smart cities and the energy transition. Private managers can also potentially capture these emerging themes as private equity and venture capital investors seek deals and help finance innovations as new themes emerge.

The resilience of select mega cap tech stocks’ earnings suggests secular demand’s potential to mitigate downside

Exhibit 8: Drawdown in earnings of select mega cap tech stocks vs. S&P 500



Source: Bloomberg, J.P. Morgan Asset Management; data as of April 2023.

5. Alternatives: Opportunities to harness alpha, hedge inflation and diversify

Alternative investments have historically demonstrated an ability to mitigate overall portfolio volatility and reduce equity beta across time, delivering more resilient all-weather portfolios. Within this diverse universe, however, certain categories stand out for their likely suitability in times of high inflation and market volatility.

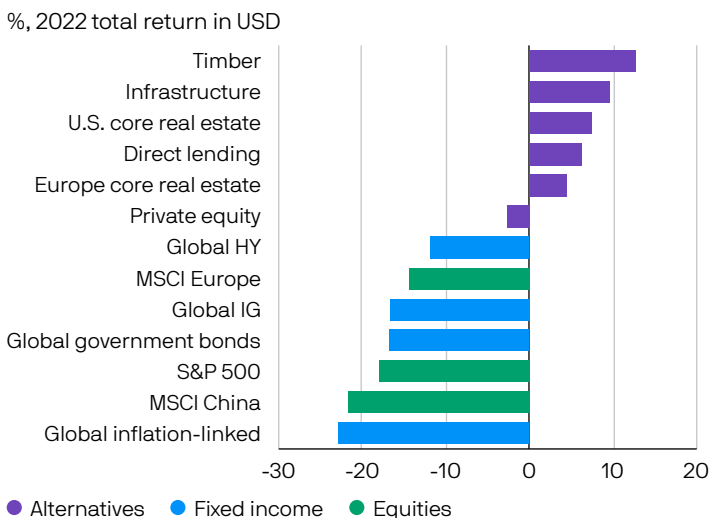
During 2022, as inflation accelerated and interest rates rose, core real assets – including real estate, infrastructure, transport and timberland – benefited from inflation-adjusted revenue streams because of their particular attributes (e.g., staggered lease terms that reprice based on inflation expectations, inflation-indexed returns, expense pass-through mechanisms and asset values that adjust to reflect input costs for new supply and/or inelastic supply). Their characteristic stable real cash flows have allowed them to generate positive real returns as virtually all other asset classes have struggled (**Exhibit 9A**).

Some analysts contend that this is simply a feature of illiquid assets being slower to reflect drawdowns than public market assets. But history bears out the resilience of real assets in previous inflation-induced bouts of market volatility. During the high and rising inflation periods of the 1970s and 1980s, real estate, infrastructure and gold were among the few asset classes that posted positive real returns, with low correlation to equity and fixed income markets.

Other categories of alternative assets have also demonstrated diversification benefits historically in periods of public market stress and increasing dispersion, and over the long term have presented opportunities to capture active alpha (**Exhibit 9B**). Hedge fund managers in particular can use their tactical flexibility to take long and short positions across a wide range of asset classes. During 2020, when stock and factor dispersions were at historical highs, macro hedge funds' performance remained resilient. Alternative credit can provide a measure of equity diversification, and managers can take opportunistic positions during periods of high interest rates and credit stress.

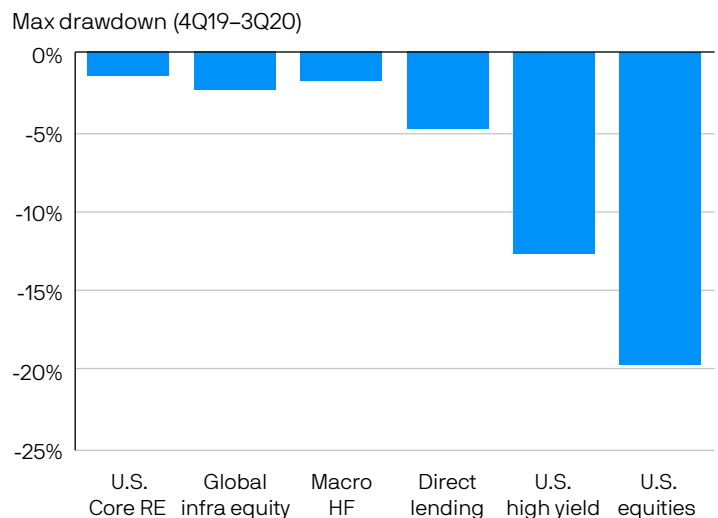
Amid inflation surges and public market stress, real assets and hedge funds excelled, with low correlations to stocks and bonds

Exhibit 9A: Real assets offered positive returns during the recent inflation spike (2022)



Source: Bloomberg, Burgiss, Cliffwater, FactSet, HRFI, MSCI, NCREIF and J.P. Morgan Asset Management. Past performance is not a reliable indicator of current and future results.

Exhibit 9B: Real assets and hedge funds provided downside mitigation to the overall portfolio during the COVID pandemic



Source: Bloomberg, NCREIF, HFRI and J.P. Morgan Asset Management. The max drawdown denotes the maximum historical peak-to-trough decline in asset values using quarter returns from 4Q 2019 to 3Q 2020 in local currency.

As alternative investments continue to evolve and grow, investors' use of the asset class should follow suit and broaden. In the past, the small size of alternative allocations biased asset allocators toward the highest returning categories – some of which (such as private equity) have been challenged in the current environment.

A larger footprint for alternatives within portfolios would allow for further diversification potential; we call this “diversifying the diversifier.” The active management of open-end core/core-plus alts funds⁹ (which have historically demonstrated intracategory dispersion at different points in the cycle), coupled with the active management of closed-end noncore funds through manager, style and vintage year selection, can potentially generate a stable source of alpha across full market cycles.¹⁰ Our experience during the current period of macroeconomic uncertainty and elevated inflation supports our confidence that alternatives should continue to provide alpha, inflation resiliency and diversification.

Additional insights from robust optimization

A fundamental concern with the classic mean-variance optimization approach is that it starts from a fixed set of returns, volatilities and correlations that are generally derived from an independent set of long-term capital market assumptions, and can't effectively incorporate a degree of uncertainty in the underlying inputs.

In the more uncertain world we forecast, with elevated macroeconomic volatility and inflation risks, the search for resilient portfolios leads us to consider alternative methods for deriving the model inputs that acknowledge the underlying parameter uncertainty.

Pivoting from traditional MVO to robust strategic asset allocation with parameter uncertainty

To better capture the impact of uncertainty, we introduce our robust strategic asset allocation (SAA) framework, which we utilize to provide our institutional clients with greater insights into portfolio design. This SAA framework uses Monte Carlo simulations to define the range of plausible risk, return and correlation assumptions across the asset classes considered. The technique incorporates our Long-Term Capital Market Assumptions (LTCMA) forecasts and also information from thousands of different possibilities (conditioned on our prior beliefs and historical data).¹¹

Under each simulation, we can identify optimal portfolio weights for varying risk appetites. The robust SAA is defined as the average of the optimal portfolio weights across all the simulations. Investors can utilize robust portfolio optimization to generate solutions that should perform well across a wide range of economic scenarios, not only under a single market environment.

To illustrate the power of this framework, we consider a diversified portfolio that invests in a broad set of asset classes.¹² **Exhibit 10** visualizes the full range of optimal asset weights under the different scenarios targeting an expected return of 8%, with the variability across key assumptions. The chart captures the suggested portfolio in this framework (the black bar) and also the confidence interval for each asset class. The confidence intervals can be interpreted as a range within which an investor's allocation can be overweight or underweight while remaining (with a high level of confidence) in a near-optimal state. The wider the range of possible allocations and the wider the confidence interval, the less certain we can be that a specific allocation point estimate is truly optimal.

⁹ Core/core-plus alts represents strategies with forecastable cash flow and high quality counterparties, such as real estate, infrastructure and transport.

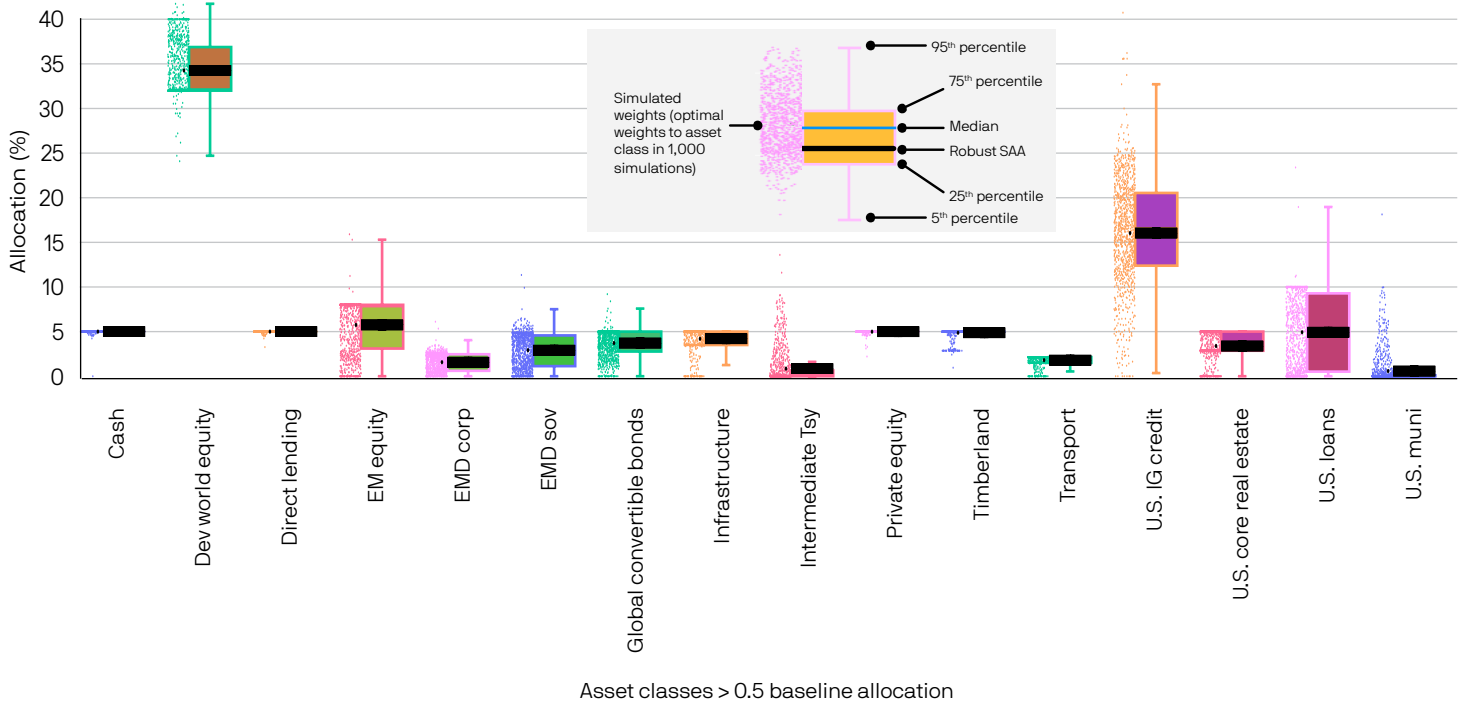
¹⁰ Pulkit Sharma, Jason DeSena and Richard Wang, “Investing in core/core-plus alternatives: Capturing return dispersion alpha while managing risk,” and “Alternative asset returns: Apples, oranges and best practices,” J.P. Morgan Asset Management, July 2022.

¹¹ This is formally called a Bayesian approach.

¹² In this illustration, we used our J.P. Morgan 2023 LTCMA USD matrix as the starting assumption.

Robust portfolio optimization: Optimal asset weights and confidence intervals suggest when allocators should rebalance, allow greater drift and exercise tactical judgment

Exhibit 10: Range of portfolio weights using robust SAA, applied to a portfolio targeting an 8% expected return



Source: EIOPA, Bloomberg; data as of September 30, 2022. J.P. Morgan Asset Management interpretation and analysis. There are some basic constraints incorporated to shape the allocation to be suitable for the investor – for example, a minimum cash level for liquidity and a limit on single-strategy allocation sizes. EM: emerging market. IG: investment grade. The above analysis is based on simulations with an expected return of 8%.

We highlight two practical uses for this information:

- To provide guidance about when to implement a rebalancing trade to bring the portfolio back to its strategic benchmark. Asset classes with wider confidence intervals may be allowed to “drift” further before rebalancing
- To offer a safe range within which an asset allocator might exercise tactical judgment regarding possible tilts in the portfolio

For example, in Exhibit 10, U.S. investment grade credit’s confidence interval is much wider than infrastructure’s, which is closely bounded around the optimal weight. This means that we have high confidence that it is ideal to own infrastructure at a 5% weight, while the optimal weight for investment grade credit varies quite a lot and depends on the state of the world.

Bringing our recommendations to life: How might an enhanced, balanced and smarter portfolio look?

Robust SAA design helps create a portfolio with greater resilience under various environments by expanding from a simple 60/40 stock-bond mix to a more balanced, enhanced set of allocations that includes wide exposures to alternatives. But to achieve the full potential benefits of all the dimensions of diversification we have covered, we recommend investors consider layering on additional diversifiers.

We believe the dimensions of diversification summarized in Exhibit 1 should be part of investors' broad toolkit to help guard against changing macroeconomic regimes and unexpected shocks. The following illustrative example brings this opportunity to life:

- 1. Starting point:** A 60/40 stock-bond portfolio
- 2. Diversify beta with alts:** As **Exhibit 11A** shows, the core beta risk of equity and duration is diversified by global real assets (a blend of global real estate, infrastructure, transport and timberland), along with private equity, direct lending, hedge funds and commodities.

- 3. Layer in additional strategies, together:** GTAA, risk premia and an FX overlay. These strategies can be seen as further overlays. In our illustrative portfolio, we scaled the return stream to a 1% tracking error for each of these additions. Added as a basket, these are very diversifying and run very contained risks.

- 4. Add further diversification opportunities with active equity security selection:** Our studies suggest benefits from allocating some equity exposure to active managers and to equities poised to benefit from thematic investing and long-term trends.

Our illustrative portfolio shows how, in a world in transition over our LTCMA horizon, investors may tap into underlying securities dispersions to achieve sufficient diversification with a varied set of exposures. The illustrative portfolio in Exhibit 11A captures all these dimensions to theoretically smooth returns over time. Without the need to anticipate an inflation shock, the set of allocations would have significantly mitigated the impact of the 2022 market drawdown. Compared with the core 60/40 portfolio, which lost more than 15% in 2022, this enhanced balanced portfolio declined less than 10%, a one-third downside reduction (**Exhibit 11B**).

Our collection of diversifiers, applied to a simulated 60/40 portfolio, would have buffered the losses of 2022

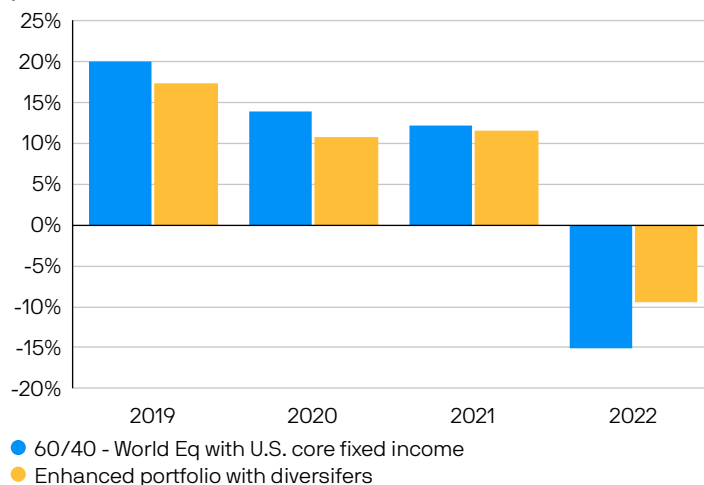
Exhibit 11A: Portfolio weight of an illustrative enhanced beta portfolio

Asset list	% of portfolio
U.S. cash	0.0%
U.S. intermediate Treasuries	10.0%
U.S. inv grade corporate bonds	20.0%
U.S. high yield bonds	3.0%
Emerging markets sovereign debt	3.0%
Developed markets equity	36.0%
Emerging markets equity	5.0%
Global real asset	10.0%
Diversified hedge funds	1.0%
Direct lending	3.5%
Private equity	3.5%
Commodities	1.0%

Source: J.P. Morgan Asset Management. Global real assets consist of a blend of 50% diversified real estate, 30% infrastructure, 15% transport and 5% timberland across developed markets.

Our collection of diversifiers helped smooth out portfolio returns over multiyear horizons, including 2022

Exhibit 11B: Annual return of a 60/40 stock-bond portfolio vs. portfolio with diversifiers



Source: J.P. Morgan Asset Management; data as of July 31, 2023. USD 100 invested at the end of 2018 would result in USD 130 for the 60/40 portfolio and USD 132.5 for the simulated enhanced portfolio with diversifiers.

This portfolio is not expected to outperform a 60/40 in all periods. But it can be expected to help prove its value when it is most needed; long-term wealth creation is not only about generating more return but also avoiding wealth destruction. In an up period, such as 2019–21, the simulated portfolio’s annual performance is very respectable: a return above 10%. Through the cycle, the smarter portfolio’s cumulative return is in line with the 60/40 but with a much improved downside (Exhibit 11B).

A liquid version of the smarter portfolio

We attempted to demonstrate, and to illustrate in Exhibits 11A and 11B, how an enhanced, balanced and smarter portfolio utilizing the full toolkit might look. But we contend with limited data availability and a short time period. In the case of alternatives – a central element of this smarter portfolio – the slow-moving, appraisal nature of illiquid assets may contribute to the lower volatility of portfolio returns. The smoothed return reflects investors’ experience on the balance sheet and therefore the accounting risks, but may not accurately capture the true economic risks of illiquid alternatives, especially within a short time frame.

To address this, we also created a simple, liquid version of the smarter portfolio, leaving out illiquid assets, helping illustrate that:

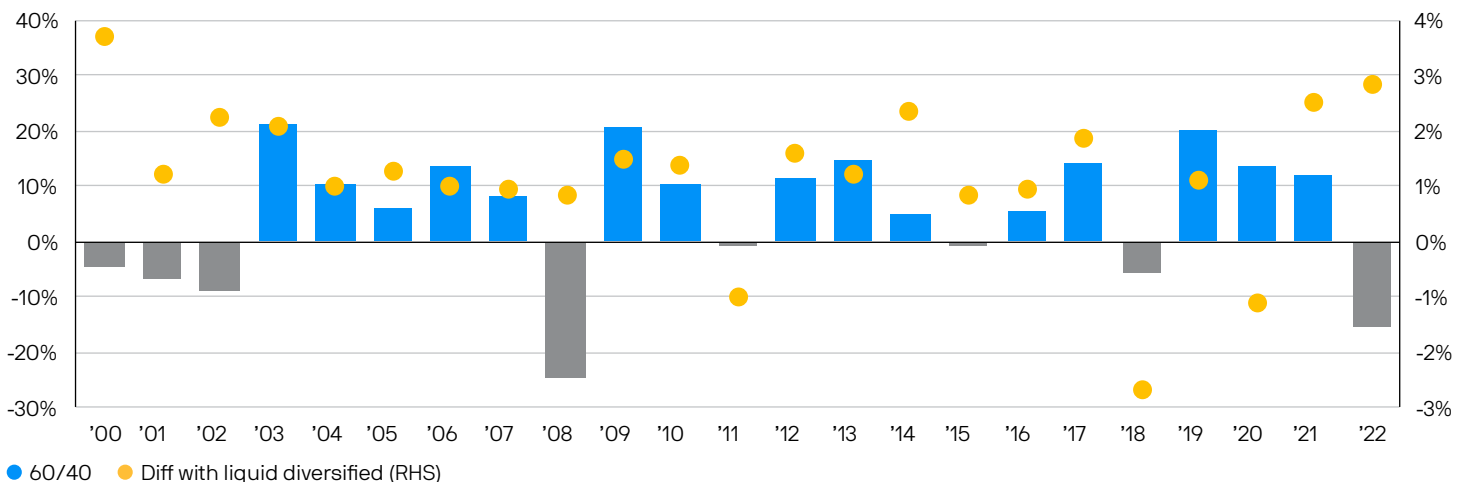
- Our toolkit can be adapted to different investor bases, including those with liquidity constraints
- This is an effective group of diversifiers, and removing one source of diversification would not affect its general efficacy

Again, we started with a 60/40 stock-bond portfolio. We skipped step 2 (diversify with alts) and proceeded as discussed in step 3 (layering in additional strategies, together: GTAA, risk premia and an FX overlay) and step 4 (adding active allocation across asset classes and security selection in equities). **Exhibit 11C** shows the simulated returns of this liquid version of the smarter portfolio, and its robustness since 2000.

Most years, the liquid portfolio helped improve annual returns. More importantly, since 2000 there have been six years with negative 60/40 portfolio returns, and the smarter portfolio outperformed five times out of six (83% of the time). The smarter liquid portfolio provided valuable downside mitigation in challenging environments over this longer horizon and also generated a better return.

The liquid subset of the smarter portfolio toolkit demonstrated valuable downside mitigation and better returns than the 60/40

Exhibit 11C: Annual returns of 60/40 stock-bond portfolio (4.7%) vs. liquid version of our portfolio with diversifiers (5.9%), 2000–22



Source: J.P. Morgan Asset Management; data as of July 31, 2023. Difference is the diversified return minus 60/40 –i.e., the positive number is outperformance and negative number is underperformance.

Conclusion: Leveraging inexpensive diversifiers to build smarter portfolios

While history (such as 2022) may not repeat itself, its echoes will resonate for some time to come. Investors' reliance on models that use historical data from a recent, exceptional period of economic history caused most of them to miss what, in retrospect, can seem like an obvious risk (inflation). By the time stock-bond correlation had risen, it was too late.

Our 2024 LTCMA forecasts call for the current period of elevated macroeconomic uncertainty to continue, though we don't know for how long. We can, however, suggest a path forward.

Fixed income remains an indispensable portfolio diversifier against growth shocks. As we've discussed, incorporating additional dimensions of diversification, such as active management, risk premia/FX strategies, thematic investing and alternatives, offers opportunities to achieve more robust outcomes across a wider range of regimes – and at times of unexpected or sudden regime change.

While analyzing various sources of diversification, we have not lost sight of the cost of building a more robust portfolio. Many hedging strategies not discussed here (such as put options) can be expensive and may create significant return drags over time. One of the things we like about our proposed basket of diversifiers is that it is not costly. Our LTCMA forecasts are for bond returns to normalize and many other forward-looking asset valuations to be close to fair, making the present moment a timely opportunity to reshape portfolios.

Moreover, many of these proposed strategies have historically delivered positive returns. Even if we assume zero excess return from an average U.S. large cap core manager (with performance in the 25th to 75th percentile) – a very conservative assumption – there is merit in using active management, as it is almost a “free” diversifier.

Finally, we recommend investors adopt a more robust form of portfolio optimization to help fill in the blind spots in the simple mean-variance approach. The value of models in the capital allocation process lies in their ability to distill the complexity of the global financial markets down to a few key variables. Using historical data to populate such models is unavoidable but can sometimes lead to unpleasant surprises, especially around an unanticipated regime shift.

Investors can avoid solutions that will only perform well in a single market outcome by utilizing robust portfolio optimization. Our simulation generates solutions that would perform well across a wider range of scenarios.



II Assumption articles



Currency exchange rate assumptions

As U.S. and non-U.S. inflation assumptions converge, a smaller decline for the U.S. dollar

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In brief

- Our 2023 currency exchange rate return assumptions are directionally little changed. We continue to believe that the USD will unwind its overvaluation over the Long-Term Capital Market Assumptions (LTCMA) time horizon.
- We reduce the magnitude of the USD decline from last year's edition due to some reversal of the dollar's 2022 strength and because our forward-looking inflation assumptions for the U.S. and non-U.S. developed economies have converged.
- We expect central banks will have to continue to prioritize meeting their inflation targets over maintaining currency competitiveness, allowing more currency pairs to converge closer to their fair value over our forecast horizon.
- A higher long-term European Union (EU) inflation forecast is consistent with a lower annual euro appreciation rate over our LTCMA horizon. The end of the era of negative rates, and reduced risks of an EU breakup, strengthen the probability that the euro converges toward its fair value, as investors are likely to raise their exposure to euro-denominated assets.
- Gradual but solid steps toward reflation of the Japanese economy lead us to raise our 2024 LTCMA growth and inflation forecast, which favors our forecast for an eventual yen appreciation.
- Limited inflation pressures reduce the impetus for the People's Bank of China to refocus its policy away from currency competitiveness.

The broad themes shaping our 2024 currency exchange rate return assumptions, and the direction of the trends, are little changed from last year. We continue to believe that the USD is due for a sizable but gradual decline, given its starting valuation and the U.S. economy's still-higher inflation profile vs. most other developed markets. We also maintain that over our LTCMA time horizon, the U.S. dollar should unwind some of the overvaluation associated with being the world's premier international reserve currency.

Contrary to prior business cycles, we expect central bankers will have to prioritize meeting their inflation targets over containing currency competitiveness –

allowing more currency pairs to converge closer to fair value over our forecast horizon.

We reduce vs. last year's edition the magnitude of the broad-based USD decline that we expect. On a nominal trade-weighted basis, we forecast the U.S. dollar to depreciate less than -0.7% per annum (p.a.), compared with last year's forecast of 1.4%. This is attributable in part to some reversal of the dollar's strength in 2023 compared with 2022. It is also because our forward-looking inflation assumptions for the U.S. and non-U.S. developed market (DM) economies have generally converged (**Exhibits 1A and 1B**).¹

We expect DM currencies to appreciate and EM currencies to depreciate vs. the USD

Exhibit 1A: LTCMA FX return drivers, major DM currencies vs. USD

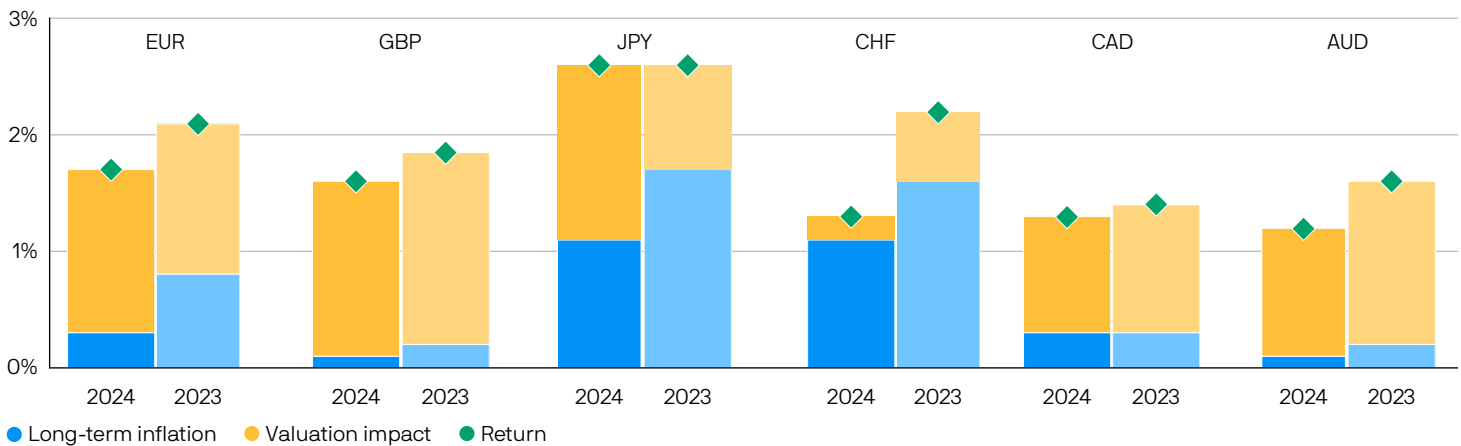


Exhibit 1B: LTCMA FX return drivers, major EM currencies vs. USD



Source: J.P. Morgan Asset Management; data and forecasts as of September 30, 2023. FV: fair value; EUR: euro; GBP: British pound; JPY: Japanese yen; CHF: Swiss franc; CAD: Canadian dollar; AUD: Australian dollar; CNY: Chinese renminbi; BRL: Brazilian real; MXN: Mexican peso; INR: Indian rupee; TWD: Taiwanese dollar; ZAR: South African rand.

¹ "Macroeconomic assumptions," 2024 Long-Term Capital Market Assumptions.

Since the last edition, our inflation assumptions have increased further for many developed market economies, excluding the U.S. Reacting to the sustained change in inflation, monetary policymakers across DM economies have had to extend an already rapid policy rate tightening cycle, moving far deeper into restrictive territory. Indeed, most major central banks are only now, as we publish, at or around our expectation for peak policy rates for this economic cycle.

We do not expect an imminent global growth downturn that might lead investors to favor the USD's safe-haven properties. Rather, U.S. inflation has proven sticky and growth more resilient than in other regions, with considerably higher terminal rate levels than in prior economic cycles, supporting ongoing USD richness.

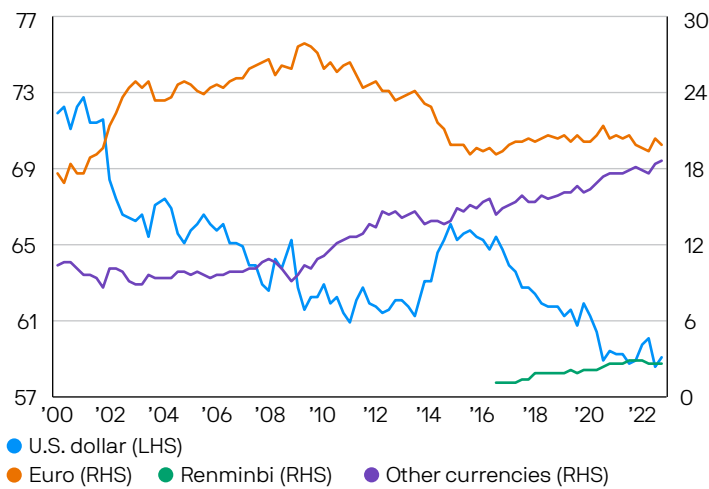
Most central banks' fight against above-target inflation remains unfinished. By our estimation, restrictive monetary policy prevails in all major economies except China and Japan. Developed market monetary policymakers' guidance reflects a hawkish stance, and for several central banks incremental rate hikes remain a possibility. The Bank of Japan (BoJ) is likely to prioritize the removal of yield curve control and ending quantitative easing before raising rates. Even as long-term inflation expectations in Japan move upward, uncertainty persists about whether the BoJ's inflation target can be achieved.

We expect the U.S. dollar to remain the dominant global reserve and trade currency. USD exceptionalism goes well beyond Treasuries' (admittedly now diminished) yield advantage; it relates to the overwhelming size, depth and breadth of USD-denominated capital markets, which make de-dollarization unlikely over our LTCMA time horizon. We expect this to be maintained.

However, we see a greater likelihood that the euro and yen capture increasing shares of trade and reserve flows as their economies exit the quantitative easing and negative interest rate regimes of the recent past – and for these currencies' weights in foreign exchange reserves to grow more proportionate to their roles within the world economy (**Exhibits 2A and 2B**). Said differently, we do not forecast all currencies to fully converge to present-day fair value vs. the USD (nor did we last year). Instead, we expect currencies such as the euro and yen to appreciate by 1.7% and 2.6%, respectively, per annum – a relative strengthening more appropriate to their economic weight and purchasing power parity (PPP).

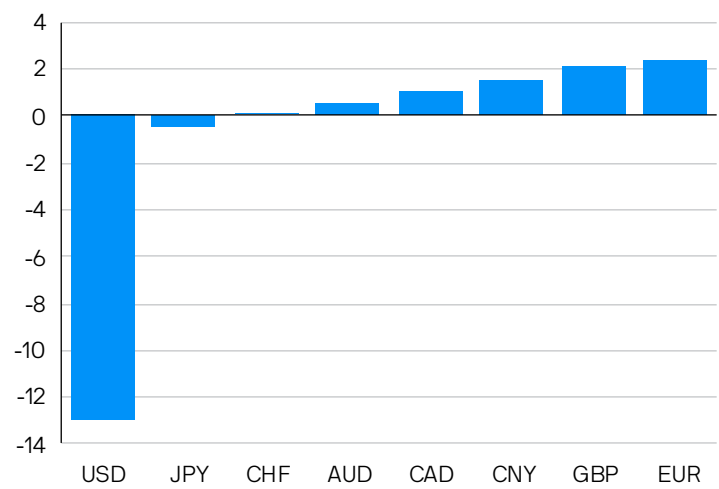
We forecast currencies strengthening commensurate with their economies' economic weight, reserve status and trade, resulting in a less strong USD

Exhibit 2A: Official foreign exchange reserves by currency (%)



Source: IMF database, J.P. Morgan Asset Management; data as of July 20, 2023.

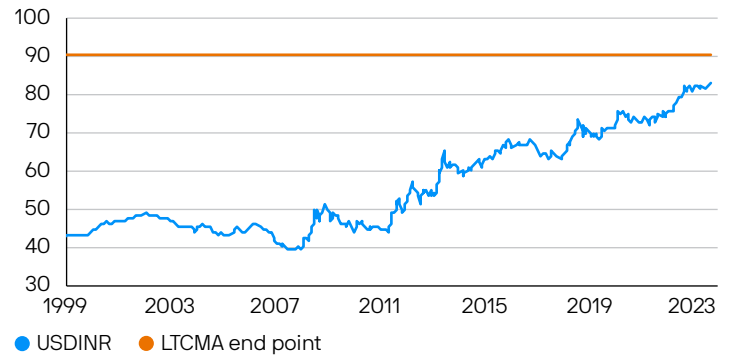
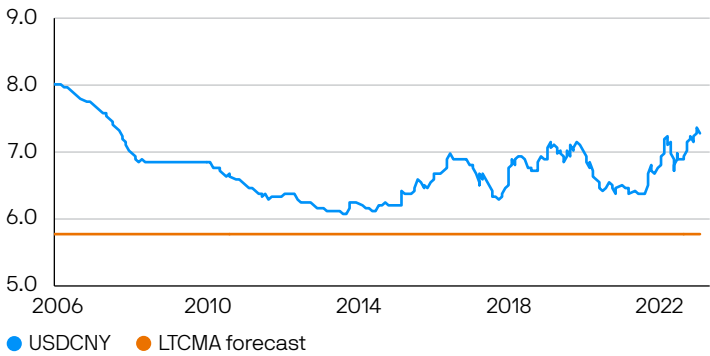
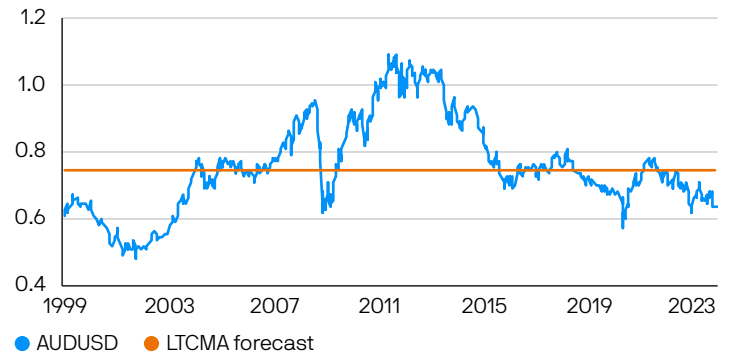
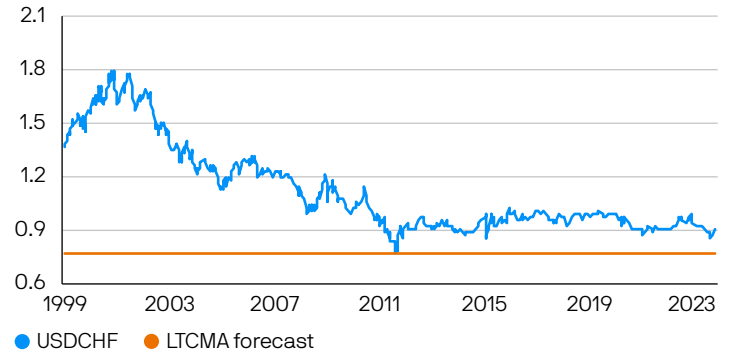
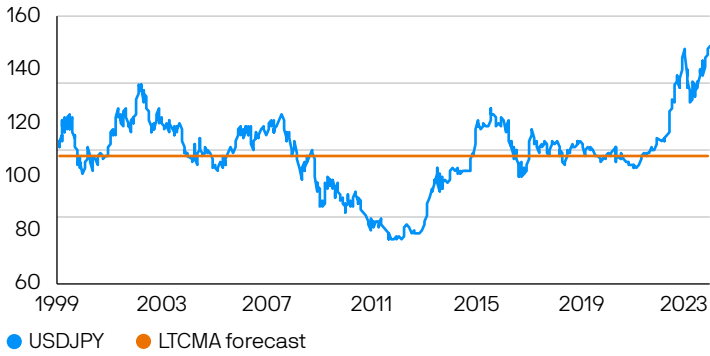
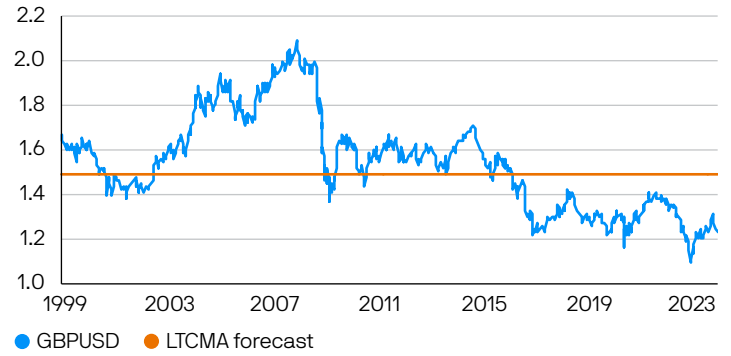
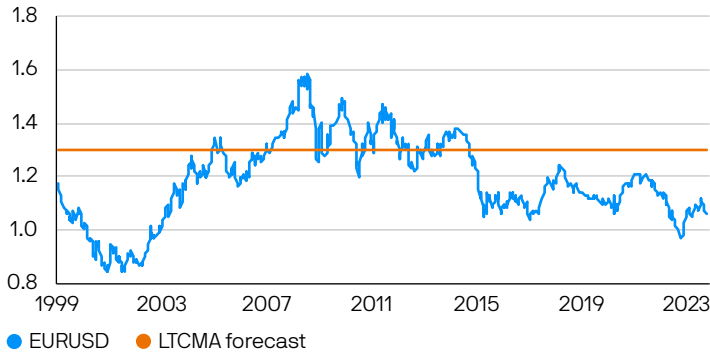
Exhibit 2B: Recent decline of the USD in global foreign exchange reserves (percentage points)



Source: IMF database, J.P. Morgan Asset Management; data as of July 20, 2023. The change period is 4Q 2000 vs. 1Q 2023, except for the Australian and Canadian dollars (starting period 2012) and the renminbi (starting period 2016).

Spot exchange rates to USD have mostly moved closer to our long-term forecasts

Exhibit 3: PPP fair value and spot exchange rates for selected currencies



Source: Bloomberg, J.P. Morgan Asset Management; data and forecasts as of September 30, 2023.

Successful reflation of the global economy and a return to trend growth globally continue to be necessary catalysts for DM currencies to sustainably appreciate vs. the U.S. dollar. We believe that reflation has finally occurred in most regions, and Japan is increasingly showing signs of reflating successfully. But the vigor of currencies' convergence to fair value remains uncertain, and the convergence period will likely be extended, as achieving trend growth rates remains somewhat elusive, particularly in Europe and China.

In sum, we expect the normalization of inflation and growth to create the conditions for broad-based U.S. dollar weakness (**Exhibit 4**). But the process has been halting, and its timing remains fraught with uncertainty, with a wider confidence interval in our FX forecasts.

Model and methodology

A purchasing power parity framework continues to be the basis of our approach to determining present-day fair value exchange rates (**Exhibit 3**). To arrive at our long-term exchange rate assumption (future fair value), we project present-day fair values forward using the LTCMAs' underlying macroeconomic assumptions. For a more detailed description of the methodology, please refer to the 2023 LTCMA publication.²

Normalization and sensitivity

The key sensitivity issues underlying our currency assumptions modeling are how much hotter, and for how much time, an economy's trend rate of inflation and real GDP growth are likely to run relative to our macro forecasts (**Exhibit 1**).

Mechanically, a 1% increase in an economy's equilibrium rate of inflation (absent an increase in another economy's inflation rate) implies about 1% currency depreciation per year over our forecast horizon. This concept holds true as well in emerging markets, where we note the following: 1% of real GDP growth per unit of labor by a single emerging market (EM) economy implies about 0.5% of additional currency appreciation per year.

Major currency pairs

Once again, we group currency pairs vs. the U.S. dollar thematically into three buckets:

- "Cyclical reversers" likely to appreciate as much as or close to what their fair value would imply, and relatively more when returns are compared with the prior cycle
- "Competitive devaluers" likely to appreciate far less than their fair value would imply, as those economies' central banks continue to favor export competitiveness
- The "structurally challenged," which we believe face idiosyncratic hurdles that they will need to overcome before they can begin to converge to their fair value

In last year's forecast, risks were fairly mechanical. As global economies were experiencing the peak of post-COVID inflationary pressures, potential forecast error was largely centered around the extent to which near-term disinflation from historical levels would deviate from our forecasted normalization trajectory.

This year, with clearer visibility into underlying inflation, potential forecast error centers around the persistence of globally tighter monetary policy and the uncertainty around fiscal policy over the medium term. Relative to prior cycles, we expect global policy rates to be higher, on average, forcing some economies we previously called competitive devaluers to behave more like cyclical reversers.

² Michael Feser, "Currency exchange rate assumptions: Rich U.S. dollar headed toward fair value," *2023 Long-Term Capital Market Assumptions*, J.P. Morgan Asset Management, November 2022.

We continue to have conviction in a secular, more gradual USD depreciation trend**Exhibit 4: Assumptions for changes in selected currency exchange rates vs. USD, nominal and real**

	Nominal			Real			Forecast level (conventional)			
	2024	2023	Chg	2024	2023	Chg	2024	2023	Chg	Chg %
Australian dollar	1.20%	1.60%	-0.40%	1.10%	1.40%	-0.30%	0.75	0.78	-0.03	-4.30%
Brazilian real	-2.50%	-1.80%	-0.70%	-0.50%	0.00%	-0.50%	6.88	6.79	0.08	1.25%
Canadian dollar	1.30%	1.40%	-0.10%	1.00%	1.10%	-0.10%	1.15	1.16	-0.01	-0.52%
Swiss franc	1.30%	2.20%	-0.90%	0.21%	0.60%	-0.39%	0.78	0.75	0.03	3.82%
Chinese renminbi	1.90%	2.30%	-0.40%	0.54%	0.90%	-0.36%	5.77	5.35	0.41	7.74%
Euro	1.70%	2.10%	-0.40%	1.40%	1.30%	0.10%	1.31	1.27	0.03	2.70%
British pound	1.60%	1.85%	-0.25%	1.50%	1.70%	-0.20%	1.49	1.40	0.08	5.91%
Japanese yen	2.60%	2.60%	0.00%	1.50%	0.90%	0.60%	108	105	3.36	3.20%
Mexican peso	-3.60%	-1.50%	-2.10%	-2.12%	-0.10%	-2.02%	27.49	24.30	3.19	13.12%
Swedish krona	2.30%	2.60%	-0.30%	2.20%	2.10%	0.10%	8.21	8.06	0.15	1.81%

Source: J.P. Morgan Asset Management; data and forecasts as of September 2023. All exchange rates are quoted in market conventional format.

Cyclical reversers returning to fair value: EUR, CHF, AUD, CAD, SEK

These currencies remained undervalued vs. the USD through the prior economic cycle, relative to their LTCMA-implied end points, and we think they will return to fair value over the LTCMA forecast period – especially the euro, with the end of the era of negative rates and the reduced risks of a European Union (EU) breakup. The euro is the second most important currency in the international monetary system, with a weight of around 20% in global foreign reserves (vs. 60% for the USD). The end of the prolonged period of extremely low, zero and negative rates in EU bond markets should increase EU bonds' share within global portfolios and central banks' foreign reserves, lifting demand for the currency.

Since we raise our 2024 LTCMA euro area inflation forecast (to 2.2% from last year's 1.8%), we now expect a 1.7% annual appreciation of the euro over our assumptions horizon, vs. 2.1% in 2023. Some of the following developments could promote the euro's convergence toward fair value.

- **Attractive EU bond issuance:** The recent shocks of the pandemic and the European energy crisis led the European Commission to roll out and promote large-scale public investment plans.³ These projects involved

the first-ever series of EU-issued bonds, which received high ratings and now make up a market that is expected to grow in the coming years.

Demand for these bonds signals the emergence of a more stable and resilient EU likely to attract global investment inflows that in turn strongly reduce the risk of an EU breakup. Bond proceeds will help to reduce the economic divergence in the EU, promoting investments mainly in highly indebted countries.

- **Reduced euro area financial fragmentation:** The 2022 European Central Bank (ECB) Transmission Protection Instrument is discouraging excessive speculation in the bond markets of more indebted countries, reducing volatility and increasing these bonds' appeal, as well as demand for the euro.
- **More sustainable debt loads:** The European Commission has proposed new fiscal governance rules to strengthen the sustainability of public debt; this should create the conditions for a more solid and fiscally integrated EU.⁴

³ They include Next Generation EU and REPowerEU, designed to further the green and digital transitions and accelerate EU energy independence from Russia by 2030.

⁴ The pact concerned sound public finances and coordinated fiscal policies. Member states will present medium-term plans with a country-specific "technical trajectory" to put their debt on a plausible downward path.

- **The reemergence of European exporters:** The eurozone current account deteriorated during the pandemic and the energy crisis, but many European companies are expected to resume their former export orientation. U.S.-China tensions are reshaping global trade flows, and European companies could gain an advantage by leveraging their know-how in many tech-intensive areas.

We foresee an EU backed by more solid political and institutional support, reducing the risk of an EU breakup and likely increasing global investors' appetite for EU bonds offering rising yield levels.

In Switzerland, we assume a 1.3% revaluation per annum for the CHF, after the Swiss National Bank joined the ECB in ending seven years of negative interest rates, prioritizing the fight against inflation. The Swiss central bank is expected to remain active in FX markets to avoid an excessive appreciation of its currency. That might be the case especially if geopolitical risks escalate, increasing the appetite for the CHF, considered a crucial safe-haven currency.

Competitive devaluers: We forecast CNY, KRW, TWD, JPY to remain below fair value

We expect that underlying inflation pressures will remain comparatively low in China, Korea, Taiwan and Japan, implying a low cost for maintaining their easy monetary policy biases. We think their central banks will continue to engineer relative export price competitiveness. Our assumptions therefore reflect a smaller appreciation than a full convergence to fundamental fair value would imply.

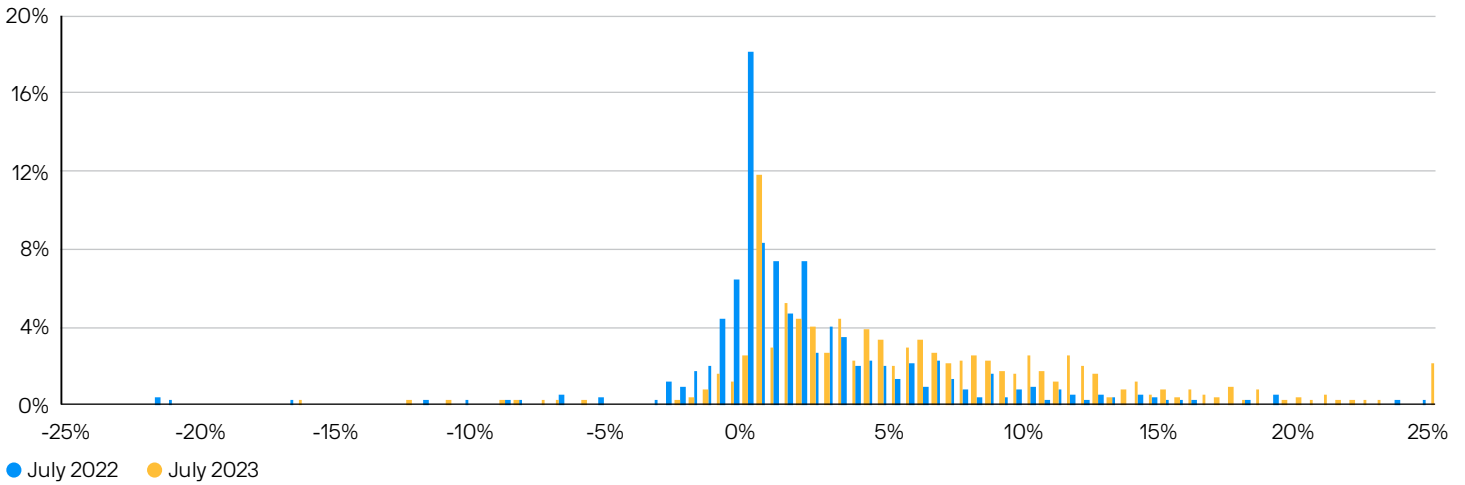
- **China:** The Chinese currency plays a limited role globally, given the size of its economy, and it is underrepresented in global foreign reserves and trade.⁵ Bilateral trade agreements may elevate the CNY, but the managed exchange rate system is likely to continue to limit its share within foreign reserves. The CNY's ascent will likely be gradual and longer term than our LTCMA forecast horizon. However, we assume that the CNY will gradually appreciate as global investors increase their exposure to Chinese assets as the country's economy grows and its financial markets continue to deepen.
- **Korea and Taiwan:** We expect monetary authorities in Korea and Taiwan to prioritize policies that keep their exchange rates competitive vs. the CNY, feeding a smaller convergence trend than their economies would otherwise justify.
- **Japan:** Japan's gradual reflation of its economy leads us to raise our 2024 LTCMA inflation forecast to 1.4%, from 0.9% last year (**Exhibit 5**), and drives our expectations for a slower yen appreciation. We forecast a 2.6% per annum rise for the JPY over our LTCMA horizon, unchanged since last year's edition.

At the 2023 Shuntō – the annual spring wage negotiations between Japanese unions and large employers – the two sides agreed to a 3.6% year-over-year pay raise, the largest jump since 1993, when CPI ran at about 2% (**Exhibits 6A and 6B**). Still, it will take time for wage growth to broaden and show enough staying power to be consistent with sustainably achieving the BoJ's inflation goal.

⁵ For example, China and Brazil signed an agreement to regulate trade in their respective currencies through China's cross-border Interbank Payment System, bypassing the Society for Worldwide Interbank Financial Telecommunication (SWIFT) system, in which the USD is central. China also has signed agreements with Iran, Pakistan and Russia intended to increase the use of the yuan in global trade.

The prices of goods and services in Japan are broadly higher

Exhibit 5: Change in Japan's core goods and services CPI (2022 vs. 2023)



Source: Japan Cabinet Office; data as of August 2023.

The 2023 negotiated rise in base pay was Japan's largest in three decades

Exhibit 6A: Results of Japan's spring 2023 wage negotiations

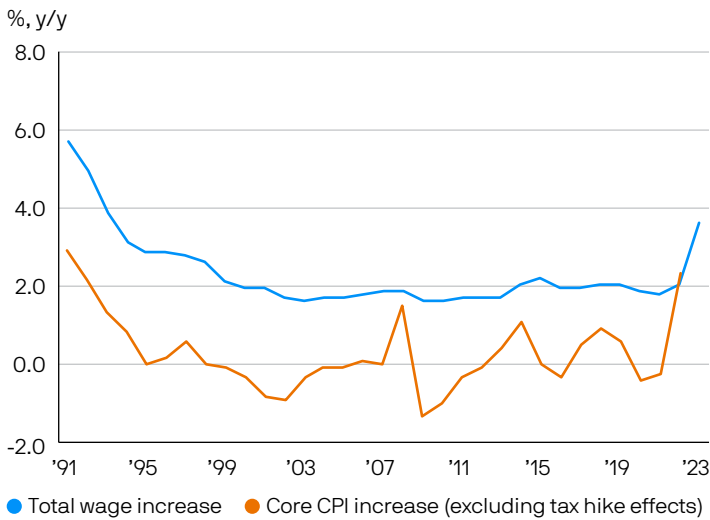


Exhibit 6B: Japanese wage increases by type of job and firm size

Total wage increase, %	CY 2022	CY 2023
Regular employees	2.1	3.6
1,000 or more	2.1	3.7
300 to 999	2.0	3.4
100 to 299	2.0	3.3
99 or less	1.9	2.9
Part-time employees	2.3	5.0

Source: Japanese Trade Union Confederation, Ministry of Internal Affairs and Communications; data as of April 2023.

The BoJ is expected to support the reflation momentum by continuing its accommodative stance; an extended period of very low real yields should limit the JPY's upside in the near term. The BoJ's normalization path is also likely to follow a different sequence from other central banks': First, end yield curve control and quantitative easing; second, exit negative interest rate policy and commence quantitative tightening, which might last for an extended period, and only after that further raise short-term interest rates.

The Japanese government fiscal stance supports the reflation agenda. Our forecast (up 0.5 percentage points over our 2023 LTCMAs) narrows the economy's inflation differential vs. other major economies and reduces the pressure for the yen to appreciate. Japan's ongoing trade deficit⁶ also constrains JPY appreciation pressure. On the other hand, Japan may preserve some of the JPY's perceived value as a safe-haven currency.

The structurally challenged: GBP, BRL, MXN, TRY, ZAR unlikely to reach fair value

We see this final group of currencies facing idiosyncratic hurdles, leading us to forecast that they will not fully converge to fundamental fair value over our LTCMA horizon.

- **The UK:** The recent rapid turnover of leaders at the helm of the UK government has not helped ease an uncertain political situation. Fiscally, the debt-to-GDP ratio is rising steeply and interest payments are increasing rapidly. However, a higher than average level of inflation and very tight labor markets (in which participation rates have not returned to pre-pandemic levels) are forcing the Bank of England (BoE) to adopt a fairly hawkish long-term policy, providing some support for the GBP. The net effect of these dynamics on GBP's long-term fair value remains unclear.
- **Brazil:** A range-bound trend (in real terms) for Latin America's biggest currency reflects uncertainty, especially over Brazil's rising social spending needs and the expected deterioration of its fiscal policy. We expect these concerns to linger over our LTCMA horizon, creating uncertainty over the real's longer-term convergence with fair value.

⁶ Japan's trade deficit is partly due to manufacturers offshoring production during a long period of globalization.



Fixed income assumptions

Fixed income returns remain attractive

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In brief

- Our fixed income assumptions are heavily impacted by our expectation that other regions will follow U.S. inflation higher, on a sustainable basis.
- Our cycle-neutral cash rate assumptions rise across major developed markets, rising most for Europe and Japan. These increases reflect our expectation that rates rise more broadly to historically normal levels and that this normalization becomes more entrenched.
- Further out on the yield curve, interest rate normalization translates to higher 10-year yield assumptions. Our 10-year cycle-neutral assumptions rise more markedly for Europe and Japan, where our outlook is for higher trend inflation over the next 10 to 15 years.
- Central banks are more likely to be successful in meeting their policy objectives over the next decade than they were over the last 10–15 years, given the more historically typical inflation environment we forecast.
- Higher macroeconomic uncertainty and rising inflation risk theoretically elevate risk premia and steepen the slope of the yield curve, but in our view, rising government bond yields globally should revive demand for longer-term bonds from large investors underweight duration. We thus keep the yield curve slope largely unchanged, leading to a level shift in the yield curve in most economies.
- The rising cost of capital increases vulnerability in pockets of the credit markets, most notably in leveraged loans, a segment with higher exposure to refinancing risk. We raise the expected cycle-neutral spread on the levered loan index and raise our U.S. high yield spread assumption.
- Our emerging market debt assumptions are little changed, with default rates consistent with historical averages.

We see higher cycle-neutral yields on a global basis

Our yield forecasts remain mostly stable in the U.S. but rise elsewhere on our expectations that central banks will catch up globally – in the European Union (EU), Australia and Japan – lifting their policy rates in response to higher inflation. Our forecasts are marked by this impact of a year-over-year (y/y) uplift in inflation assumptions outside the U.S., as we expect other regions to follow U.S. inflation higher.

We expect higher refinancing costs to impact credit markets – starting with leveraged loans, the sector most exposed; knock-on impacts in high yield (HY) are also likely. We make only minor adjustments to our fair value assumptions for emerging market (EM) debt.

The Federal Reserve (Fed) was first to grapple with rising prices, hiking interest rates in 2022–23 at the fastest clip since the 1980s. Our fixed income assumptions anticipate a coordinated, globalized return to the yield levels that prevailed before the 2008 global financial crisis (GFC), and the end of the negative (and zero) interest rates of the recent past (**Exhibit 1**).

We lift our developed market cash rate cycle-neutral assumptions as inflation expectations rise

Exhibit 1: LTCMA cash rate assumptions, 2023 vs. 2024

Cash rate assumptions	2024 LTCMAs	2023 LTCMAs	Change
U.S.	2.5	2.3	0.2
Euro area	1.9	1.4	0.5
UK	2.3	2.2	0.1
Japan	1.2	0.5	0.7

Source: J.P. Morgan Asset Management; data as of September 30, 2023.

The last few years have revealed changing attitudes in policy circles, related to both the monetary and the fiscal fronts. Pro-cyclical fiscal stimulus,¹ which has taken the form of renewed industrial policy in major economies undertaking government spending for national security reasons and to support the transition to green energy (among other goals) has helped support domestic demand and consumption.²

Demand and consumption have extended the economic cycle while adding to inflationary pressures. Moreover, tighter labor markets and higher wage negotiations in the short term should help support reflation in regions such as Japan and the euro area.

Regarding monetary policy, we note growing discussion about when and how to use unconventional policies such as quantitative easing (QE) and negative interest policies, and an awareness that these nontraditional tools carry a cost.³

We expect these policies to return to their role as emergency measures in recessionary phases, not tools used to fine-tune economies in normal times. As economies move away from deflationary risks and central banks are more likely to meet their inflation objectives, we see average policy rates through the economic cycle remaining modestly higher than was the case in previous editions.

The overall resilience of developed economies, and their ability to absorb the sharp rise in the cost of financing imposed by central banks, have meant that recessions have largely been averted so far. As policymakers raised rates in response to surprisingly persistent inflation, the short end of the interest rate curve initially rose more than the long end – causing persistent yield curve inversions. Recently, the curve has started to steepen as growth has held up better than expected, but it still remains inverted (**Exhibit 2**).

We view the stability of inflation breakevens during this bond sell-off as a sign of the anchoring of long-term inflation expectations and the market's belief in the credibility of central banks' commitment to bringing down inflation.

Our Long-Term Capital Market Assumptions (LTCMAs) expect that, on average, central banks achieve higher real policy rates than the last decade's. Central banks' actions in 2023 to a large degree confirm this expectation and give us greater confidence in our views.

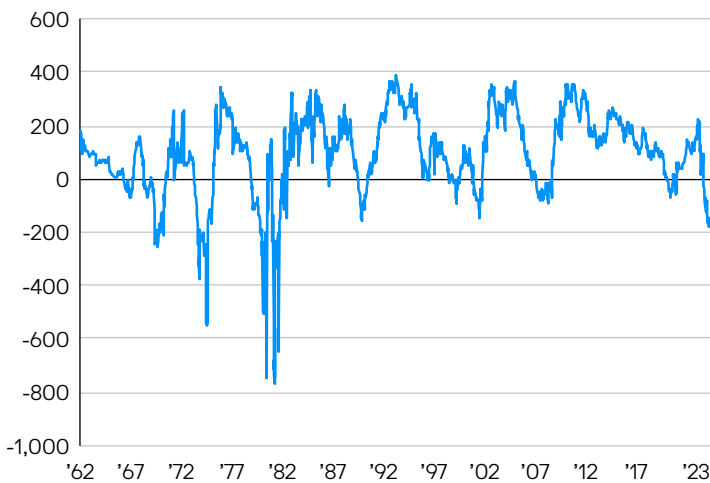
¹ Occurring in periods of economic growth rather than during the downturn phase of the cycle.

² "The state's role in the economy: How investors can assess the rise of industrial policy," *2024 Long-Term Capital Market Assumptions*.

³ In a recent speech, Gita Gopinath, first deputy managing director of the International Monetary Fund, said, "The costs and benefits of quantitative easing should ... be reconsidered. QE will likely remain a critical tool should central banks face circumstances like the post-GFC period in which unemployment runs high and inflation low even though policy rates have hit their floor. But there should be more wariness of using QE."

Yield curves have not been this inverted since the 1980s as central banks combat high inflation

Exhibit 2: 3m10y U.S. yield curve (1962–August 2023)



Source: Bloomberg, J.P. Morgan Asset Management; data as of August 31, 2023.

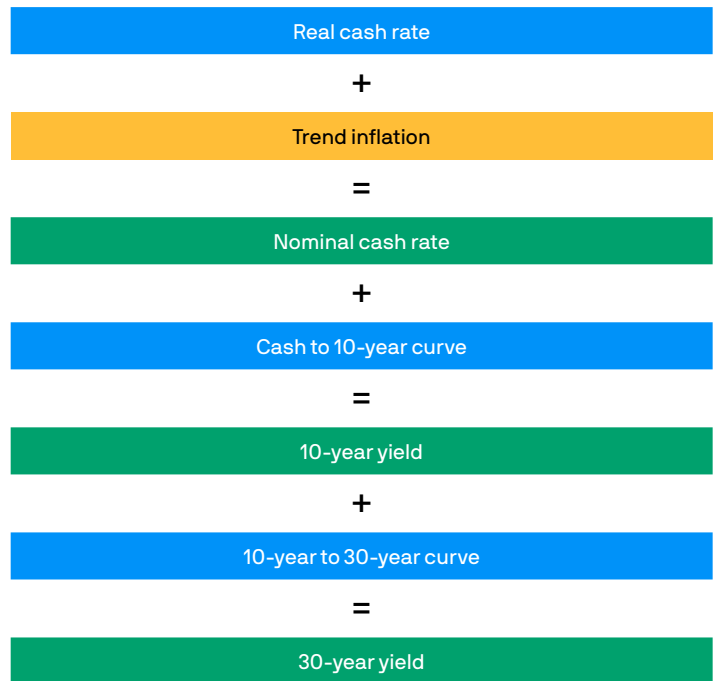
Key markets and asset classes

Model and methodology

Our LTCMAs’ cycle-neutral forecasts follow a building-block approach (**Exhibit 3**). Our long-term growth and inflation economic projections are direct inputs into those building blocks. We combine our estimates of real cash rates with the latest LTCMA inflation projections to generate estimated nominal cash rates. Next, we forecast the slopes of government bond curves to generate 10-year and 30-year bond yields, interpolating across the curve for other maturities. This produces a sovereign yield curve in each currency. These sovereign yield curves form the base for all our fixed income assumptions.

How we produce our fixed income return forecasts

Exhibit 3: LTCMA fixed income building blocks, sovereign debt



Source: J.P. Morgan Asset Management; as of September 30, 2023.

To these curves, we add spread forecasts for corporate and other nonsovereign debt sectors that we believe are fair based on the projected macroeconomic environment and the structural changes we anticipate. By combining an expected transition path from current yields to these projected yields over time with the compositional characteristics of each relevant debt market index, we ultimately arrive at forecast returns across all fixed income markets (**Exhibit 4**).

Higher inflation assumptions lift cash rate forecasts

Exhibit 4: Building-block fixed income return projections for G4 economies

	USD		GBP		EUR		JPY	
	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return
Inflation	2.5%		2.4%		2.2%		1.4%	
Cash	2.5%	2.9%	2.3%	2.8%	1.9%	2.2%	1.2%	0.9%
10-year bond	3.4%	4.6%	2.8%	4.2%	2.6%	3.5%	1.7%	1.2%
Long bond index*	3.7%	5.2%	2.9%	6.1%	2.8%	4.4%	2.0%	1.1%
Investment grade credit	4.9%	5.8%	4.6%	5.4%	3.8%	4.0%	2.1%	1.6%
High yield	8.0%	6.5%			6.3%	5.7%		
Emerging market debt**	7.1%	6.8%						

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023.

* EUR: 15y+ index; JPY: JGB Bond Index; GBP: 15y+ index; USD: 20y+ index. ** EMD hard currency debt.

Normalization and sensitivity analysis

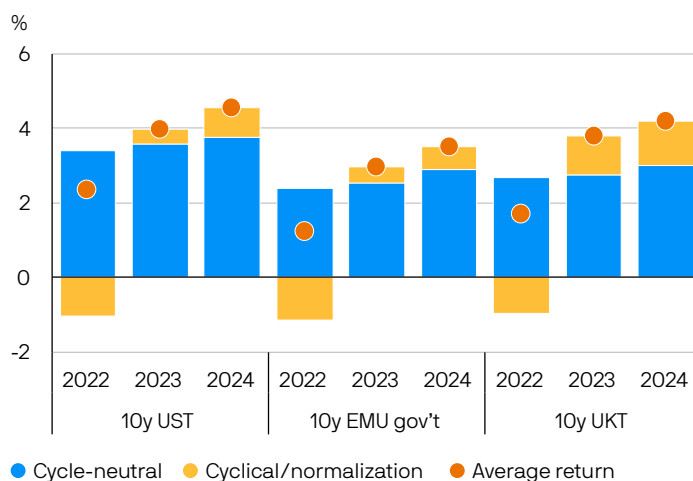
We keep unchanged, at three years, the normalization pathways for all markets except Japan, which we raise to four years. That means we think it will take three years (2024–26) to reach our cycle-neutral assumptions in most markets and four years (2023–27) in Japan.

For Japan, we forecast a more gradual normalization path because the central bank is likely to be patient and engineer reflation by keeping nominal policy rates lower for longer. The patient policy environment we forecast in Japan would allow inflation to pick up gradually. Although the Bank of Japan has already embarked on a journey to tighter policy, its policymakers will be determined not to overtighten too quickly.

In the past, when our cycle-neutral assumptions were higher than market yields, normalization was a significant headwind to fixed income returns. This changed dramatically last year, when the path to normalization became a positive contributor to returns. This theme is still in place in our 2024 assumptions, as the cyclical or normalization return is positive across all major fixed income assets (Exhibit 5).

Bond returns remain attractive

Exhibit 5: Cycle-neutral vs. cyclical returns for major government bond markets



Source: J.P. Morgan Asset Management; data as of September 30, 2023.

Cash rates: Higher inflation assumptions lift rates across economies

Our cash rate assumptions rise across all economies. This change manifests in a parallel shift across the yield curve, leaving its slope unchanged. Our higher expected cycle-neutral cash rate assumptions reflect our expectation for broader and more entrenched interest rate normalization. Elevated inflation and a modest boost to real GDP push our U.S. cash cycle-neutral level up by 0.2%, to 2.5%.

Why don't we steepen our yield curve forecasts, as in previous years? This year, we spent a great deal of time debating the impact of higher inflation assumptions on the yield curve slope forecast. Theoretically, higher macro uncertainty and rising inflation risks would elevate risk premia and steepen the slope of the yield curve. But we disagree with this view.

As we consider the journey fixed income investors have traveled over the last decade, we see that low, zero and negative interest rates forced fixed income investors into other asset classes and higher returning assets. Now, with government bond yields rising across the globe, we expect increased structural demand for longer-term bonds from investors that were underweight duration, such as pension funds. We believe that revived demand will act as a countervailing force offsetting the impact of a higher inflation environment. We have thus kept the slope unchanged in most markets. Having said that, the potential of an extension of the current business cycle may force us to reassess this judgment.

As yields return to levels similar to those before the GFC, yield curves will be flatter, on average, than in the last decade, when negative short rates led to very steep curves. Adding to the flattening dynamic, our view around long-term potential growth is little changed from last year, even while we expect average policy rates to be higher as central banks achieve their targets more sustainably. This view also means we forecast the bulk of the inflation change will be felt as a level shift of the yield curve rather than a steepening vs. last year's assumptions.

Government bond yields: Modest rise in yields outside the U.S.

U.S. rates: Assumptions remain fairly stable

The modest boost to growth and inflation lead us to lift the level of our cycle-neutral cash rates, which translates directly into a higher 10-year Treasury yield assumption: It rises by 0.2 percentage points (ppt) y/y, to 3.4%. As noted, with higher rates meeting increased demand, we do not expect much U.S. yield curve steepening. That leads to a total return assumption of 4.6% for 10-year Treasuries and 5.2% for 30-year bonds.

Euro area rates: Meaningful change as European Central Bank raises inflation expectations

We make meaningful changes to our 10- to 15-year EU inflation forecast, lifting the EU trend inflation rate to at or above target, on average, lifting our rate assumptions. We anticipate less need for policy accommodation, on average, through the business cycle and expect policy to be symmetric, with experiences of both above- and below-target inflation. This would be a strong contrast to the last decade, when the European Central Bank (ECB) was fighting deflation concerns.

We set our euro area cash rate assumption 0.5% higher than last year's, at 1.9%, and raise our real euro cash rate assumption by 0.2%, to -0.1%. Those increases reflect our view of less accommodative central bank policy and a modest pickup in productivity growth over our forecast horizon.

Investor demand is an important factor in our European assumptions for the long end of the yield curve. Over about a decade, low yields and negative rates spurred EU investors to migrate to U.S. bonds and reduce their European fixed income holdings. Euro area investors are still structurally underweight European duration – a deficit we expect to reverse in the coming years. We particularly anticipate domestic liability-driven investors will return to European fixed income. That demand should cap how far long-end yields can rise in the local market.

In the euro area satellites Switzerland and Sweden, our forecasts follow the same contours as the euro area's. Trend inflation rises meaningfully, which translates mechanically into higher cycle-neutral assumptions for the cash rates: the SWE cash rate rises by 0.4% and the CHF by 0.5%.

We raise our euro 10-year yield by 0.4%, to 2.6%, and flatten the slope of the yield curve to account for higher cash rates and the repatriation of demand. This results in a total return forecast for the euro 10-year bond of 3.5%, 50 basis points (bps) higher than last year.

UK rates: Uncertainty around inflation; a higher risk premium

In making our UK forecast, we must consider the persistence of high inflation while acknowledging that the combined shocks of Brexit, the 2022 energy crisis and COVID have made the inflation picture difficult to assess. Supply-driven factors constraining labor participation rates, and concerns that persistent inflation is feeding into demands for higher wages in negotiations, appear to be idiosyncratic to the UK.

We raise our cash rate assumptions a slight 0.1%, to 2.3%. The UK is also the only economy for which we forecast the yield curve slope steepening modestly, to reflect this uncertainty around inflation and to bring our UK slope assumption more in line with other economies. Our 10-year Gilt bond assumption rises to 2.8%.

Japanese rates: Joining developed economies in a higher inflation environment

In our view, Japan's economy is undergoing a structural regime change – for now, more a medium-term forecast than a fact. As such, we expect inflation to move higher over our LTCMA horizon. The data are encouraging: Wage growth is accelerating, and there are signs that inflation expectations are rising on a sustainable basis. We make a sizable jump in our forecast for trend inflation, which we think should settle higher than at any time since the GFC. That follows from our view that the rise in inflation will be sustainable and that policy will work with it to reflate the economy.

These factors lift our cash assumption 70bps, to 1.2%, reflecting our more symmetric view of inflation in Japan. A long period of normalization would be required to get to cycle-neutral rates, and monetary policy will need to be kept accommodative to engineer such a reflation. We expect an end to yield curve control and negative interest rate policy over our forecast horizon.

We raise our 10-year yield assumption by 70bps, to 1.7%, a meaningful change. The regime change we expect leads to a step change higher in cash rates and the 10-year government bond – which argues for flattening the 10s30s curve as yields normalize – and again reflects

the idea that the pegging of 10-year yield policy will be removed. We raise our 30-year bond assumption by 50bps, to 2%.

Australia and Canada

The Australian economy, which in the past had the highest rates in developed markets, has exhibited more sensitivity to higher rates during this cycle. In our view, the cash rate is unlikely to reach previous cycles' heights because of the country's debt burden, slowing growth in China and some households' vulnerability. We slightly lower our real cash rate assumption to acknowledge this shift. Our assumptions for Canada change in ways that mirror the U.S.

Corporate credit and leveraged loans

As more regions experience brisker inflation and wage growth than in years past – pointing to a sustained rise in inflation expectations and positive real yields – credit markets will likely feel the impact. Higher financing costs due to monetary tightening will disproportionately hit those parts of the credit market where leverage is greatest. We round up credit spreads and 2024 forecast returns for spread products in **Exhibit 6**.

EU spreads widen modestly; U.S. credit is little changed

Exhibit 6: Credit spreads and returns for spread products, 2024 vs. 2023

		Cycle-neutral spread assumption (bps)	2024 return (%)	2023 return (%)
U.S.	IG	160	5.8%	5.5%
	HY	490	6.5%	6.8%
	Loans	540	6.5%	6.2%
EU	IG	140	4.0%	3.6%
	HY	400	5.7%	5.7%
UK	IG	180	5.4%	5.7%
Emerging markets	Sovereign (hard)	380	6.8%	7.1%
	Corporate	400	6.7%	7.0%

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023.

Investment grade credit: Little change in U.S. spreads; widening in Europe

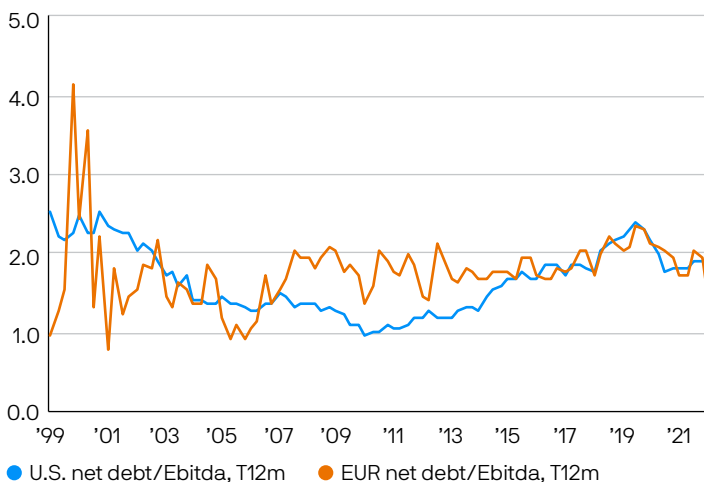
We keep our U.S. investment grade (IG) spread unchanged, at 160bps over Treasuries. Our forecast reflects our view that the investment grade bond market's lower rating bias (its skew toward BBB issuance) will continue but not grow significantly. Our total return assumption for U.S. IG credit, at 5.8%, is 30bps higher vs. last year.

Europe presents a contrast: Our IG spread forecast widens modestly, to 140bps. We remove the impact of implicit ECB support, through its corporate sector purchase program (of corporate bonds to help the economy), which is no longer needed. We believe the bar is higher for what would spur such outright support again and expect it will be limited. Moreover, as European interest rates rise and converge with those in the U.S. and the ECB halts its support of credit instruments, we think investors will also demand a higher spread.

In addition, companies in Europe (the same is true for the U.S.) have during the past two years delevered their balance sheets, back below 2x on a net basis (**Exhibit 7**). Looking ahead, companies are expected to lower their debt growth as well. These moves should serve to insulate firms somewhat from the rise in yields.

Corporate issuers in the U.S. and EU have delevered their balance sheets, reducing the impact of the rise in yield

Exhibit 7: U.S. and EUR corporate issuers' median 12-month net leverage



Source: J.P. Morgan Asset Management; data as of June 30, 2023. T12m: trailing 12 months.

Leveraged loans and high yield bonds: Loans likely most vulnerable

With rising cash rates leading to higher financing costs, we are seeing signs of vulnerability in pockets of the credit markets – most notably, leveraged loans, a more levered segment with higher exposure to refinancing risk (**Exhibit 8**). Credit conditions should tighten most sharply, and downgrades hit hardest, for borrower companies that grew based on a business model of very low cost financing. We raise the expected spread on the levered loan index by 20bps, to 540bps. Elsewhere in this edition, we discuss how funding through direct lending has picked up as the leveraged loan market has come under pressure.⁴

U.S. high yield issuers may face similar challenges, but because of the index's better composition, ratings-wise, the impact should be more limited. We are likely to see more single B credit issuance as companies migrate from the leveraged loan market seeking lower cost financing. Existing debt could also experience downgrades. As such, we reduce the weight of BBs and increase the weight of single B issuers we expect in the HY index. Our U.S. HY spread forecast widens by 10bps, to 490bps.

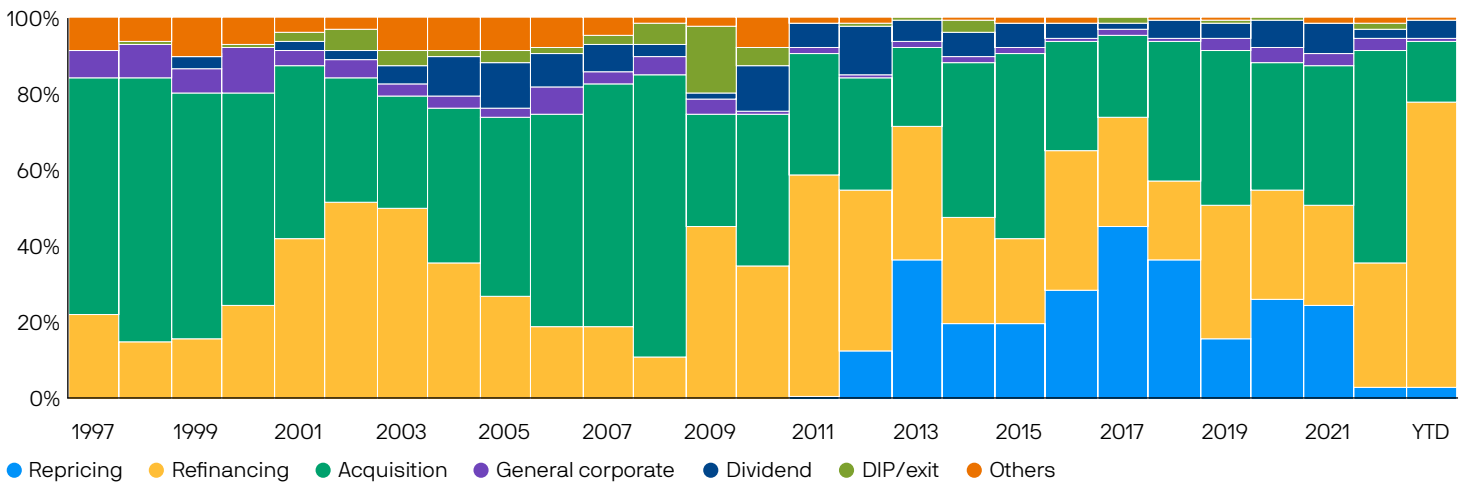
We leave our European HY spread unchanged. We expect EUR HY will feel less impact from the migration of leveraged loans, and we therefore maintain our spread forecast at 400bps.

After an era of exceptionally low default rates, we continue to believe that default and recovery rates will rise to long-term averages and that recovery rates will be unchanged from our previous forecasts. We leave unchanged our forecast for long-term default averages in the U.S., at 3.2%, and in the EU, at 2.6%.

⁴ In "Alternative asset assumptions," *2024 Long-Term Capital Market Assumptions*, this is discussed in depth.

The growth in refinancing of leveraged loans in 2023 YTD highlights the vulnerability of certain pockets of credit

Exhibit 8: Leveraged loans – use of proceeds over time



Source: J.P. Morgan Asset Management; data as of June 30, 2023. DIP: Debtor-in-possession.

Emerging market debt: Spread assumption little changed; relatively attractive valuations

We find little reason to adjust our fair value assumptions for emerging market debt. Meanwhile, a stubborn inflation cycle and heightened perceived odds of a global recession have kept spreads wider than average, modestly boosting longer-term return prospects.

For the EM sovereign debt index, optically wide index spreads are owed in large part to a small set of specific distressed issuers, such as Lebanon, Sri Lanka and Egypt. While these outliers notably increase index spreads, they reflect selective default situations or high near-term probabilities of default and are less indicative as long-term drivers of return through spread compression.

More broadly, over the long term, we think the index's weighting of HY and IG issuers will remain roughly balanced. In our view, some of the current issuers will likely improve their ratings over time. But we expect issuers that make the jump to higher quality will then begin issuing less hard currency debt and instead seek more domestic funding in their own local currencies, including from domestic pension funds and insurance companies. This is especially our expectation for bond-issuing companies in Asia and the Middle East. We expect new entrants to continue to skew somewhat toward the lower end of the ratings quality spectrum.

For EM local debt, a combination of undemanding currency valuations driven by U.S. dollar strength and relatively high starting yields continues to offer attractive entry levels. Furthermore, since our last edition, the risk of local market stress has fallen as global inflation has peaked, while growth has remained resilient around trend.

For EM corporate credit, we likewise expect a stable index composition in terms of both maturity structure and ratings distribution. We maintain our expectation that long-term default and recovery rates will remain close to their historical levels, and keep our assumption of a 400bps cycle-neutral spread.



Equity assumptions

Valuation pressures, slightly lower forecast returns

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In brief

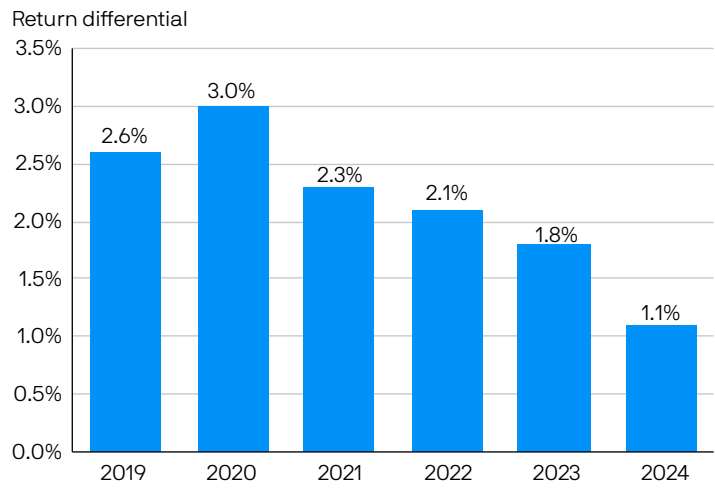
- Long-term equity return expectations remain healthy, though they have moderated slightly from last year. As markets have rallied, cyclical headwinds have increased. Broadly, valuations function as a greater drag and margins function as less of a drag relative to last year.
- U.S. large cap return expectations decline from 7.9% to 7.0%, and U.S. small cap return expectations fall from 8.1% to 7.2%. Both moves reflect valuation pressures. We continue to forecast a reduced small cap premium relative to large cap, given relatively less favorable sector composition and profitability dynamics, and the continued trend of companies remaining private for longer.
- We expect non-U.S. equities to outperform U.S. equities. While we think U.S. stocks will deliver stronger earnings and revenue growth, developed non-U.S. equities offer more compelling valuations and higher dividend yields, contributing to modestly higher total return expectations. For USD-based investors, a weaker dollar should offer additional support for non-U.S. equities, although the anticipated magnitude of dollar weakness has moderated relative to last year.
- Emerging markets' return premium to the developed markets continues to decline. As the transmission of economic growth into earnings growth has disappointed for several emerging markets, we take a more conservative approach in our revenue forecasts.

Our expected equity return assumptions shift modestly lower compared with last year's forecasts, although they remain in the upper single digits. Along with more challenging valuations, our modeling of the equity market incorporates the following themes:

- **Reduced EM/DM return differential:** This year, emerging market (EM) returns move quite close to developed market (DM) returns in local terms (**Exhibit 1**). This is partly due to a decline in our 10- to 15-year growth forecasts for China. As China's economy becomes more mature, we expect its growth rate will continue to moderate toward the OECD level. The reduced EM/DM return differential also reflects less valuation support for EM relative to DM equities.
- **Reduced small cap premium:** We expect U.S. small caps to perform only modestly better than U.S. large caps. The spread between the annualized revenue growth for U.S. small caps and large caps has decreased significantly over the past decade. Going forward, continued elevated levels of private capital formation in the small cap space will likely reduce small cap's share in public markets, keeping a lid on its returns.
- **Sector shift, profit focus:** We expect growth in developed market economies outside the U.S. to remain resilient despite some near-term cyclical concerns. We focus on sector-level opportunities (for example, in Europe's industrial and consumer sectors) and expect a multiyear tailwind to industrial profit growth amid a new phase of reconfigured supply chains and a continued shift from China to other ASEAN economies. In Japan, a new regime for inflation implies stronger corporate revenues. At the same time, a greater focus on profitability should provide support for the stock market. Additionally, we account for an artificial intelligence (AI) led pickup in productivity in DM equity markets, including the U.S.

As China's growth moderates, the gap narrows between emerging market and developed market expected returns

Exhibit 1: EM-DM expected return in USD



Source: J.P. Morgan Asset Management; data as of September 30, 2023.

Model and methodology

Partnership with our Global Equities team continues to enhance our forecasting methodology. The top-down analysis of equity markets, reflecting estimates of GDP, inflation, rates and other macroeconomic inputs, is cross-checked against a bottom-up aggregation of the 3,000 companies for which our Global Equities team forecasts earnings. The team's real-time assessment of company fundamentals (earnings, margins, shareholder returns and valuations) is a key input into our process.

Normalization and sensitivity

Central to our methodology is the concept of normalization. This is the path that equity market metrics (profit margins, multiples, revenues) take to reaching the cycle-neutral target at the end of our 10- to 15-year forecast horizon.

Our cycle-neutral targets are sensitive to several inputs:

- **Revenues:** Corporate revenues are a function of the nominal GDP environment in the regions where revenues are earned. Higher real GDP and inflation expectations thus support higher revenue growth in our equity model.
- **Margins:** Our margin assumptions reflect our general understanding of trends in the capital/labor share of the economy. In most developed markets, we think that margins will be higher than historical averages. We base that outlook on the increased capitalization of particularly profitable, high return-on-capital companies (many in, or formerly in, the tech sector). At the same time, we acknowledge potential headwinds from supply constraints in more labor-intensive areas of the market.
- **Valuations:** A market with higher secular growth potential, a healthier capital structure and lower volatility of earnings will – all else equal – trade at a higher P/E ratio than other markets. Once again, our P/E forecasts come in higher than long-term averages, largely due to secular shifts in index sector composition.

U.S. markets

Our expected return for U.S. equities falls modestly, from 7.9% to 7.0% in U.S. dollar terms. In last year's forecast, U.S. equities were trading close to recent market lows, providing significant valuation support. This support has diminished as the market has significantly rerated over the past year. Realized margins, on the other hand, have moved lower since our last forecast. This results in a modestly reduced headwind from margin normalization, which partially mitigates the impact of higher starting valuations.

While we think the unusually strong corporate profitability of the post-pandemic period will weaken further in the next several years, our cycle-neutral margin assumptions are notably higher than historical averages would suggest.

Once again, we note cycle-neutral changes to the market structure (a more dominant role for the higher margin technology and communications services sectors). We remain confident in the upgrades we have made over the last few years to our forecasts for through-cycle profitability for the U.S. large cap market.

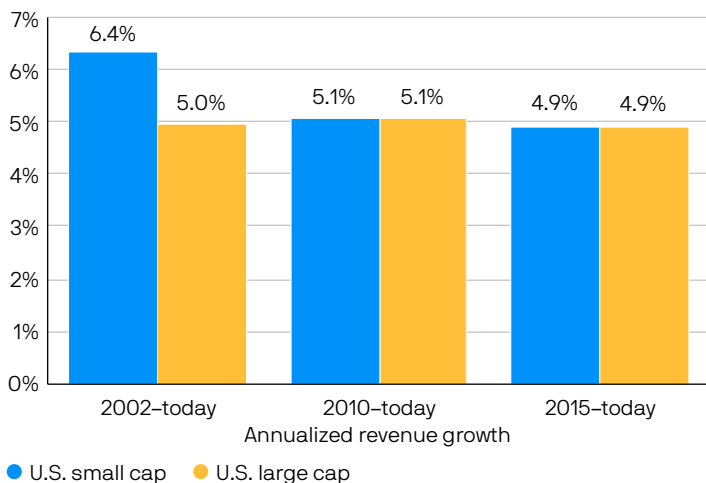
We acknowledge two-sided risks to this view. There is upside risk in renewed optimism about the ways in which AI could boost corporate productivity and thus profits – a key investing theme year-to-date. We also see downside risk to margins in the inflationary impacts of nearshoring and more volatility in labor/wage dynamics. Broadly speaking, we think the competing factors of AI-driven productivity potential vs. the inflationary impacts of deglobalization increase the tails of the distribution around our U.S. large cap profitability assumptions.

As we've noted, we see a reduced small cap premium vs. history, as we moderate our return expectations for small caps to decline to levels only slightly higher than large caps. Sector composition is an issue for small cap markets, which have relatively less exposure to secular growth areas – and profit generators – such as the technology sector. In recent years, this has led U.S. small caps to significantly underperform large caps.

The structural rise in private capital formation poses another challenge for the small cap market. While small cap stocks may gain a modest M&A premium as a preferred acquisition target for private capital, high quality companies are staying private longer, opting to go public as more mature businesses. After a long history of delivering higher revenue growth, small caps have largely converged with large caps on this key metric (**Exhibit 2**). Given the reduced return premium, small cap stock selection will become increasingly important.

As small cap revenue growth converges with large caps, we reduce the small cap premium vs. history

Exhibit 2: Revenue growth, U.S. large cap and small cap



Source: FactSet; data as of September 2023.

Non-U.S. developed markets

Our expected returns for non-U.S. developed markets are modestly lower. We observe a clear and consistent theme across regions: Profit margins are at their peak levels and due for a longer-term decline. In our view, that drop will be steepest in the UK, while in Japan margins will move lower on a shallow glide path. Two forces will drive margin decline, we believe: a giveback of pricing power that companies enjoyed during pandemic-induced supply shortages and heightened expectations for wage growth driven by a restricted supply of labor.

That said, we still expect margins to remain elevated vs. the pre-COVID period. Margins will be supported by various factors, in our view: in Europe, a sectoral shift to more profitable and higher return-on-asset sectors; productivity enhancements, including the increasing adoption of AI; and pricing that does not revert fully to pre-pandemic levels.

For eurozone equities, we target a return of 8.0% in local currency terms, marginally below last year's 8.4% forecast. Year-to-date, broader European markets have performed strongly, but earnings expectations have also risen. As a result, valuations look very attractive, leading us to expect a rerating of eurozone markets alongside consistent profit growth. We also see potential for additional cash return beyond the already attractive dividend yield.

Balance sheets remain strong, and companies across the broader market increasingly see share buybacks as the best investment for surplus cash. Case in point: the European banking sector. Most European banks announced sizable buybacks during a year in which three U.S. regional banks collapsed.

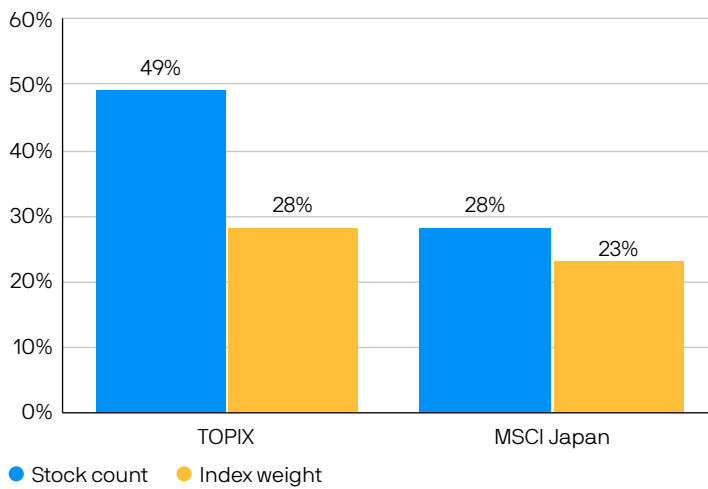
UK equity return assumptions are also modestly lower, at 7.0% in local currency terms. The UK market's exposure to the commodities sector, mainly mining and energy, proved a weakness this year (it was a strength last year). In addition, higher profitability levels for UK banks may not be sustainable. Yet, in our view, current market valuations reflect these concerns. We thus see the prospect for a gentle rerating alongside strong cash returns (with a current dividend yield of 4.1%) supporting competitive UK equity market returns over the longer term.

Expected returns for Japanese equities fall from 7.8% to 6.7% in local currency terms, largely because of higher starting valuations. The surprising strength of Japanese equities in 2023 reflects investor confidence in the prospects for shareholder-friendly corporate reform. The Tokyo Stock Exchange publicly asked constituent companies to outline plans for better capital efficiency. It specifically targeted Japanese companies' cross-shareholding arrangements, as well as stocks trading below book value (**Exhibit 3**). In Japan, 49% of companies trade below book value, whereas in Europe and the U.S. that number is 20% and 13%, respectively.

Additionally, we think that buyback rates will be higher than in the past and note the resurgence in M&A activity in Japan, some of which has come from foreign investors. These are meaningful changes to the Japanese market landscape, we believe, but they are at least partly priced into current stock valuations. As a result, valuation is now a closer-to-neutral component in our return forecast vs. a strong tailwind last year.

A significant share of the Japanese equity market trades below book value

Exhibit 3: % of companies by number and market capitalization that trade below book value



Source: Bloomberg; data as of September 30, 2023.

Emerging markets

Our EM equity return assumptions fall by 1.3%, to 8.8% in USD terms.

We continue to expect that EM equities will outperform DM equities, but we find the risk-reward profile less attractive than in the past and expect it to deteriorate further over our investment horizon.

In general, emerging economies tend to grow at a faster pace than their developed counterparts. But some of the major EM economies, notably China, appear to be starting to shift toward a structurally lower growth environment – in China's case, likely converging toward OECD growth levels.

Across EM economies, the persistence of a high inflation environment and steady currency depreciation, and their combined impact on corporate earnings, lead us to reduce our revenue growth assumptions, to 6.9% from 7.8%.

The 1.3% decline in our expected EM equity return in USD terms is considerably larger than the 0.7% decline in USD return expectations for DM equities. We now see lower revenue growth for EM equities, but improved productivity metrics mean that margins now modestly support returns (last year they were a detractor). Valuations remain a support, albeit at reduced levels.

Regionally, Asian economies continue to show improvements in margins, but slower economic growth has reduced the prospects for substantial earnings gains. In addition, market valuations rose quickly in 2023 in some major economies (including Korea and Taiwan), contributing to an even larger drag from valuations in our EM return forecasts. Overall, we now expect a local currency return of 8.4% (vs. 9.4%) from MSCI China, 8.9% (vs. 9.5%) from China A shares, 6.8% (vs. 7.9%) from Korea and 7.2% (vs. 7.5%) from Taiwan equities, while return assumptions for Indian equities are also lower, at 7.6% (vs. 8.3%).

Across regions, we make the steepest decline in return forecasts for Latin American economies, where we lower our expected returns by 1.7%, to 8.5% in USD terms. While valuations continue to be a modest support and prospects of dividend yield improve vs. last year, slower growth and weaker currencies will likely drive returns lower. Brazil once again presents a marked contrast: Expected returns from Brazilian equities still rank the highest across global markets, with a 12.1% local currency return. But we note that currency risk and volatility are likely to lower the return to 9.6% for a USD investor.

In **Exhibits 4A** and **4B**, we present our long-term return assumptions and building blocks for developed market and emerging market equities.

Valuations tailwinds subside, but equity return forecasts remain compelling

Exhibit 4A: Selected developed market equity long-term return assumptions and building blocks, in local currency terms

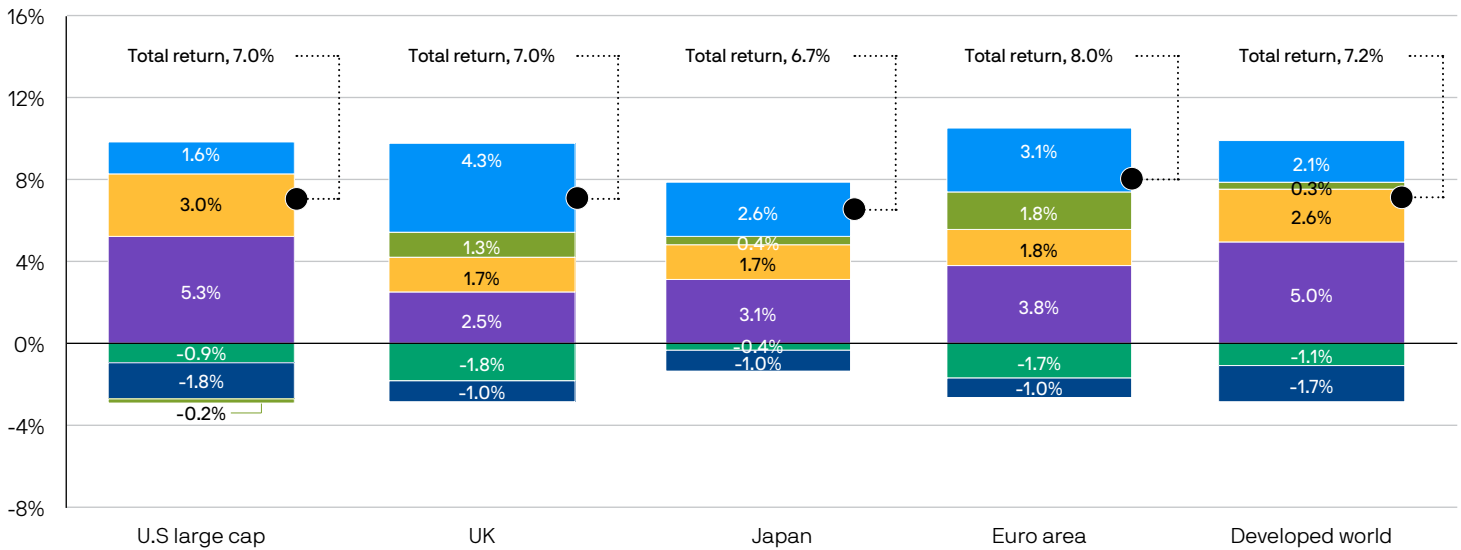
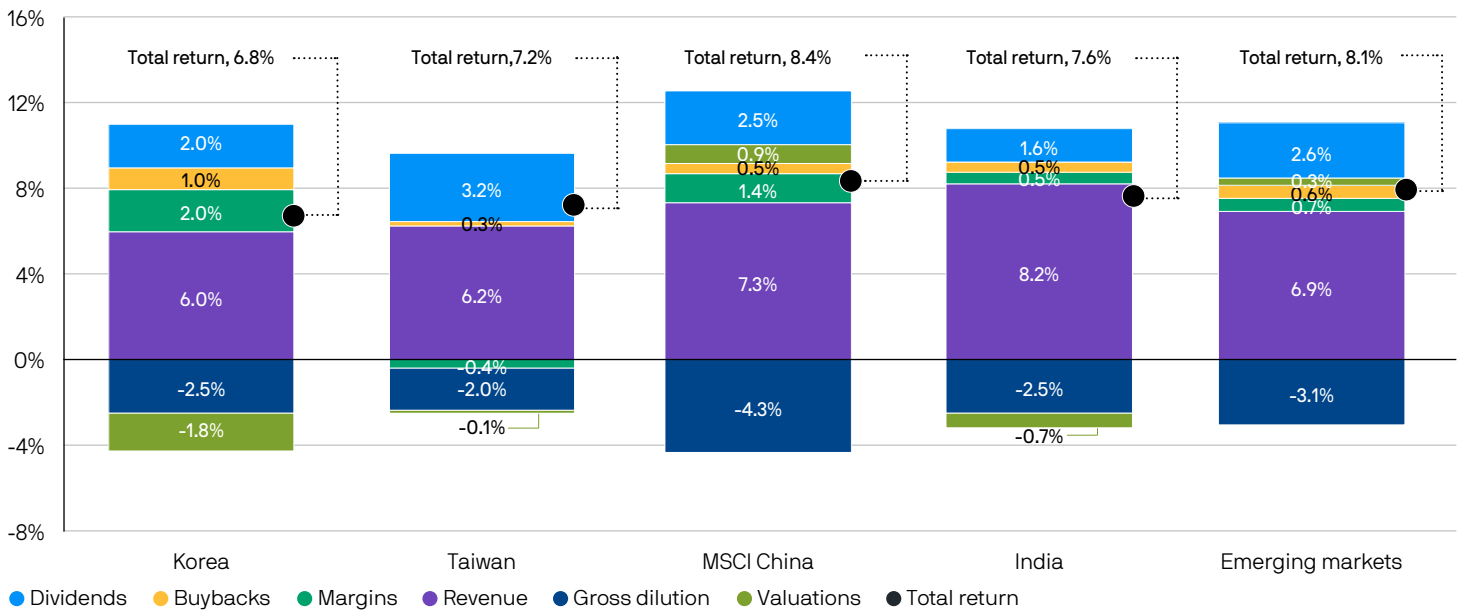


Exhibit 4B: Selected emerging market equity long-term return assumptions and building blocks, in local currency terms



Source: J.P. Morgan Asset Management; data as of September 30, 2023. Please note that figures may not sum up due to rounding. MSCI China is treated as an asset whose local currency is CNY.

Factors

Our long-term assumptions include return estimates for a range of long-only equity factor strategies. We cover five individual factor strategies (value, quality, momentum, minimum volatility and dividend yield) and multifactor strategies in four geographies (U.S., global developed, international developed and emerging markets), with U.S. assumptions included in this report.

Our long-only factor strategy return assumptions reflect favorable valuations across a wide range of factors and signal the potential for significant excess returns relative to passive U.S. large cap equity exposures. That said, valuations and, correspondingly, assumptions around potential excess returns have come down year-over-year as the factor landscape has continued to normalize in the wake of the pandemic shock to valuations in 2020 (**Exhibits 5A and 5B**).

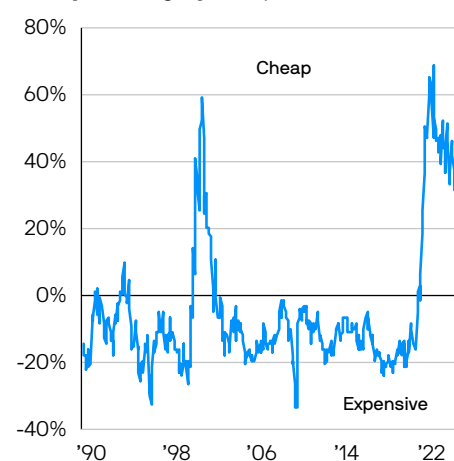
Valuations suggest significant excess returns vs. passive U.S. large cap equity exposures

Exhibit 5A: U.S. factor valuations, 1990–2023

Value: earnings/yield spread*



Quality: earnings/yield spread*



Momentum: earnings/yield spread*

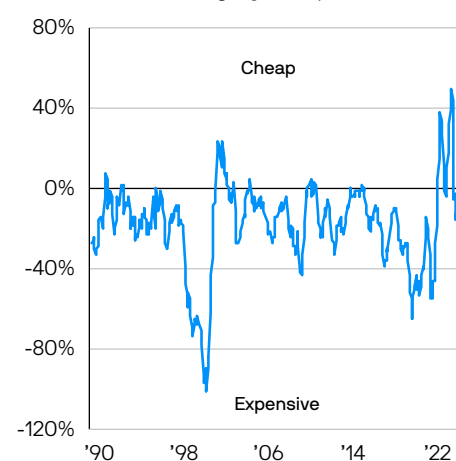


Exhibit 5B: U.S. factor expected returns

		U.S. diversified	U.S. value	U.S. quality	U.S. momentum	U.S. dividend	U.S. min vol
Equity market beta	(1)	0.9	1.0	0.9	1.1	0.9	0.8
Market return contribution	(2)	6.4%	7.0%	6.6%	7.4%	6.6%	6.0%
Factor return contribution	(3)	1.6%	1.4%	0.4%	0.5%	1.3%	1.4%
Long-only factor strategy return assumption (2023)	(2)+(3)=(4)	8.1%	8.5%	7.0%	7.9%	8.0%	7.4%

Source: J.P. Morgan Asset Management; data as of September 30, 2023. Numbers may not add due to rounding.

* Valuation spread is defined as the difference in valuation (forward earnings yield) between top-ranked (Q1) and bottom-ranked (Q4) stocks, relative to a broad market universe.

Methodology

We determine our long-term assumptions by examining the properties of two index suites, designed by J.P. Morgan Asset Management and calculated by FTSE Russell. The J.P. Morgan Diversified Factor Suite describes the performance of stocks chosen for their characteristics across multiple factors; the J.P. Morgan US Single Factor Suite describes the performance of large U.S. companies chosen to target a single factor or characteristic. While there is no unambiguous, natural choice of index to represent long-only strategies in these spaces, we hope that these assumptions will help inform how investors think about asset allocation with respect to factors.¹

A long-only factor strategy return assumption is made up of a return contribution from equity market exposure and a contribution from its exposure to the factor itself. To reach a factor return assumption, we first make assumptions about the relative performance of the best and worst stocks according to a factor. Significantly, we measure them relative to their sector and geographical peers, isolating the pure factor performance. We rebalance the quartile portfolios monthly and incorporate conservative estimates for the cost of trading. We then apply a haircut to these returns to account for potential selection bias effects and market adaptation. These steps form a long-term baseline for our long-short factor return assumptions.

Next, we adjust for the current richness/cheapness of factors under the assumption that long-short factor returns are persistent but cyclical. Mechanically, we assume that the forward earnings yield differential between top-quartile stocks and bottom-quartile stocks will revert toward its long-term average over time, and adjust the factor return assumption accordingly. Importantly, this reversion in earnings yield moves “toward” and not “to” the long-term average. Our methodology thus allows for elements of structural change within markets and, more specifically, within the components favored by a given factor.

This year, the value and quality factors receive boosts from our valuation adjustment step, reflecting that the value factor is still as cheap as it has been since the dot-com bubble, while the quality factor is nearly as cheap. In addition, momentum, which is typically biased to more expensive growth stocks, is currently neutral in terms of favoring value vs. expensive stocks, removing what is usually a headwind to returns.

Convertible bonds

Our expected returns for global convertible bonds and global credit rate-sensitive convertible bonds (hedged into USD) are 7.9% and 5.9%, respectively, vs. 9.1% and 7.2% last year (**Exhibit 6**).

Convertibles can improve the risk-adjusted returns of balanced stock-bond portfolios due to their asymmetric return profile and diversification benefits. In addition, convertible valuations can benefit from increased volatility, as they are implicitly long volatility via the optionality embedded within them. As a credit alternative, convertible bonds offer an income component and structurally lower duration than credit broadly.

In our view, convertible bonds are now in a sweet spot, given their current low valuation and strong convexity. Around 65% of convertible bonds in the U.S. (70% of the total market) are trading below par, which is nearly the highest level since 2010.² The average delta level of the Refinitiv Global Convertible Bond Index is around 40%, lower than in years past, which provides less upside equity sensitivity than has been the case historically.³ This allows the asset class to participate in some equity upside and, more importantly, provides downside support if recession risks rise and equity volatility increases.

Moreover, primary issuance has started to pick up. Year-to-date, new issuance is around USD 44 billion⁴ and draws from diverse industries. Many new issuers are larger cap companies with stronger financial metrics relative to issuers overall. As many companies will need to refinance before 2025, we expect to see more primary issuance coming from both repeat issuers and companies seeking to reduce interest expense. That reflects the fact that convertible bonds typically have lower coupons compared with corporate bonds.

¹ Unlike style box exposures (e.g., value vs. growth), our selected factor indices do not add up to a market cap benchmark but instead reflect the most attractive stocks for a given factor(s). In other words, it is possible, as is the case this year, for each of our factor assumptions to exhibit a positive excess return, with this assumed positive excess return balanced or offset by assumed negative excess returns on stocks that are not included in the factor indices (e.g., those that are expensive, low quality and/or exhibit negative momentum).

² Source: Nomura, J.P. Morgan Asset Management; data as of June 30, 2023.

³ Source: J.P. Morgan Asset Management; data as of June 30, 2023.

⁴ Source: J.P. Morgan Asset Management; data as of June 30, 2023.

For our convertible bond assumptions, we incorporate LTCMA return estimates for equity and fixed income, along with convertibles' delta to credit quality, and the underlying stock beta.

We see a divergence of the underlying equity beta of high yield and investment grade convertible bonds. On one hand, the underlying equity beta of high yield convertible bonds will likely continue to move higher, as these companies tend to be small cap and mid cap companies that are more biased toward growth. On the other hand, the underlying equity beta of investment grade convertible bonds will probably remain lower.

Due to the de-rating of many growth companies, the delta of the Bloomberg Global Convertibles Credit Rate Sensitive index (whose underlying stock trades significantly below the conversion price) has declined. As a result, we reduce our delta assumption across the U.S., Europe and Asia. We also lower the delta for Asia in other global indices (Refinitiv Global Convertible Bond Index and Refinitiv Global Investment Grade Index), as the valuation for Chinese companies (the majority of Asian companies in the indices) has declined due to a slower structural growth environment and increased geopolitical risks.

Expected returns remain compelling, though they decline relative to last year

Exhibit 6: Convertible bond long-term return assumptions, 2024 vs. 2023*

	2024 return assumptions	2023 return assumptions	Change y/y
Global convertible bonds	7.9%	9.1%	-1.2%
Global credit rate-sensitive convertible bonds	5.9%	7.2%	-1.2%
Global investment grade convertible bonds	6.1%	7.3%	-1.3%
U.S. convertible bonds	7.7%	9.0%	-1.3%
Europe convertible bonds	6.7%	8.3%	-1.6%
Japan convertible bonds	5.7%	6.2%	-0.5%

Source: J.P. Morgan Asset Management; data as of September 30, 2023. Numbers may not add due to rounding. * All returns are hedged in USD.



Alternative asset assumptions

Rewarding a renewed focus on diversification, inflation resilience – and alpha

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In brief

Although near-term challenges persist – notably, normalizing interest rates in the context of elevated inflation – alternatives continue to offer powerful tools that support portfolio diversification, inflation hedging and resilient performance.

- We expect real assets will continue to deliver resilient returns, inflation sensitivity and diversification over our 10- to 15-year investment horizon. Real estate equity benefits from substantial repricing, while real estate debt – represented by a new category, commercial mortgage loans – experiences higher yield. We expect other real assets, such as infrastructure, transport and timber, will provide stable returns, and we anticipate that returns for commodities will outpace inflation. Although leverage is less accretive in this environment, inflation resilience and sustainability considerations may also support the valuation of real assets.
- Our return assumptions for financial alternative assets and strategies continue to be defined by superior returns vs. public markets and significant diversification benefits. We expect to see high absolute returns for private equity and venture capital, high cash returns for direct lending and increasingly efficient, broadly stable returns for diversified hedge funds. Across private markets, however, historically large amounts of dry powder have yet to be deployed, which tempers our outlook for alpha across some of these investment classes.
- Our 2024 long-term return projections for a traditional 60/40 stock-bond portfolio experience a slight decline compared with our 2023 forecast. As a result, we expect to see investments in alternatives play a more significant role in portfolio allocations by providing potentially attractive returns and diversification benefits. In core alternatives with high dispersion of returns across asset types, active management will play a critical role in realizing value; in noncore alternatives, manager selection will be key to realizing alpha.

Real assets

Resilient, inflation-sensitive and broadly differentiated returns

Overview

Real assets demonstrate their value by providing resilient returns during periods of public market stress. Those characteristics have proven to be – and we expect them to continue to be – advantageous for investment portfolios across market cycles. Furthermore, real assets offer differentiated sources of returns and relatively wide intracategory expected return dispersion on an annual basis. Because of this, investors may benefit from diversification across categories with similar investment attributes but differentiated return drivers.

Looking ahead, we expect that returns for real assets will typically fall between equities and fixed income on the efficient frontier, in line with their long-term average positioning. These assets are expected to continue to provide inflation resilience and diversification benefits as part of an overall portfolio strategy. As the investment opportunity set in real assets expands and the number of categories increases, active management may become more critical to realizing real assets' potential to deliver resilient returns, inflation sensitivity and diversification (**Exhibit 1**).

Our long-term return assumptions for private **real estate** equity increase significantly compared with last year's assumptions. Over the past 12 months, rising interest rates and an uncertain macroeconomic outlook have triggered a period of price correction in private real estate; transaction volumes have declined, and cap rates have increased. Return projections for global **REITs** also rise in all regions this year, driven by higher core unleveraged returns and share price corrections, which reflect the increase in interest rates.

This year, we introduce a category for real estate debt: U.S. **commercial mortgage loans** (CMLs), which now constitute an investment market in excess of USD 5 trillion. A healthy spread premium and correspondingly higher yields in CMLs, relative to historical data, make the asset class an attractive investment option in the current market environment.

Our 2024 return expectations for real asset categories improve broadly relative to 2023

Exhibit 1: 2024 return assumptions for real assets (leveraged,* net of fees, %)

Real assets	2024	2023
Private real estate equity (local currency)		
U.S. core	7.50	5.70
U.S. value-added	9.70	7.70
European core	5.60	4.70
European value-added	7.50	6.70
Asia-Pacific core	7.10	6.10
REITs (local currency)		
U.S. REITs	8.20	6.80
European REITs	8.00	6.10
Asia-Pacific REITs	7.00	5.10
Global REITs**	7.90	6.40
Commercial mortgage loans (local currency)		
U.S.	6.30	n/a
Global infrastructure (USD)		
Core	6.80	6.30
Global transport (USD)		
Core	7.70	7.50
Global timber (USD)		
Global timber	6.20	6.70
Commodities (USD)		
Commodities	3.80	3.10
Gold	4.10	3.50

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022, and September 30, 2023.

* All return assumptions incorporate leverage, except for commodities, where it does not apply.

** The global composite is built assuming the following weights: roughly 70% U.S., 10% Europe and 20% Asia-Pacific.

Global **infrastructure** and **transport** continue to demonstrate strong return resiliency and benefit from inflation-linked, cash flow-driven returns, favorable supply-demand dynamics and the ongoing transition to low carbon energy sources. **Timberland's** return assumption declines, however, mainly due to compressed yields in the context of higher mortgage rates and reduced housing demand. Nevertheless, timberland valuations are still supported by limited global softwood timber supply – the predominant material used for home construction.

Finally, our return assumptions for **commodities** continue to outpace inflation. Demand is likely to exceed supply as sustainability considerations, climate risk and shareholder activism bend normal commodity cycle dynamics.

Model and methodology

We apply a building-block approach to constructing our return assumptions for global real assets. The key building blocks for private real asset equity include net operating income (NOI), maintenance capital expenditure, net cash flow growth and exit yield; we incorporate leverage, then deduct industry fees. For listed real assets, we take into account differences in sector composition, leverage and amortization to net asset values. We tailor our building blocks to capture the unique nature and distinct return drivers of two specific categories – CML and commodities – in their respective sections, which follow below. For most of the real asset categories, however, our approach is broadly consistent (**Exhibit 2**).

Our approach to constructing leveraged return assumptions is broadly consistent across real asset categories

Exhibit 2: Real assets illustrative building blocks¹

Core real asset returns	
=	Starting NOI yield
-	Maintenance capex
+	Net cash flow growth
+	Exit yield adjustment
+	Leverage impact
-	Standard industry fees

Source: J.P. Morgan Asset Management.

¹ Building blocks vary by category; this example most closely reflects the building blocks for private real estate.

U.S. real estate

Our 2024 long-term return assumption for U.S. core real estate increases to 7.5% from 5.7% last year, while our value-added return assumption climbs to 9.7% from 7.7% in 2023. This markedly improved outlook for both investment styles is predominantly due to a combination of rising interest rates, economic uncertainty and debt market challenges, which sharply depressed real estate values in 2023.

This year, the real estate industry is in a very different position, as lower asset values create more affordable and attractive entry points for investors (**Exhibit 3**). It's worth noting that the challenging market conditions that emerged in the U.S. last year have not been fully resolved and may affect entry capitalization rates, potentially driving an increase in future return assumptions. Exit cap rates have gone up as well, but the move is incremental (and based on a normalized spread assumption).

U.S. core real estate repriced in 2022 as economic uncertainty and higher interest rates drove up cap rates

Exhibit 3: Underwritten unleveraged IRRs (3Q 2005–2Q 2023)



Source: Moody's Analytics, U.S. Federal Reserve, J.P. Morgan Asset Management; data as of June 30, 2023.

In our view, U.S. real estate fundamentals remain sound, but performance varies by sector. Office is the most challenged as work-from-home headwinds weigh on the sector, but new build and trophy assets still offer promising investment opportunities. We believe remote work pressures will ease going forward as employees head back to the office, making the long-term outlook better than some market participants may expect. However, lingering work-from-home trends will have at least some lasting effect on long-term demand, which may keep the sector underperforming and result in a reduced portfolio weighting in the future.

Residential assets, however, have outperformed over the most recent market cycle, and we expect they will continue to do so going forward. A shortage of affordable housing means supply/demand metrics for apartments and single-family rentals remain favorable and should stay that way over our 10- to 15-year investment horizon. Although ebbs and flows in performance may occur as the market normalizes after COVID-driven shifts, the sector should remain a long-term outperformer, justifying an increased weight across institutional portfolios. Retail and industrial fundamentals remain sound as well, keeping a constant upward pressure on rents.

With the exception of office, U.S. real estate continues to demonstrate resilience, thanks, in part to the strong run-up in rents the asset class has experienced over the past few years. In our estimation, this dynamic has pulled forward at least some future rent growth, so we have reduced our NOI growth assumptions accordingly.

Looking ahead, U.S. value-added real estate may benefit the most from recent market dislocations, but we also see opportunities to capture potentially outsize returns in mezzanine lending, preferred equity positions and discounted purchases of loan portfolios. Unleveraged internal rates of return (IRR) in value-added real estate are now approaching levels last seen during the global financial crisis (GFC).

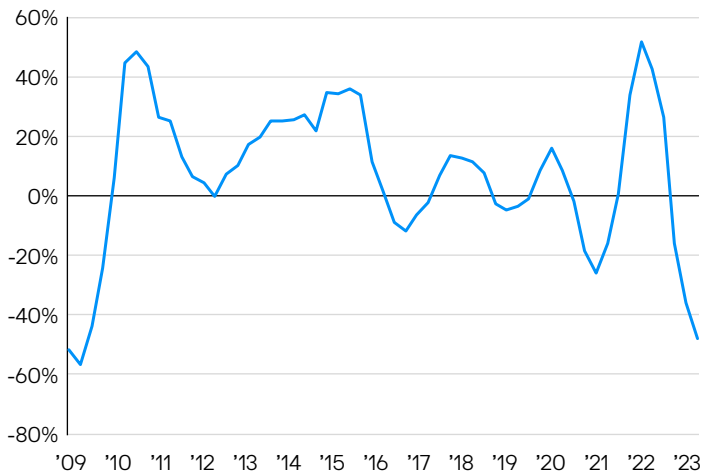
European real estate

Our 2024 European core real estate return assumption increases to 5.6% from 4.7% last year. We attribute this change to a higher starting yield and minimal yield movement on exit. Despite the current economic uncertainty, rental growth forecasts, supported by relatively low vacancy rates and inflation-enhanced cash flows, remain robust. Our European value-added projections also increase, rising to 7.5% from 6.7% last year. In the current market, which is characterized by low liquidity and highly opacity (**Exhibit 4**), we would expect alpha opportunities to stay elevated.

Transaction volumes in European real estate have decreased by nearly 50% year-over-year

Exhibit 4: Real estate transaction volumes

Rolling y/y change



Source: MSCI Real Capital Analytics; data as of June 30, 2023.

Our starting assumption for core NOI yield increases slightly, which reflects the repricing of assets in the market; in the short term, we expect yields to move out even further. However, our longer-term expectation is that real estate yields will compress and settle around their current level. Structural factors, such as demographics, will likely ensure that government bond yields return to low levels (albeit not as low as we have seen in recent years).

Return dispersion continues to be a key theme both within and across European real estate sectors. In the office sector, hybrid working patterns strengthen demand for high quality, well-located offices while increasing the risk of obsolescence in lower quality space. The ongoing shift to e-commerce, boosted by the pandemic, supports demand for logistics properties while undermining demand for traditional retail spaces. Across Europe, the institutional residential sector continues to mature as structural factors, such as ongoing undersupply and the increasing number of total households, support positive rental cash flow growth.

Asia-Pacific real estate

In Asia-Pacific, our 2024 return assumption for core real estate increases, climbing by 100 basis points (bps) to 7.1%, from 6.1% last year. The change reflects a meaningful increase in our entry cap rate – a phenomenon led by real estate markets in Australia and New Zealand, where yield expansion has been more pronounced since the second half of 2022. Other markets in the region have generally experienced moderate expansions in cap rates since last year, due to stable capital markets and still-positive fundamentals. Although macroeconomic conditions vary across Asia-Pacific, inflation for the region as a whole has been more contained than in the U.S. and Europe. Monetary policy is stable in Japan (but loosening in China), while long-term economic growth assumptions are similar to last year's. Although total real estate returns in Asia-Pacific remain resilient after an overall market drawdown in mid-2022, investment sentiment has weakened slightly and lenders are now being more selective. That said, capital markets across Asia-Pacific still function well, and debt capital is available for real estate investment.

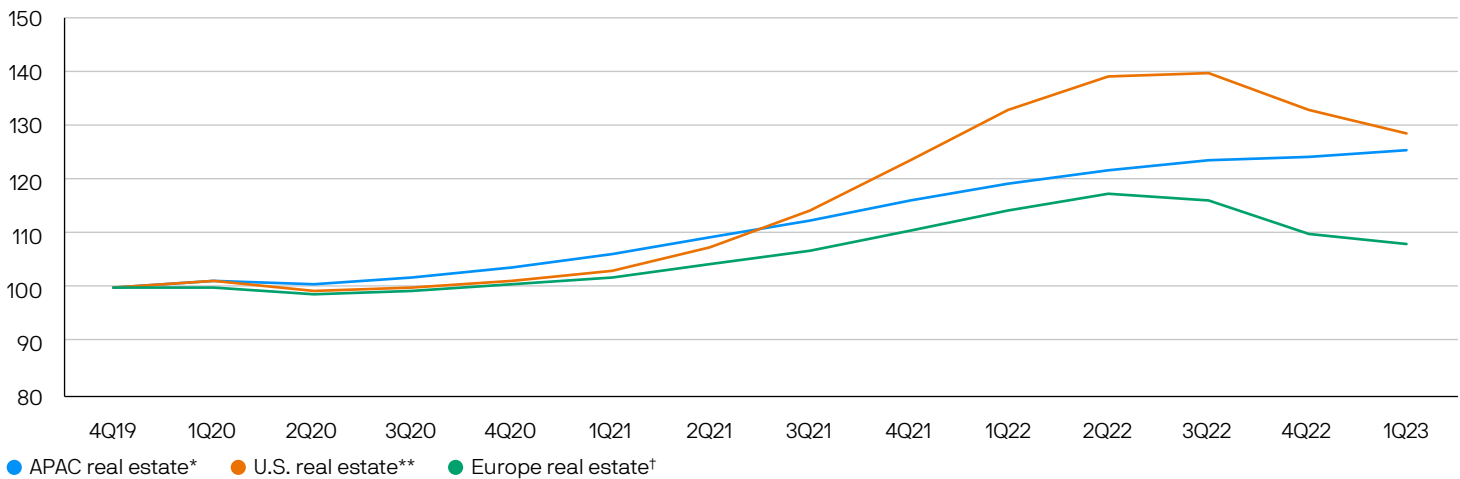
Over our investment horizon, we expect to see real estate rental growth assumptions edge slightly higher as the quantitative effect of subdued rental growth in 2023 across some office and retail markets starts to roll off. Changing capital market conditions in Japan may support that uplift because long-term inflation is expected to increase. The regional industrial sector remains an important contributor to the overall real estate growth picture in Asia-Pacific, particularly Australia, Singapore and Hong Kong, which have a shortage of industrial assets (**Exhibit 5**).

Unquestionably, the structural slowdown in China's residential real estate market is having a strong knock-on effect on the country's economic growth. However, China's growth over the medium to longer term will likely be faster than growth in developed economies, and the expansion of demand for commercial real estate will continue. We also expect the evolution of China REITs (known as C-REITs) to underpin the long-term development of the real estate market.

Overall, the entry point for real estate investment in the region is now generally more attractive than it was in last year's outlook. Although the average entry cap rate for the region is still high, our exit cap rate assumption is relatively conservative, and the risk inherent to any investment return is more likely to land on the upside.

Real estate returns across Asia-Pacific appear resilient

Exhibit 5: Gross total return index (in current local currency), 4Q = 100



Source: * Asian Association for Investors in Non-Listed Real Estate Vehicles (ANREV), ** National Council of Real Estate Investment Fiduciaries (NCREIF), † European Association for Investors in Non-Listed Real Estate Vehicles (INREV); data as of June 30, 2023.

Real estate investment trusts (REITs)

Our global REITs return projection rises to 7.9% from 6.4% last year, and we forecast increases in return assumptions across all regions to the high single digits. We expect the U.S. and Europe will have the highest returns, given recent price corrections.

As in previous years, we adjust our assumptions in the U.S. for greater public market exposure to alternative sectors, such as technology-related assets (transmission towers, data centers), health care properties and manufactured housing. It is worth noting that although public markets still offer better access to these alternative sectors, private markets have caught up in one category: industrial asset exposure. Higher near-term growth rates for the industrial sector mean that alternative sectors are no longer alone in offering significantly higher growth expectations.

Looking ahead, the amortization-to-net asset value (NAV) discount² implies potential upside for REITs across all regions because stock prices have declined, partly in response to the higher interest rate environment. Over the longer term, we forecast that REITs will offer compelling valuation discounts across all regions, especially in Europe and the U.S.

REITs are well positioned, given strong balance sheets, exposure to relatively high quality assets by sector and region (including lower exposure to the challenged office sector), and access to diversified sources of funding, including secured and unsecured loans and equity. Stock prices do tend to overshoot, and in the past we have seen gaps between public and private markets close. We remain confident in the business model's ability to generate cash flow and remain resilient over our assumptions horizon.

² Calculating the amortization to NAV discount refers to the process of reducing the difference between the net asset value and the market value over time.

U.S. commercial mortgage loans

This year, we introduce return projections for U.S. commercial mortgage loans, an asset class with a vast investment market size, in excess of USD 5 trillion. Our inaugural forecast calls for U.S. CMLs to generate annual returns of 6.3% over our 10- to 15-year investment horizon, supported by higher base rates and CML spreads relative to history (**Exhibit 6**).

CMLs serve as a vital conduit for capital flow in the real estate market by supporting the acquisition, development and refinancing of commercial properties. Secured against institutional-quality assets, CMLs are first-lien debt³ that can be tailored by term length (typically ranging from three to 30 years), structure and loan type (either fixed or floating). Typically, CMLs are extended to well-capitalized sponsors with proven real estate experience.

Investors in the CML market benefit from higher yields and lower spread volatility than they could expect from traditional investment grade bonds. Additionally, CMLs provide the potential for diversification through exposure to differentiated property types, property locations and counterparties. These characteristics enhance the overall appeal of the asset class, making it an attractive option for investors seeking stable income and returns.

The CML market went through a period of readjustment in 2022, triggered by shifts in the Federal Reserve's approach to fiscal policy and an upward trajectory in interest rates. It is worth noting that despite the increase in longer-term rates, CML spreads continue to demonstrate resilience, remaining wider than their historical averages.

The current market dynamics – higher rates and reduced capital availability – have put lenders in a favorable position to negotiate improved contract terms and structure. Furthermore, overall leverage in the CML market is also at its lowest level in recent history, indicating a more conservative lending environment. These developments create an advantageous landscape for disciplined lenders seeking attractive long-term returns.

Understanding our approach to generating a long-term return forecast for U.S. CMLs

Exhibit 6: Building blocks for U.S. CML return assumptions

CML returns (%)	2024	Notes
Base rate	4.4	Forward curve estimate and LTCMA 10-year assumptions
Spread	2.2	Spread assumption is based on market-weighted portfolio of core CML loans*
Gross yield	6.6	
Impact of price action	0.1	Difference between current and historical long-term spreads
Pre-pay performance	0.2	CML loans are typically structured with strong prepay security
Credit losses	-0.3	Combination of historical experience and proprietary research on forecasted losses
Fees	-0.4	Standard administrative/management fees
Total return	6.3	

Source: J.P. Morgan Asset Management; data as of September 30, 2023.

* Designed to align with the composition of the market across two key dimensions: loan types (fixed and floating) and property types (office, retail, apartment and industrial properties).

³ A lien is the legal right of a creditor to seize property from a borrower that has failed to repay the creditor; holders of first-lien loans are paid back before all other creditors.

Global core infrastructure

Our 2024 global core infrastructure return projection edges up to 6.8%, slightly higher than last year’s estimate of 6.3%. Given the essential nature of the services infrastructure provides, we expect the asset class will continue to deliver stable returns and inflation resilience over the LTCMA forecast period of 10–15 years.

This year, we amend slightly our methodology for calculating infrastructure returns to reflect that starting yields are based on leveraged values at the asset level; we have eliminated the leverage impact as a separate line item. Our projection for cash flow therefore includes leverage to show that it exists (and compounds) at the asset level. Finally, the cash yields are now assumed to be net of maintenance costs, given that our infrastructure asset models and return assumptions include maintenance requirements in their building blocks (Exhibit 7).

This year, we modify our methodology to reflect that infrastructure yields are measured on leveraged values

Exhibit 7: Building blocks for 2024 infrastructure return assumptions

Core infrastructure (USD)	2024
Starting equity yield	4.4
Cash flow growth	3.1
Maintenance	n/a
Exit yield	-0.3
Leverage impact	n/a
Fees and other expenses	-1.3
Currency impact	0.9
Total return	6.8

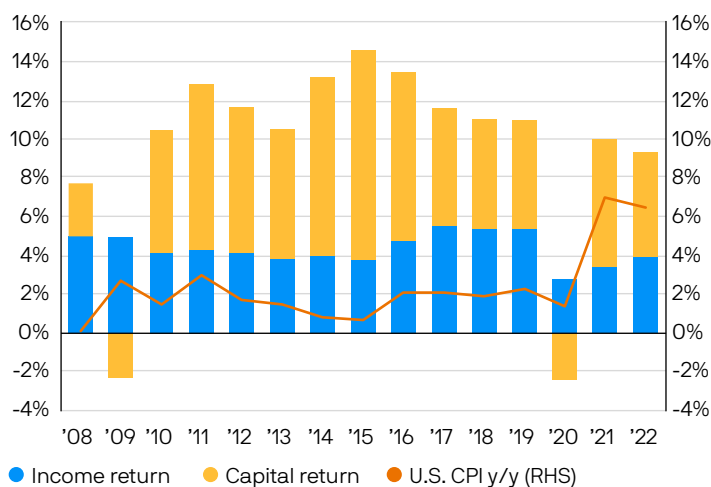
Source: J.P. Morgan Asset Management; data as of September 30, 2023.

For this year’s assumptions, we reduce the expected exit yield of the asset class to reflect higher debt costs and the rise in median managers’ discount rates. Even during recent periods of macroeconomic difficulty, however, the asset class has proven to be a reliable source of steady, forecastable, cash flow-oriented return.

In a higher interest rate environment, private core infrastructure offers resilient returns with the potential for inflation-linked performance and downside resilience (Exhibit 8). Investors can benefit from inflation resilience at the underlying asset level, both explicit (e.g., service providers whose rates are contractually linked to inflation, inflation adjustments in utilities’ allowed return on equity) and implicit (e.g., pass-through of commodity costs).

Core infrastructure offers inflation resilience and steady income

Exhibit 8: Annual income and capital returns for core infrastructure vs. U.S. inflation



Source: MSCI, J.P. Morgan Asset Management; data as of June 2023.

Furthermore, the ongoing energy transition has the potential to create opportunities in the infrastructure sector, although it is still in the early stages of implementation and it is anticipated that the transition will take time to unfold. Government policies and incentives already play a vital role in shaping infrastructure investments, and we expect that momentum to continue over our 10- to 15-year investment horizon.

Global core transport

Our 2024 long-term return assumption for global core transport rises to 7.7%, up slightly from 7.5% in 2023. Although market headwinds are rising, we expect returns for global transport to remain steady over the coming 10–15 years, primarily due to the interplay of supply constraints and specific demand-side improvements, such as increased spending on infrastructure and rising investment approvals in the liquefied natural gas (LNG) sector. Going forward, an array of broad macroeconomic themes – energy security, geopolitical tensions and inflationary pressures – will continue to uphold the strong performance of transportation.

Maritime and energy logistics: Concerns about geopolitical risks remain as Russia’s war against Ukraine grinds on, and inflationary pressures in the U.S. and Europe have proven stickier than anticipated. Countries in the Organization for Economic Cooperation and Development (OECD) are diversifying their energy sources away from Russia in response to Western trade sanctions – a move that is reshaping global shipping routes and lengthening ton-mile demand. The longer the conflict goes on, the more permanent these trade routes will become.

We expect the outperformance of assets linked to the seaborne transport of oil products and LNG will continue over the medium term. We think the dry bulk segment will likely experience baseline growth, thanks to increased infrastructure spending (**Exhibit 9**). Growth in the container shipping segment, however, is likely to stall.

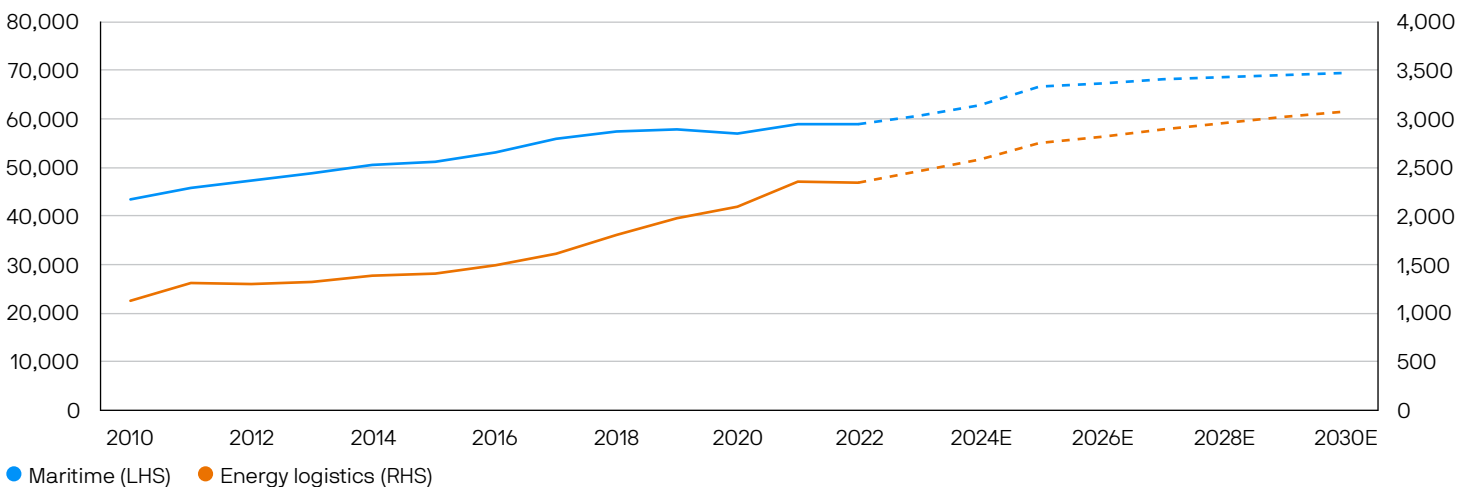
Aviation: The aviation sector continues to suffer from persistent supply chain issues as rebounding demand for air travel squeezes the market from a supply-demand perspective. Domestic passenger traffic has already surpassed 2019 levels. International passenger traffic is still recovering from COVID-induced lows, but volumes have reached 91% of their pre-pandemic highs. While we still expect to see longer-term recovery and growth in air travel, rising interest rates, aviation-related labor shortages, higher fuel prices and the looming possibility of a recession are potential headwinds that threaten the pace of the industry’s recovery.

In the aviation sector, as in other real assets more broadly, environmental, social and governance (ESG) remains an important theme for investors. Transportation assets that can participate in the transition to a lower carbon-intensity future will continue to command a premium over comparable assets.

Global demand continues to support maritime trade in energy and dry goods

Exhibit 9: Forecast change, total maritime and energy logistics trade

Estimated ton-miles, in billions



Source: Clarksons Research, Maritime Strategies International, J.P. Morgan Asset Management; data as of June 2023.

Global core timberland

Our 2024 forecast calls for global core timberland to deliver annual returns of 6.2% over our 10- to 15-year investment horizon, down slightly from 6.7% in 2023. The decline, which is in line with our expectation of falling inflation, also reflects yield compression in the context of higher mortgage rates and reduced housing demand – especially in the U.S., where affordability challenges are weighing on the residential real estate market.

Although the pace of homebuilding has slowed in the U.S., near-term industry projections for new home construction are substantially higher than they have been over the past 15 years (**Exhibit 10**). We also expect repair and remodeling demand to stay strong as existing housing stock matures and older U.S. homeowners prepare to age in place. In Australia and New Zealand – as in the U.S. – affordability concerns softened the housing market in 2023, but we expect demand to rebound in the coming 10–15 years with expanding household formation and growing immigration.

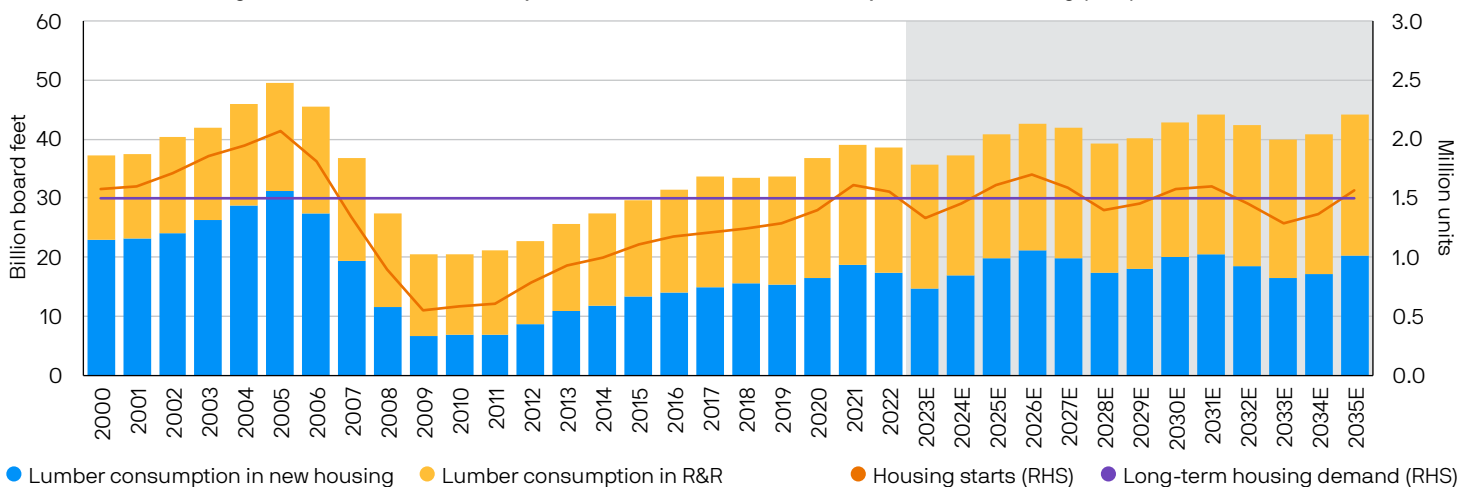
Looking ahead, a global shortage of timber supply will likely continue to support lumber and log price growth. The global supply of softwood timber – the predominant material used for home construction – is limited by forest establishment that occurred 25–45 years ago, and Russia’s war against Ukraine is still disrupting supply chains, putting increased pressure on log and lumber supply.

Strong investor interest is also supporting timberland valuations, thanks to the asset class’s inflation-hedging and diversification attributes. Even if the U.S. housing market were to cool, we would still expect to see healthy investor interest in timberland as a preferred nature-based solution to combat climate change via carbon sequestration.⁴

Carbon markets are rapidly maturing in response to increased demand for high quality carbon offsets, such as cultivated and managed forests. Although carbon return is not included in our current return estimations, we expect carbon prices to increase 5x to 10x in the coming decade – a transformation that may contribute to timberland’s total return in the future.

Although new U.S. housing starts have slowed, the dip may be short-lived

Exhibit 10: U.S. housing starts and lumber consumption: New home construction, repair and remodeling (R&R)



Source: Forest Economic Advisors; data as of June 30, 2023.

⁴ Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide through biological or chemical processes.

Commodities

Powered by changing, nontraditional supply and demand dynamics, our 2024 return assumption for long-term broad-basket commodities strengthens, rising from 3.60% last year to 4.30% on a pre-execution cost basis.

In a typical 12-year commodity cycle, our return outlook would ordinarily align more closely with inflation, but this forecast is noticeably above our long-term inflation assumption of 2.50%. Ongoing energy supply constraints are driving this change, as well as additional supply restrictions in agricultural commodities and heightened demand for industrial metals and gold. We expect the resulting return and correlation dynamic could be additive for a standard USD 60/40 stock-bond portfolio.

Model and methodology

For commodities, we take a slightly different approach in constructing our return projections, compared with other real assets. Our model begins with a cash return assumption and then adds a premium or discount based on current commodity cycle positioning and expected price trajectories. We make further adjustments related to per capita consumption patterns in emerging markets and the anticipated decline in trade-weighted USD. We then layer in a gold premium based on rising global demand and discount fees to create a total return expectation. This year, we incorporate a new adjustment for the incremental return we expect from climate risks to agriculture and supply scarcity in energy and base metals arising from a global transition to low carbon fuels. (Exhibit 11).

Our 2024 approach seeks to capture the incremental return investors may expect from climate change impacts and the transition to a greener economy

Exhibit 11: Building blocks for commodities return assumptions

Commodities return methodology	2024	Details
Collateral return*	2.90	LTCMA for cash
Commodity cycle positioning (+premium/-discount)	-0.10	Based on traditional cycle dynamics, where we are in the current commodity cycle and projections of the next, as indicated by the Commodity Event Index and length/return study of past cycles
EM per capita consumption adjustment	0.10	Increased growth of EM demand, catalyzed by lockdown reopenings and strong economic growth expectations
Trade-weighted USD decline impact (projected incremental annual decline vs. historical base period)	0.75	The inverse relationship between commodity returns and the U.S. dollar; we use the LTCMA assumption for trade-weighted USD
Contribution from gold premium to index return	0.06	Absolute expected return premium from gold of 40bps, weighted by gold's share in the BCOM index
Governance/climate risk/transition economy adjustment	0.60	Incremental return expected to come from physical risks arising from forecasted climate change developments, "green" policy initiatives and supply/demand imbalances related to the transition to a more sustainable economy
Broad commodities, gross of fees	4.30	
Gold premium	0.40	We assume gold demand benefits relative to overall commodities, given greater demand from central banks as well as consumers in China and India
Gold return, gross of fees	4.60	Premium above broad commodities return, net of gold's contribution to index return and rounding
Fees	-0.50	Fees, based on U.S commodity ETFs and mutual fund average fees
Broad commodities return, net of fees**	3.80	Assumption based on the Bloomberg Commodity Total Return Index (a collateralized index composed of futures contracts)

Source: Bloomberg Finance L.P., J.P. Morgan Asset Management; estimates as of September 30, 2023.

* The Long-Term Capital Market Assumption for U.S. cash in the specified year.

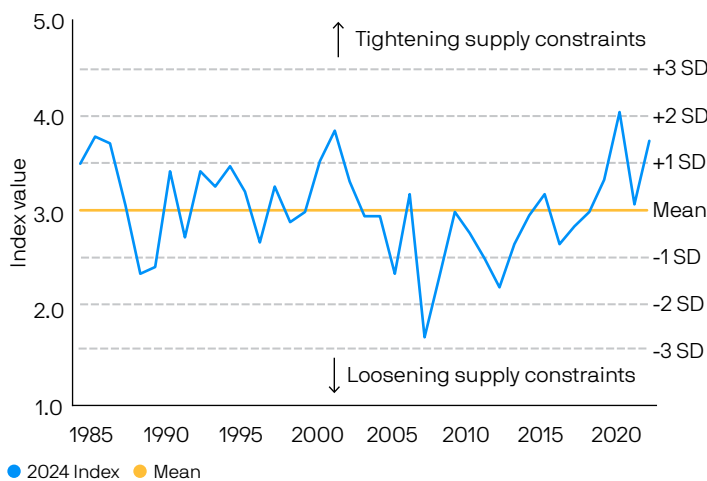
** Assumes the impact of roll yield will net to zero over the life of the assumptions.

Our 2024 base case outlook incorporates new and evolving demand drivers

Our Commodity Event Index model, which captures seven different supply-focused indicators as a proxy for producers' supply constraints and sentiment, suggests an only marginally above-inflation return outlook (**Exhibit 12**). But new externalities are reshaping this base case view as consumer appetite for new-economy metals, fossil fuels and select agricultural products boosts overall demand. Although we expect to see many policy and corporate governance decisions impact prices over the next 10–15 years, our estimates remain at the more conservative end of the range of potential outcomes.

The J.P. Morgan Commodity Event Index attempts to capture producers' supply constraints

Exhibit 12: The Commodity Event Index



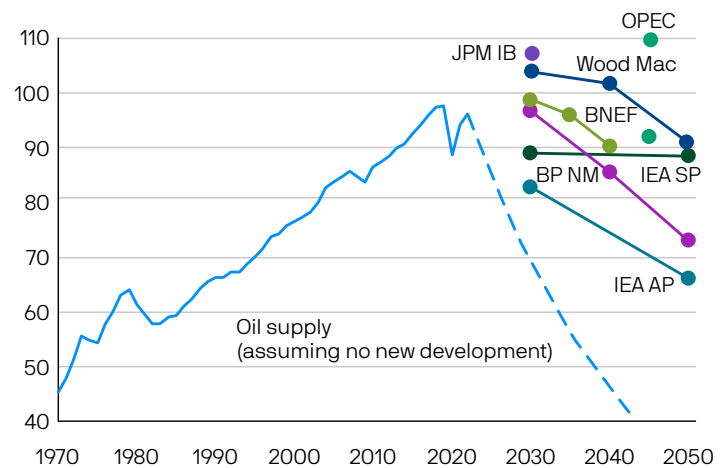
Source: Baker Hughes, Bloomberg Finance L.P., Empirical Research, FactSet, U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of June 30, 2023. Components may not sum to 100% due to rounding.

Excess returns expected across energy, metals and agricultural complexes

Energy: Over the past several years, shareholder concerns, ESG considerations and geopolitics have impacted fossil fuel prices, driving them lower. In Europe, Russia's war against Ukraine has effectively stranded energy assets in both countries. Demand has continued to rise modestly, however, and is expected to grow until the latter part of this decade (**Exhibit 13**). The world's largest economies, notably China (No. 2) and India (No. 5), continue to be fossil fuel dependent, even as the trend of switching from coal to natural gas gains momentum. Overall, we expect multiple supply disincentives to create a supply-demand mismatch for several years, adding modest upside pricing pressure to approximately 28% of the commodities in the BCOM index.

As robust oil demand meets industry-wide capital starvation, a future supply deficit may result

Exhibit 13: Existing oil supply vs. industry demand projections (millions of barrels per day)



● OPEC reference / Adv. Tech cases ● JPM IB Investment Bank
 ● Wood Mackenzie base case ● BNEF Bloomberg New Energy Finance
 ● IEA SP stated policies ● BP NM new momentum ● IEA AP announced pledges

Source: BloombergNEF, BP, International Energy Agency (IEA), Organization of the Petroleum Exporting Countries (OPEC), U.S. Energy Information Administration (EIA), Wood Mackenzie, J.P. Morgan Securities, J.P. Morgan Asset Management; data as of March 2023.

Industrial metals: Three new-economy metals – copper, aluminum and nickel – are essential to achieving a successful low carbon energy transition, and together they make up approximately 11% of the BCOM index. Production of solar panels, electric vehicles (and their batteries) and wind turbines will spur increased demand for these metals. Copper, which at 5% is the largest single component of the base metals complex, is most likely to see above-trend demand growth; some industry experts expect that the share of copper demand linked to the energy transition will grow at a compound annual rate of approximately 11% through 2035.⁵

When we overlay this structural shift in demand with supply projections, the price outlook skews to the upside. According to the International Energy Agency (IEA), mines have already reached capacity output and capex (mine expansion) is nearing a multidecade low.⁶ The current shortage will likely affect prices and may be exacerbated by the lag time from discovery to production of copper (which takes approximately 12 years).⁷ Concerns around the environmental impact of metals extraction may further challenge these lead times.

Gold: We have modeled a modest return premium of 40bps relative to the BCOM index assumption to reflect gold's elevated demand from central banks as well as elevated per capita gold consumption from large, fast-growing populations in India and China.

Agricultural/soft commodities: Climate change considerations are already impacting agricultural product returns. Recorded global temperature increases and higher atmospheric accumulations of carbon dioxide (CO₂) pose a risk to the supply outlook for two key agricultural weights: soybeans and corn. Together, they account for 16% of the BCOM index. At the same time, arable land may continue to shrink globally – a worrying trend that is consistent with industrialization, urbanization and climate change.

Conclusion

Secular drivers across commodity subsectors power our above-trend return assumption. Threats to agriculture production from a changing environment, supply and demand imbalances in energy and industrial metals and fundamental support for gold lead us to conclude that investors can expect a long-term commodity return that is additive to portfolios. Beyond these dynamic conditions, we anticipate that commodities allocations will continue to help diversify portfolios and capture inflation.

⁵ J.P. Morgan Global Commodities Research, as of April 2023.

⁶ "World Energy Outlook: The Role of Critical Minerals in Clean Energy Transitions," IEA, May 2021.

⁷ IEA, "The Role of Critical Minerals."

Financial alternatives

An evolving alpha outlook creates shifting patterns of opportunity

Overview

Our 2024 return assumptions for financial alternatives reflect changing realities as public market headwinds strengthen and interest rates, having moved dramatically higher since the Federal Reserve started its rate-hiking cycle, remain elevated. Changes on the margin of our fixed income and equity market assumptions inform our slightly lower beta assumptions vs. last year. Adjustments to our alpha assumptions are also mixed: We expect the alpha for private equity to decline slightly, but alpha rises for hedge fund returns. Growing financial asset flows and rising amounts of dry powder in private equity – and increasingly in direct lending – modestly lower our overall alpha expectations. Looking ahead, hedge funds are likely to be the prime beneficiaries of the notable rise in rates.

In **private equity**, lower public equity returns lower our returns forecast. Our alpha expectations are marginally lower as financial engineering proves less productive, leaving operational improvement as the only likely source of alpha. Small private equity funds, however, buck these trends: Smaller funds are enjoying attractive asset valuations augmented by larger entities actively seeking bolt-on acquisitions of smaller operating businesses. Across private equity, the dispersion of manager returns remains wide and may widen further over time because operational improvements require a rarer skill set than financial engineering strategies.

After a challenging period characterized by declines in deal flow, exit events and valuations, our 2024 long-term outlook for **venture capital** (VC) improves. Recent advancements in artificial intelligence (AI) and health care suggest that over our 10- to 15-year investment horizon opportunities and returns will likely remain robust. Of all asset classes in financial alternatives, venture capital has the greatest dispersion between top- and bottom-quartile performers.

Our **direct lending** return assumptions rise, consistent with our fixed income assumptions. Credit risk is unchanged from last year, but the level is slightly elevated vs. the historical record, as new entrants (and significant amounts of dry powder) are likely to weaken underwriting standards by a marginal amount. However, the combination of higher yields and the shrinking availability of public financing options remains a positive catalyst for direct lending.

Our forecast for diversified **hedge funds** remains the same, at 5.0%, as our volatility estimate falls, improving the return-to-risk equation. The rise in rates is lifting our projected alpha, while our beta estimates reduce returns. This outlook primarily affects equity long-biased and diversified strategies. Depending on the strategy, alpha as a percentage of total return ranges from approximately 40% to 60%.

Across financial alternatives, future performance may exhibit wider dispersion of returns

Exhibit 14: 2024 return assumptions for financial alternatives (leveraged, net of fees, %)

Financial alternatives	2024	2023
Private equity (USD)*		
Cap-weighted composite	9.7	9.9
Private equity - small cap	9.7	9.5
Private equity - mid cap	9.5	9.4
Private equity - large/mega cap	9.7	10.2
Private debt (USD)		
Direct lending	8.5	7.8
Venture capital (USD)		
Venture capital	9.2	8.5
Hedge funds (USD)		
Equity long bias	4.7	5.0
Event-driven	5.0	5.4
Relative value	4.9	4.9
Macro	3.6	4.1
Diversified**	5.0	5.0
Conservative†	3.7	3.7

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023, and September 30, 2022.

* The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

** The Diversified assumption represents the projected return for multi-strategy hedge funds.

† The Conservative assumption represents the projected return for multistrategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage. The 2024 Conservative assumption uses a 0.70 beta to Diversified.

Private equity

Our 2024 private equity (PE) return assumption shifts downward slightly from last year, reflecting a lower public market base return and a less robust outlook for alpha (at least for the average PE manager). Notable changes are afoot in the industry, and we expect continued operational improvements to be the only likely source of excess returns in the coming years. Other sources of alpha, such as balance sheet improvements and exit multiple premiums, may prove harder to obtain, given the higher cost of debt and reduced options for public market financing.

Building blocks: Public market beta, alpha

We base our core buyout/growth capital return projections (**Exhibit 15**) on public market beta, derived from our LTCMA public market return expectations. The PE return premium above public markets, or alpha, is marginally reduced to reflect a noticeable increase in the cost of capital – and to acknowledge the industry’s substantial amount of dry powder, or committed capital that has yet to be deployed. Importantly, we model alpha as the premium above the actual market beta risk taken across regions and capitalization ranges; we do not gauge it relative to a single U.S. large or mid cap benchmark.

Our methodology reflects our assessment of current alpha potential, adjusted for excess capital to invest (reserves) and the rising cost of debt

Exhibit 15: Components of PE return

	Small PE (<USD 1bn)	Mid PE (USD 1bn–USD 5bn)	Large/mega PE (>USD 5bn)*	Cap-weighted**
Public market exposures				
U.S. small cap	100%	40%		
U.S. mid cap		50%	65%	
Europe		10%	20%	
Japan†			5%	
Asia ex-Japan			10%	
Assumptions (USD, %)				
Public market exposure	7.2	7.5	7.8	7.6
Historical alpha trend	2.6	2.4	2.4	2.4
Higher cost of debt impact/3-year PPMP amortization††	-0.2	-0.4	-0.5	-0.4
Net alpha trend	2.5	2.1	2.0	2.0
2024 LTCMAs‡	9.7	9.5	9.7	9.7
2023 LTCMAs‡	9.5	9.4	10.2	9.9

Source: J.P. Morgan Asset Management; estimates as of September 30, 2023.

* The regional weights for the large/mega PE composite are: U.S., 65%; Europe, 20%; Japan, 5%; and Asia ex-Japan, 10%. These capitalization weights reflect a composite of sources that were calculated using data from Preqin.

** The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

† The Japan weight is an extrapolated number.

†† PPMP stands for purchase price multiple premium.

‡ Return numbers reflect the partial removal of net asset value public market adjustments that were included in the 2023 return numbers: -0.90, -1.10, -1.20, -1.10 for small, mid, large/mega and cap-weighted, respectively.

Our geographic investment breakdown follows industry sources' intentions for investing dry powder and reflects a partial migration of capital back to the U.S.

We base our alpha expectations primarily on average alpha trends, with an eye toward periods that seem closest to the investment environment facing the industry over the next 10–15 years. In this year's projection, we focus on the alpha potential encompassed by the opportunity in a changing global economy that in part harkens back to the industry's alpha regime of 2004–'07. Our alpha expectations are at the low end of the 15-year trend line (and are slightly lower than last year's projections). We make an exception, however, for small cap PE funds, for which alpha increases year-over-year – unlike our alpha expectations for mid cap and large PE funds. Our small cap alpha figure rises based on attractive valuations and the growing popularity of bolt-on acquisitions (grouping purchase price multiple premium companies in related business sectors), which may boost exit price multiples. All of our 2024 return projections remain bounded, however, by dry powder, near-term markdowns and the rising cost of debt.

Changing industry conditions likely to persist – and to shape future PE returns

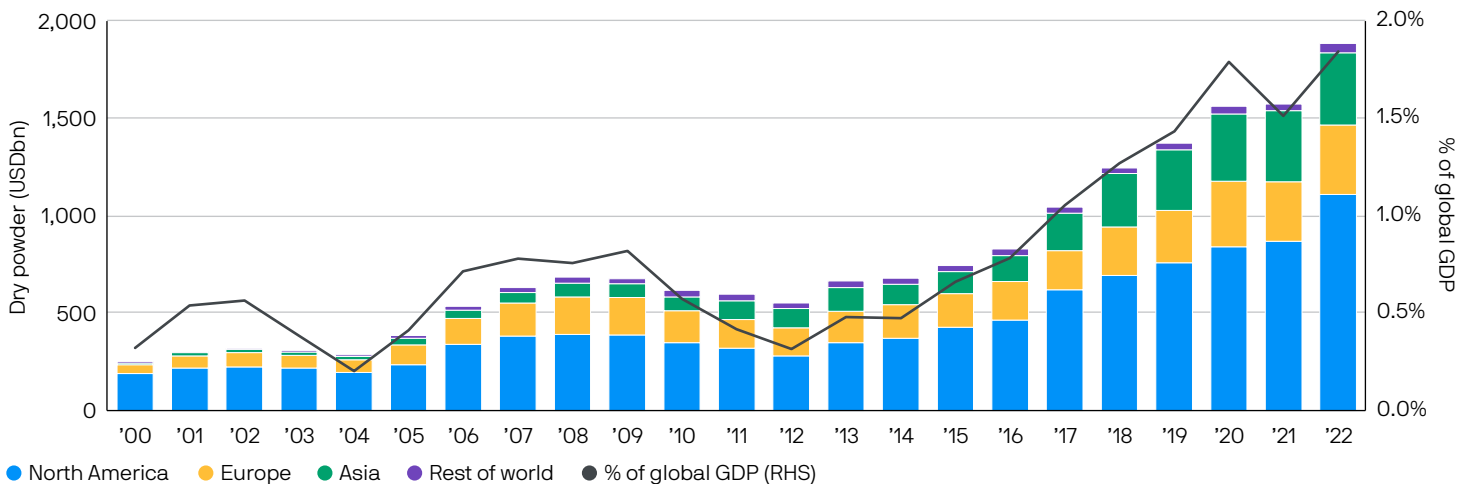
Industry fundraising has fallen significantly over the past year as existing PE investors have maxed out their allocations and pulled back – a dynamic that may create a more favorable environment for limited partners (LPs) to secure better investment terms. Even as the rate of fundraising has declined, however, dry powder looks to be at an all-time high, approximately USD 2 trillion, setting up fierce competition for assets once the investment and financing environment becomes clearer (**Exhibit 16**).

For our return outlook, we expect the cost of financing to rise as public market financing options diminish. Banks in particular, concerned about regulatory capital requirements and loan book risk, are likely to retreat even further from lending in the PE space. Tellingly, industry assets are increasingly concentrated in the top 25 PE firms, which look after one-third of all assets under management.

The geographic composition of portfolios appears to be indicating a partial migration back to the U.S. This trend is only true for the large/mega PE funds (USD 5 billion or more in assets under management) with the largest global investment mandates; those mandates now reflect greater U.S. exposure, while exposure to Asia ex-Japan slightly declines and Europe remains the same.

The level of dry powder in PE has reached a historical high even as fundraising has slowed

Exhibit 16: Volume of dry powder by geographic region and as a % of global GDP



Source: IMF and Preqin. Global GDP figures as of December 31, 2022; dry powder data as of December 31, 2022.

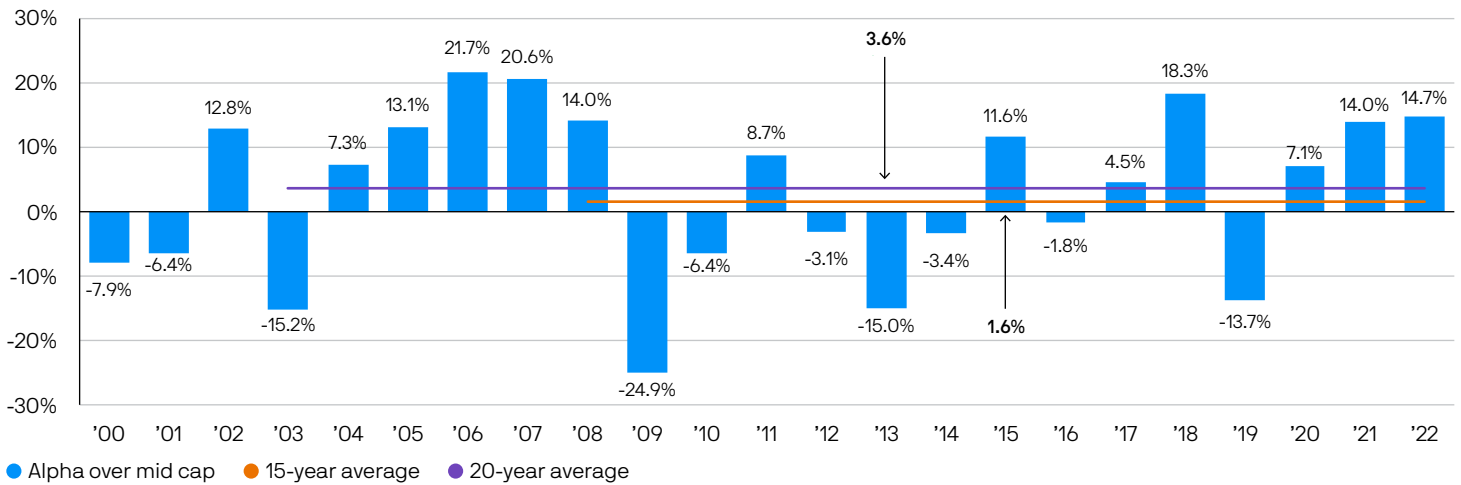
Across all fund sizes, mandates’ sectoral composition has changed. We see a notable slowdown in allocations to consumer and product services, materials and resources. After a substantial increase in deal flow over the past five years, information technology is experiencing reduced investment. Over the past two years, we have noted a rise in bolt-on acquisitions as a dominant form of deal activity; this trend likely confirms the importance of operational improvement in PE’s alpha playbook.

Conclusion: Our decreased alpha outlook

We reduce our expectations for cap-weighted alpha to approximately 2% over the public markets – a figure at the lower end of the 15-year trend line and slightly lower than last year’s projections (**Exhibit 17**). We also mostly unwind our 2023 estimated return hit of 1% for the PE industry based on the adjustments to net asset value that managers have already made over the past year.

We expect alpha generation will decline to the lower end of its 15-year trend line

Exhibit 17: Historical premium of PE to U.S. mid cap equity (2000–22)*,**



Source: Bloomberg, Burgiss Private iQ, J.P. Morgan Asset Management; data as of December 31, 2022.

* Includes buyout and expansion capital funds.

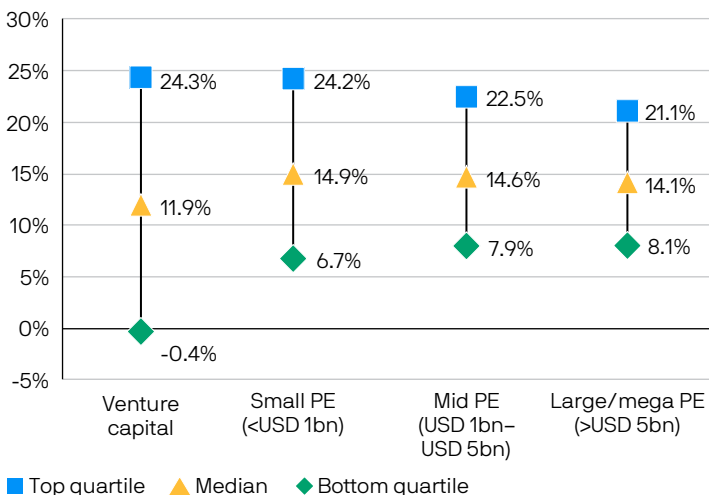
** The historical premium to U.S. mid cap returns (shown here) is not directly comparable to the forward-looking PE cap-weighted composite alpha trend assumption. Our alpha trend assumption reflects a range of public market exposures (across regions and size categories) in addition to U.S. mid cap, the dominant market exposure.

Ongoing macro challenges, such as the rising cost of debt, are still likely to depress the industry’s alpha outlook. Managers will be forced to contend with a debt hangover – attributable to rising purchase price multiples over the past three years – that has culminated in a record debt-to-earnings ratio of 13.2x earnings before interest, taxes, depreciation and amortization (Ebitda). That legacy needs to be worked off, and we expect that a higher cost of capital will weigh on future exit multiples, resulting in a tougher alpha-generating environment.

With reduced prospects for leverage and exit premiums to contribute to returns, the core of alpha generation resides almost entirely in managers’ ability to make operational improvements. We see this ability as the most essential strategic skill – and one that will likely drive greater dispersion of future returns across the universe of private equity investment (Exhibit 18).

Historically, manager dispersion in PE has been wide – and this should continue, underscoring the importance of manager selection

Exhibit 18: Historical returns by manager percentile ranking (internal rate of return, USD)*



Source: Burgiss Private iQ, J.P. Morgan Asset Management; data as of December 31, 2022.

* Includes buyout and expansion capital funds. Represents vintages from 2006 to 2022.

Venture capital

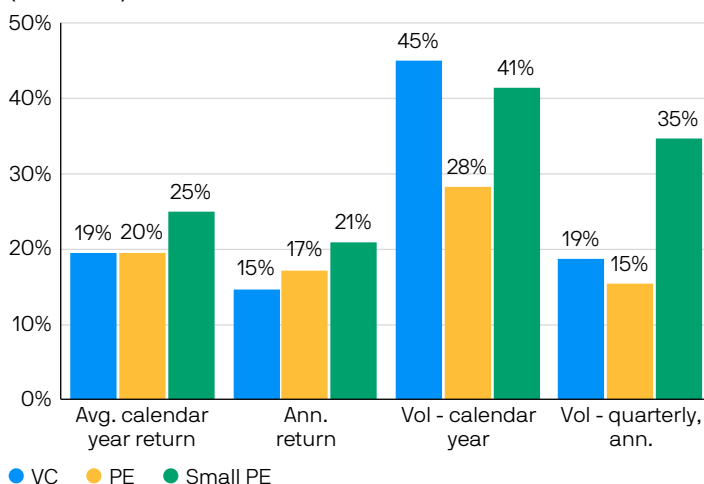
Our 2024 return forecast calls for venture capital to deliver annual returns of 9.2% over our 10- to 15-year investment horizon, up from 8.5% in last year’s edition. (2023 was the first time we introduced a return projection for venture capital alongside our private equity assumptions.)

Model and methodology

In forming a return estimate for venture capital, we start by reviewing the characteristics of the historical data set. Although many investors assume that venture capital has outperformed over time, private equity has actually generated better returns since the early 1980s, primarily due to the higher volatility of VC returns (Exhibit 19). In the aftermath of the tech bubble collapse in the early 2000s, for example, venture capital saw outside losses.

Over a 40-year period, venture capital has underperformed private equity and proven more volatile

Exhibit 19: Venture capital vs. private equity returns and volatility (1981–2022)



Source: Burgiss, J.P. Morgan Asset Management; data as of August 15, 2023.

In an effort to capture the true trend in what is a very idiosyncratic asset class, we take a statistical approach to generating our long-term return assumption, using both fundamental, bottom-up analysis as well as a top-down view. We run two bottom-up analyses that employ different combinations of independent variables,⁸ whereas our top-down approach looks at the relationships between private equity and venture capital returns over time.

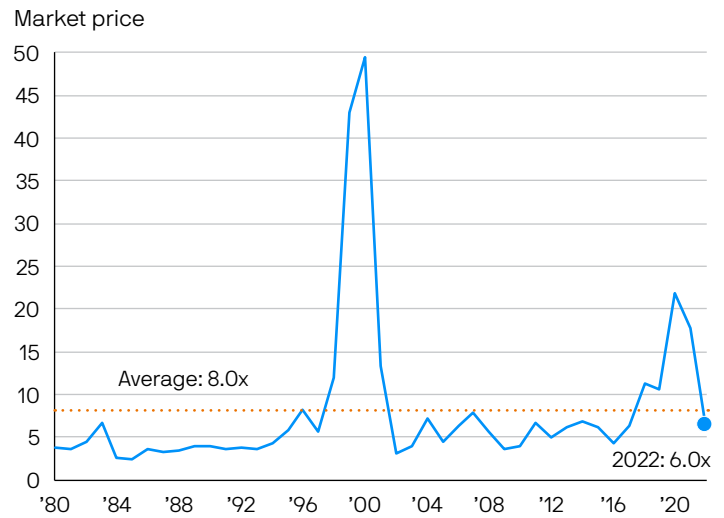
For the first top-down model, we add the average historical spread between year-over-year (y/y) quarterly venture capital and private equity returns on both an arithmetic and a geometric basis. Our second top-down approach uses the historical statistical relationship between quarterly venture capital and private equity returns on a y/y basis. We then take the median of these top-down and bottom-up estimates as the expected return.

Declining valuations signal better entry points

2022 was a challenging year for venture capital, as robust inflation, elevated market volatility and a hawkish shift in monetary policy weighed on the asset class. Aggressive valuation markdowns led to the worst annual performance for venture capital in more than a decade. At the same time, initial public offering (IPO) activity fell by more than 90% from 2021 levels, and the price-to-sales ratio that those IPOs were able to command declined by nearly 66% (**Exhibit 20**).⁹

Venture capital valuations ended 2022 well below their long-run averages

Exhibit 20: Venture capital IPO price-to-sales ratio (1980–2022)



Source: Jay Ritter, "Initial Public Offerings: Updated Statistics," (Warrington College of Business, University of Florida), August 7, 2023; J.P. Morgan Asset Management; data as of August 15, 2023.

However, it is always darkest before the dawn, and 2022's pain suggests that better times may lie ahead. The broad-based decline in both valuations and deal activity has subsequently improved the long-term outlook for venture capital. Lower valuations, coupled with what we expect to be a gradual return to a lower interest rate environment, support the upgrade in our estimate of long-term returns.

Conclusion

We expect venture capital to continue to marginally underperform private equity, with much higher return volatility. Given the extreme dispersion of returns across managers, investors also need to be aware that venture capital remains a challenging asset class to navigate – and may not deliver returns commensurate with greater risk.

⁸ Independent variables include: small private equity buyout returns (zero to USD 500 million), 10-year U.S. Treasury yield, U.S. real GDP growth, S&P 500 Index total returns, relative performance of the Russell 2000 Index vs. the Russell 2000 Growth Index (total return), price-to-sales (P/S) ratios of VC-backed IPOs, and the number of VC-backed IPOs.

⁹ 2022 is the most recent full year for which price-to-sales data are available.

Direct lending

Our 2024 return assumption for private debt rises to 8.5% from 7.8% last year. Although some market observers have described the current conditions as golden, we take a more temperate view: The increased return assumption still represents an illiquidity premium over public credit that remains in line with historical averages. However, the balance of power between borrowers and lenders has shifted in favor of private lenders as banks continue to retreat from the market, borrowers' loan-to-value ratios decrease and lenders benefit from more favorable contractual provisions, which are increasingly dominant in this space.

Return estimation building blocks and methodology

Our higher 2024 assumption reflects changes we have made to the base interest rate assumptions that inform our building-block approach (**Exhibit 21**). Shifting credit conditions for borrowers and lenders – notably, an improved competitive landscape for private lenders – also inform our more positive outlook.

Higher financing costs, fund administration fees and expected losses partially offset these improvements. Longer term, we assume that underwriting losses will rise modestly from the almost nonexistent levels of the past 10 years as industry assets rise and new direct lending funds emerge in the industry.

Financing costs and fee adjustments filter through our enhanced methodology for direct lending

Exhibit 21: Building blocks for direct lending return assumptions

USD, %	2024 Rate/spread	
Base rate (cash)	2.9%	LTCMA assumption for cash
Spread	6.5%	Based on anticipated leveraged loan spreads, weighted for issuance quality and seniority
Fees	1.0%	Represents additional return relative to liquid loan alternatives in the form of upfront fees and pre-payment premiums (amortized over a three-year period)
Unlevered yield	10.4%	Cash + spread + fees
Leverage	10.4%	
Credit costs	-1.9%	Assumed defaults, net of assumed recoveries in restructuring scenarios
Cost of financing	-5.7%	Estimated total cost of funding for an asset-based facility (spread above cash)
Administration fees	-1.2%	Based on manager discussions of fund administration fees
Fees	-3.5%	Based on manager discussions of management and performance fees on levered assets
2024 Net levered return	8.5%	Sum of unlevered yield + leverage + credit cost + cost of financing + fees
2023 Net levered return	7.8%	

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022, and September 30, 2023.

Power balances are changing

The balance of power between borrowers and lenders is changing. Over the past year, lenders have gained the upper hand as banks have retreated from direct lending, temporarily restricting borrowers' access to public market options (**Exhibit 22**).

U.S. banks in particular are cautious about their loan risk exposure. Financial regulators are weighing the possibility of increasing buffer capital requirements for the banking industry, while many banks may voluntarily decide to temper their loan risk profiles should interest rates remain elevated. We expect to see private financing play a larger role as borrowers become increasingly willing to consider private credit for its structural flexibility and as public financing options become less available.

Credit risks remain generally stable

Currently, financial sponsors – which make up 80% of the direct lending industry base – are being prudent in navigating a changed rate environment. Higher credit costs and purchase price multiples have induced borrowers to reduce total leverage ratios¹⁰ from the norm of 70-30 over the past 10 years to approximately 50-50 at publishing time.

Other indicators of credit stability derive from changing credit structure terms: Approximately 80% of all private market lending is senior secured or unitranche (combining senior and subordinated debt into one hybrid loan) in structure. Likewise, junior and subordinated loans are now being extended to larger and more stable businesses than in the past.

The broader credit market remains challenging, however, and these potential loss-reducing changes should be viewed in the context of reduced (that is, weaker) interest coverage ratios,¹¹ which have worsened on legacy loans as rates have risen. Certain sectors also face additional economic headwinds. In health care services, for example, wage inflation risk is real; in commercial real estate, many properties are highly leveraged.

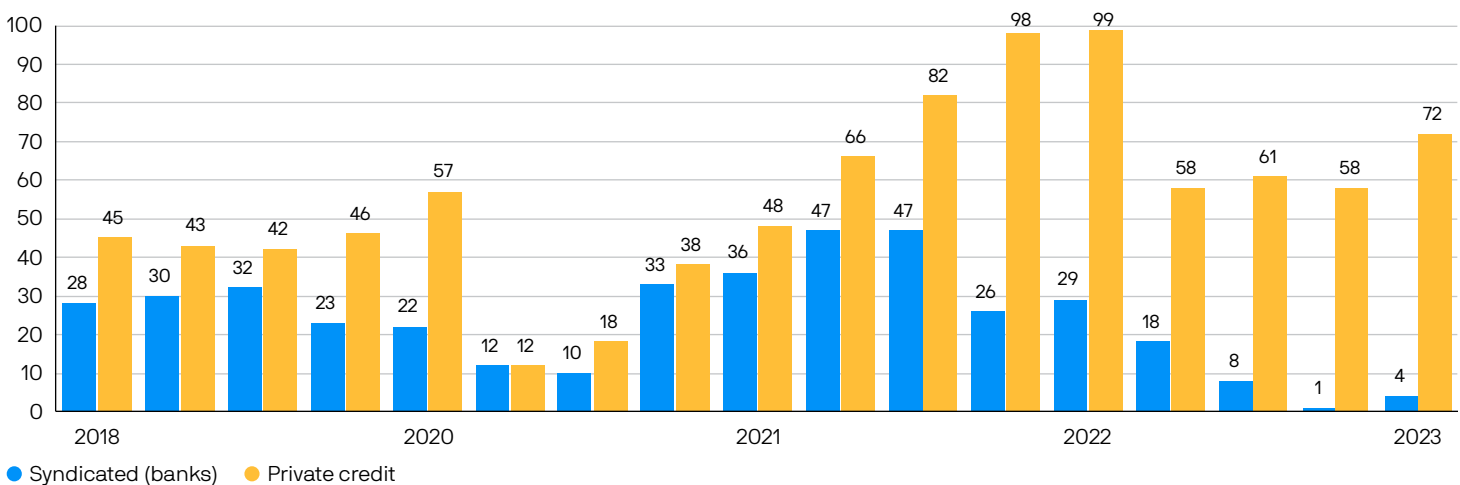
Conclusion

Although we are mindful of deteriorating debt-to-cash flow ratios, which we consider to be a cyclical issue, and some weaker sectoral credit exposures, we expect the outlook for private market lenders to remain broadly strong and stable over the next 10–15 years.

Public market lenders have retreated from the credit industry, leaving space for direct lending funds to gain market share

Exhibit 22: Private credit vs. public syndicated debt (1Q 2019–1Q 2023)

No. of LBO deals



Source: LCD, Morningstar LSTA US Leveraged Loan 100 Index, PitchBook, J.P. Morgan Asset Management; data as of March 31, 2023.

¹⁰ The total leverage ratio reflects the proportion of debt to equity in a borrower's capital structure.

¹¹ The interest coverage ratio is a borrower's operating cash flow divided by its interest expenses.

Hedge funds

Our 2024 return outlook for hedge fund strategies is mixed. The prospect of lower equity market returns, or beta, nudges our latest assumptions for equity-focused strategies downward.¹² Most – but not all – hedge fund strategies exhibit modest declines in their 2024 return assumptions. Our return assumption for diversified strategies remains flat at 5.0% year-over-year.

Even as our assumption for equity market beta declines, the overall environment for industry alpha improves, raising the portfolio-level diversification benefit that hedge funds afford. Our projection for alpha as a contributor to hedge fund returns rises accordingly.

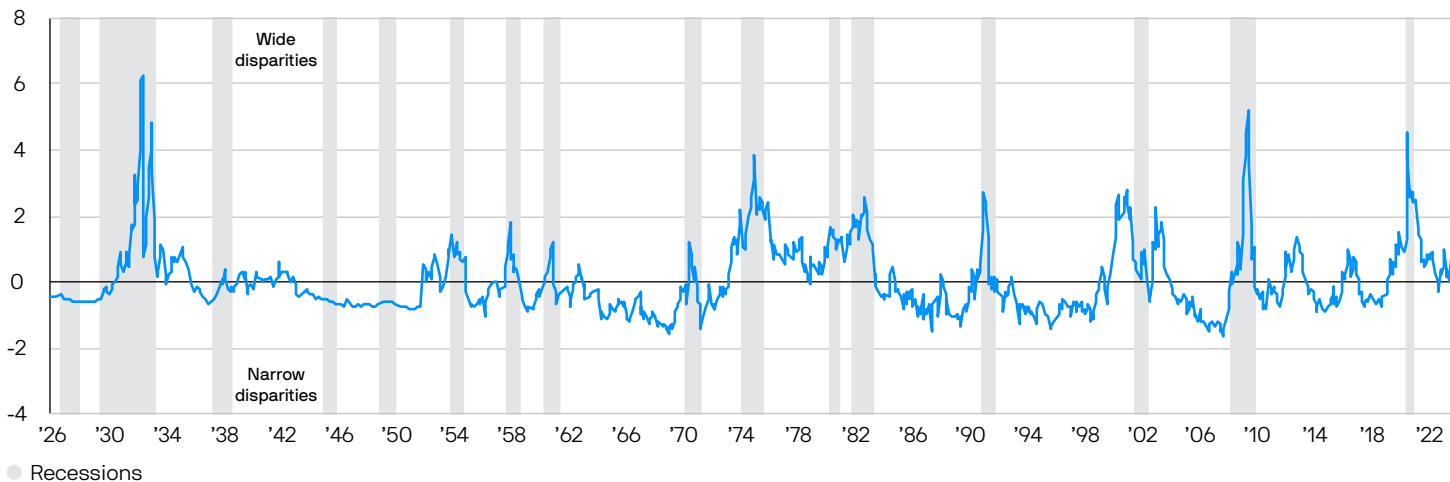
We now expect alpha to account for approximately 40% to 60% of total returns for equity long-biased and diversified strategies, respectively.

Our assumption for short-term interest rates drives this improved alpha outlook.¹³ Over the past 25 years, a meaningful portion of rate increases has fallen to the alpha bottom line, fueled by higher returns on cash allocations and an increase in short-term rebate rates.¹⁴ Other fundamental drivers also support our alpha view, including the increased dispersion of valuation spreads in equity (**Exhibit 23**), increasing inter-asset class opportunities and the probability of employing developing technologies such as generative artificial intelligence (AI).

Valuation spreads are rising in U.S. equities

Exhibit 23: Valuation spreads in U.S. equities: Expected return differential of lowest quintile vs. average (1952–2023)

Standard deviations



Source: Empirical Research Partners; data as of June 2023.

¹² In our latest LTCMA assumptions for hedge funds, the market beta component has declined relative to the prior year forecasts.

¹³ Short-selling stocks results in immediate cash proceeds, which can then be invested in short-term fixed income to generate additional returns. As short-term rates are now higher than they have been in over a decade, our alpha outlook has improved markedly.

¹⁴ Oscar Montes, "Hedge funds: Interest rates and hedge fund returns historically rise in tandem. Here's why," J.P. Morgan Asset Management, June 7, 2023.

Return estimation methodology and building blocks

Our return projections are primarily based on a multifactor modeling framework that captures the most important systematic risks and performance generators for each hedge fund strategy class. Essentially, this approach uses regression analysis based on historical industry performance data to extract the beta, or public market drivers of return, from the alpha, or idiosyncratic, skills-based return contributors.

What our statistical analysis cannot identify as a market factor we attribute as alpha, and every strategy's return projection is the sum of its beta and alpha components. Ultimately, we arrive at a return projection by overlaying the factor model's output with our own judgment, which is informed by various historical beta and alpha regimes (**Exhibit 24**).

More recently, we have enhanced our approach by migrating from a long only-based regression model to a spread methodology that utilizes long-only and long-short data, or spread factors, to better capture the industry's investment dynamics over time (**Exhibit 25**). This enhanced approach provides better intuitive understanding of hedge funds' risk positioning and improved explanatory power (i.e., greater statistical accuracy) while mitigating multicollinearity issues (where two or more predictor variables are closely related to one another).

Differentiating between beta and alpha drivers of hedge fund strategies

Exhibit 24: Components of hedge fund strategy returns

2024 Forecast	Equity long bias	Event-driven	Relative value	Macro	Diversified*	Conservative**
Beta return	2.79	2.94	1.04	0.09	2.04	1.43
Alpha trend line	1.90	2.05	3.90	3.50	3.00	2.25
Return expectation	4.69	4.99	4.94	3.59	5.04	3.68
Rounded	4.70	5.00	4.90	3.60	5.00	3.70
2023 LTCMA	5.00	5.40	4.90	4.10	5.00	3.70
Delta	-0.30	-0.40	0.00	-0.50	0.00	0.00

Source: J.P. Morgan Asset Management; estimates as of September 2023.

* The Diversified assumption represents the projected return for multi-strategy hedge funds.

** The Conservative assumption uses a 0.70 beta to Diversified for the 2024 assumption.

Hedge fund monthly alpha assumptions rise modestly, driven by higher returns on cash allocations and an increase in short-term rebate rates

Exhibit 25: Hedge fund model assumptions

2024 Forecast	Monthly intercept	SPTR	SC-LC	EAFE-SPTR	EM-EAFE	HY-IG	EMD-IG	CNVT-SPTR	US10Y	COMDTY	DXY	r-sq
HFRI Equity Hedge Index	0.13%	0.39	0.18	0.02	0.01	-	-	-	-	-	-	0.82
HFRI Event Driven Index	0.16%	0.16	-	0.12	-	0.40	0.17	0.26	-	-	-	0.88
HFRI Relative Value Index	0.30%	-	-	-	-	0.25	0.34	0.12	-	-	-	0.83
HFRI Macro Total Index	0.27%	0.02	-	-0.02	-	-	-0.07	-	-0.11	0.13	-0.03	0.22
HFRI Fund Weighted Composite Index	0.15%	0.24	0.06	0.10	0.04	0.07	0.11	0.21	-0.06	0.05	-	0.93

Source: J.P. Morgan Asset Management; estimates as of September 2023.

Looking ahead, large multistrategy funds may gain an edge

Within the hedge fund complex, multistrategy funds are outperforming single-strategy funds and gaining noticeable market share: They now account for approximately 15% of all industry assets. Increasing inter-asset class opportunities, which offer more diversified return streams (and can result in superior risk-adjusted returns), may be the main driver behind these fund flows.

Larger multistrategy funds may also benefit from their ability to access superior resources. Better-performing funds attract top traders, and increasing the number of trading pods within a firm can also positively impact fund returns. As AI technology develops, managers with sufficient resources to deploy – if not create – proprietary AI research and trading capabilities will likely drive greater performance dispersion between top and bottom industry quartiles. Eventually, less successful (and less well-resourced) competitors may dwindle in number.

Conclusion

Hedge funds continue to offer meaningful diversification benefits. With higher return contributions coming from alpha, and lower volatility estimates, the diversification potential of hedge funds becomes increasingly apparent. The 5% return assumption for a diversified hedge fund strategy compares favorably to the 7% return of a 60/40 stock-bond portfolio; the diversified strategy also offers the benefit of just 6% volatility, with only a modicum of correlation to public market returns.



Volatility and correlation assumptions

Settling into higher bond volatility and unstable stock-bond correlation

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In brief

- For a second year, our assumptions forecast more elevated bond volatility and less negative stock-bond correlation.
- We expect macroeconomic volatility to return and central bank policies to normalize – bringing back bond returns but also bond volatility.
- Correlations between equities and bonds are likely to remain volatile in the short term, lessening the efficacy of core fixed income in smoothing risk asset returns. Over the long term, bonds' diversification role in portfolios is weakened but remains relevant in downside scenarios.
- Year-over-year, our risk assumptions are little changed across asset classes after shifting significantly last year. We see last year's forecasted risk dynamics continuing.
- We lower our Sharpe ratio forecasts for most fixed income and equities as return assumptions fall and cash rate assumptions rise. Sharpe ratios are little changed for most alternative assets, except for real estate, where Sharpe ratios improve, given a meaningfully improved return outlook.
- The record pace of central bank rate hikes is stressing select parts of the economy, such as private commercial real estate. We take a deep dive into the changing sectoral composition of the real estate market and its potential impact on our real estate volatility forecast. The changes impact our volatility forecasts only minimally, but affect the asset class's economic and factor exposures.

Surprisingly stable forecasts despite higher bond volatility and more dynamic stock-bond correlations

As 2023 began, we expected inflation, policy and interest rates to normalize. Instead, normalcy remains out of reach and many macroeconomic uncertainties have yet to be fully resolved. In the short term, we find ourselves continually managing the ramifications of a highly unusual time.

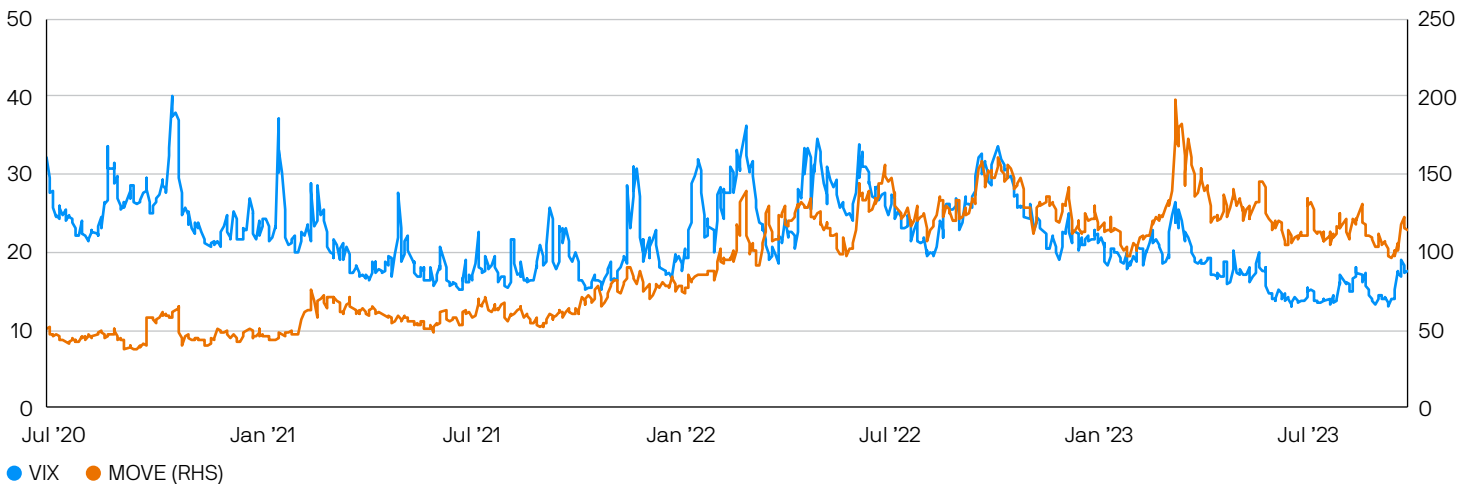
While “bonds are back” in forecasted return terms, interest rate volatility remained elevated at publishing time (**Exhibit 1**) and macroeconomic and financial uncertainties persist. At the time of writing, investors’ expectations – of central bank rate hikes, the pace of inflation’s decline and the probability of recession – were all highly volatile. These uncertainties produce instability in current short-term risks as market participants hotly debate the next likely market and economic regime, leaving portfolios vulnerable to different risk scenarios, whether imminent recession or more sustained inflation.

Yet against this unusual backdrop, our long-term forecasts are surprisingly stable.

The reason our risk and correlation forecasts are so stable: We anticipated much of this heightened bond volatility, and more positive stock-bond correlation, in last year’s publication. In some sense, our risk forecasts are playing out, so we saw no need for much change to our year-over-year (y/y) volatility or correlation assumptions.

Fixed income risk remains elevated vs. equity risk after yet another peak in 2023

Exhibit 1: Fixed income (MOVE) and equity (VIX) volatility, 2020–23



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2023.

How do our forecasts compare with history?

In fixed income, especially core government bonds, we forecast higher risks than historical long-term levels, by 20 basis points (bps) for intermediate U.S. Treasuries and 50bps for long U.S. Treasuries. As central banks continue their tightening cycle, quantitative easing's volatility-dampening effect has disappeared over our forecast horizon. For investors, this means that the relevant reference period for fixed income risk is more likely before the global financial crisis (GFC) than more recently, when bond yields were suppressed.

In correlation, a powerful tool for balanced investors, we expect the stock-bond relationship to be less stable and to experience a wider short-term range than pre-2022. We see the possibility that markets will return to a positive stock-bond correlation regime, as in 2022, for short-lived periods over our 10- to 15-year forecast horizon. We still think bonds offer efficacy in providing protection in times of stress and that short-term stock-bond correlation can turn negative should a major market correction occur.

For multi-asset investors, more unstable stock-bond correlation and higher levels of more positive correlation pose challenges for portfolio diversification. Elsewhere in this edition, we address how expanding a portfolio's dimensions beyond the traditional 60/40 stock-bond allocation – to incorporate active management, secular themes and alternatives – may provide a more robust investment outcome.¹

The record pace of central bank rate hikes is also stressing parts of the economy, such as private commercial real estate. We take a deep dive later in the chapter to examine an underappreciated trend: the real estate market's changing sectoral composition since the GFC and its effect on our real estate volatility forecasts. We find that while these changes are notable economically, their impact on our volatility forecasts is minimal.

Model and methodology

Long-term asset volatility and correlations are the common starting point for our assumptions. To calculate our assumptions, the return data window starts in 2H 2006 and ends in 1H 2023. We use monthly data for liquid assets and quarterly data for private assets,² removing outliers that could bias our volatility estimates.³ To align our forecasts with our forward-looking long-term view, we leverage historical return series but weight each data point by relevance, based on what we expect will be the frequency of various economic regimes.

Now, as over the past few years, we have applied a long-run average probability of 15% to global periods of stress, reflecting our expectations of the likelihood that recession-like conditions will prevail during the next 10–15 years. We also continue to apply a long-run average probability of 10% to periods with elevated inflation risks. Applying these probabilities mitigates the impact of a rolling data window on the forecasts and helps capture the core macro outlook in our risk assumptions. Last, we incorporate key themes and structural changes that we expect over the forecast horizon, such as changes in credit ratings and maturities in asset classes, and reflect them in our long-term risk forecasts.⁴

Sensitivity analysis: Incorporating short-term changes into long-term forecasts

As we anticipated last year, the upward trend of short-term volatilities⁵ continued well into 2023 in many asset classes, especially fixed income, despite receding near-term inflation risk (**Exhibit 2**). Driven by these elevated short-term risk levels, those assets' long-term volatilities⁶ trended up gradually. We observed short-term risks peaking in the first quarter of 2023 and then coming down meaningfully, especially in equities and commodities. Having passed that turning point, we believe short-term risk will revert over time toward our forecasted long-term range.

¹ "Expanding the diversification toolkit: A smarter portfolio to mitigate shocks in a less predictable world," *2024 Long-Term Capital Market Assumptions*.

² We use the most recent data available at the time of forecasting for private assets. However, we obtain the quarterly data with a lag. As a result, we use data ending December 2022 for private assets.

³ For extreme data points above the 99.5% (or below the 0.5%) significance level of normal distribution, we adjust data by capping (or flooring) it at the 99.5% (or 0.5%) level.

⁴ For a covariance matrix to be used in optimization, it needs to be symmetric and positive semidefinite (PSD). The final matrix is adjusted to ensure this stable numerical property, PSD, is satisfied.

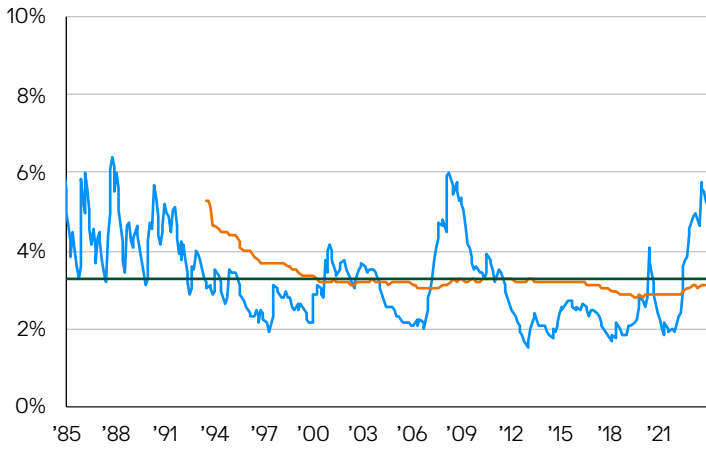
⁵ Short-term volatility is annualized exponentially weighted moving average (EWMA) volatility with a three-month half-life and a three-year lookback window, using daily return data.

⁶ Long-term volatility is annualized equal 15-year volatility using monthly return data.

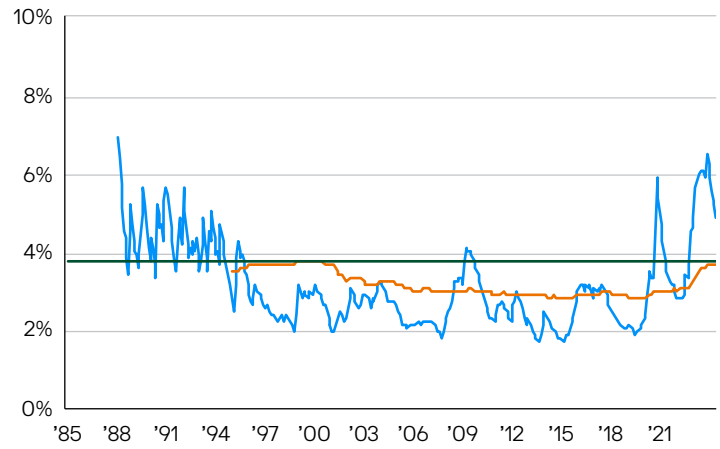
Elevated short-term volatility is pulling the long-term volatility trend higher

Exhibit 2: Short- vs. long-term volatility (% annualized), selected assets in USD

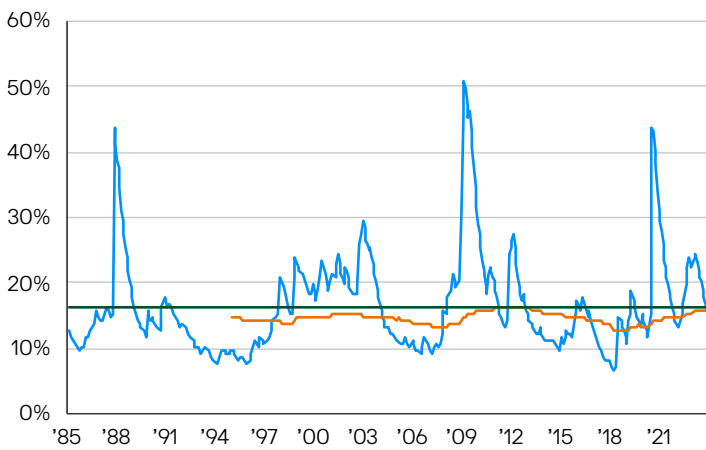
U.S. intermediate Treasuries



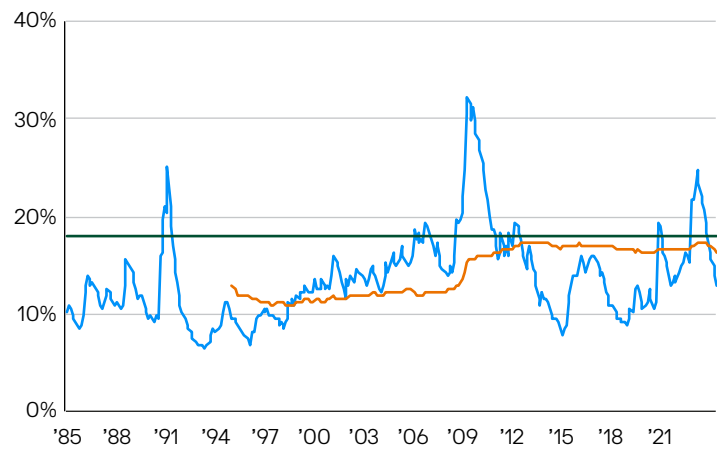
World government bonds (hedged, USD)



U.S. large cap equities



Commodities



● Short-term ● Long-term ● 2024 LTCMAs

Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2023. Short-term volatility is annualized exponentially weighted moving average (EWMA) volatility with a three-month half-life and a three-year lookback window, using daily return data. Long-term volatility is annualized equal 15-year volatility using monthly return data.

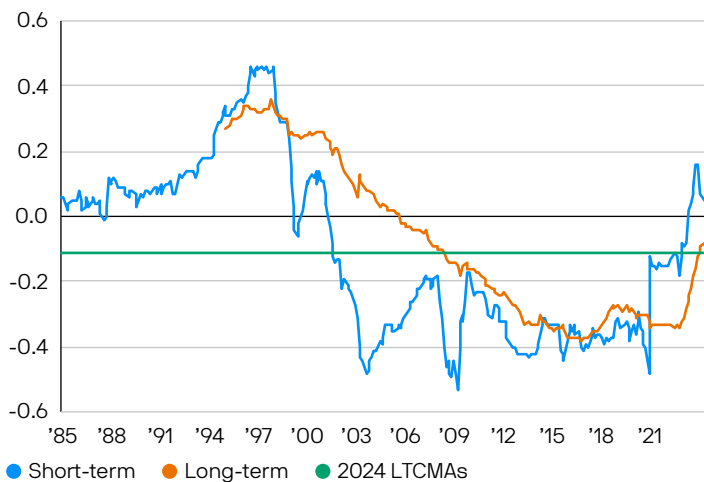
As for correlations, positive short-term stock-bond correlations⁷ peaked in U.S. and global markets at the end of 2022 and declined starting in 2023, yet have remained positive and volatile (**Exhibit 3**).

While long-term correlation⁸ between U.S. large cap equities and Treasuries remains negative, in line with the past decade, it has been trending upward toward neutral. Compared with our last Long-Term Capital Market Assumptions (LTCMAs) correlation forecast, -0.15, this year we forecast a slightly higher level, -0.11. Similarly, our 2024 correlation forecast for world equities⁹ and world government bonds, a popular measure of global stock-bond dynamics, also trends higher: 0.02, vs. last year's -0.03.

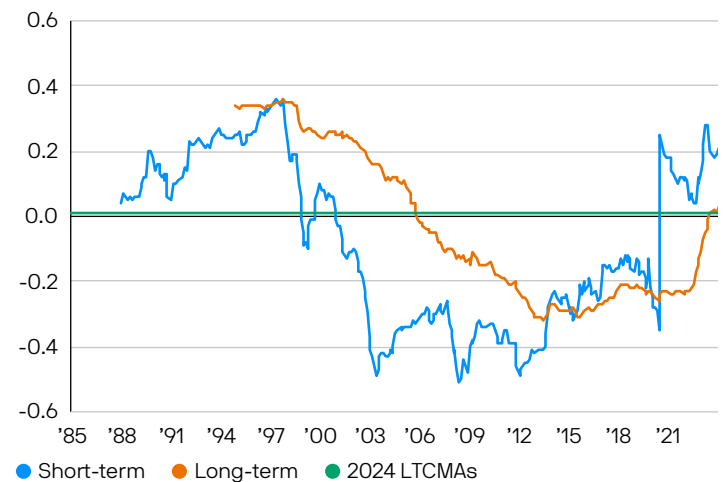
Stock-bond correlations have peaked in the short term, driving up long-term correlations

Exhibit 3: Short- vs. long-term stock-bond correlations, U.S. and global (USD)

U.S. large cap vs. U.S. intermediate Treasuries
Correlation



AC World equity vs. world government bonds (hedged)
Correlation



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2023.

⁷ Short-term correlation is EWMA volatility with a three-month half-life and a three-year lookback window, using weekly return data.

⁸ Long-term correlation is equal-weighted 15-year correlation using monthly return data.

⁹ World equities are based on the MSCI All Country World Index (ACWI).

Key markets: Volatility and correlation forecasts

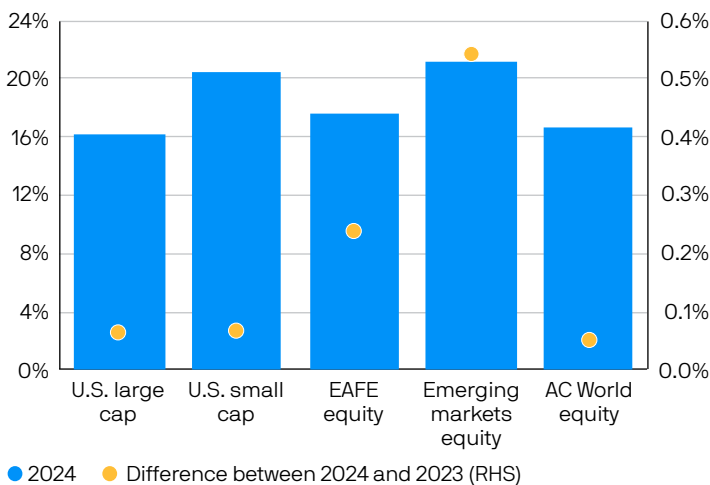
This year’s LTCMA risk assumptions are broadly in line with last year’s (**Exhibit 4** and **Exhibit 5**). The fact that both volatilities and correlations are peaking (Exhibit 2 and Exhibit 3) – moving toward our long-term forecasts of last year – strengthens our conviction in our assumptions.

Equities

Our volatility forecasts for equities are generally unchanged, especially for developed market equities, where y/y differences are minimal. One exception is Hong Kong equities, which we expect to be more volatile than we have historically forecasted. Hong Kong equities’ sizable movements recently are likely to persist over the 10- to 15-year assumption horizon, in our view, as policy risks remain heightened. Similarly, we are forecasting a 50bps increase in emerging market equities volatility this year.

Our equity volatility forecasts are generally unchanged, except in emerging markets

Exhibit 4: LTCMA equity volatility forecasts, 2024 vs. 2023



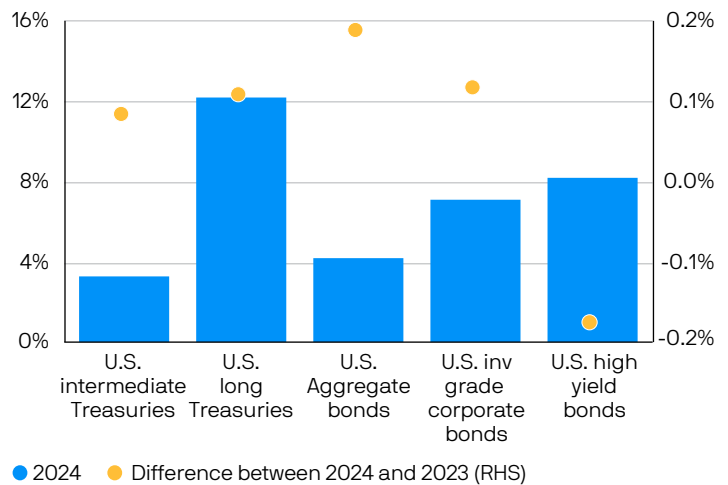
Source: J.P. Morgan Asset Management; data as of September 30, 2023.

Fixed income

We keep our fixed income long-term volatility forecasts stable, since we incorporated heightened bond volatility into our forecasts last year. As for cash volatility, with cash yields now higher, we expect cash volatility to be back to pre-GFC levels – higher than in recent history. To account for this shift (**Exhibit 6**), for a second year, we adjust slightly upward our volatility forecast for the U.S. and initiate a similar upward adjustment to our UK cash volatility forecast.

Much of the change we expected is playing out in higher fixed income volatility

Exhibit 5: LTCMA fixed income volatility forecasts, 2024 vs. 2023

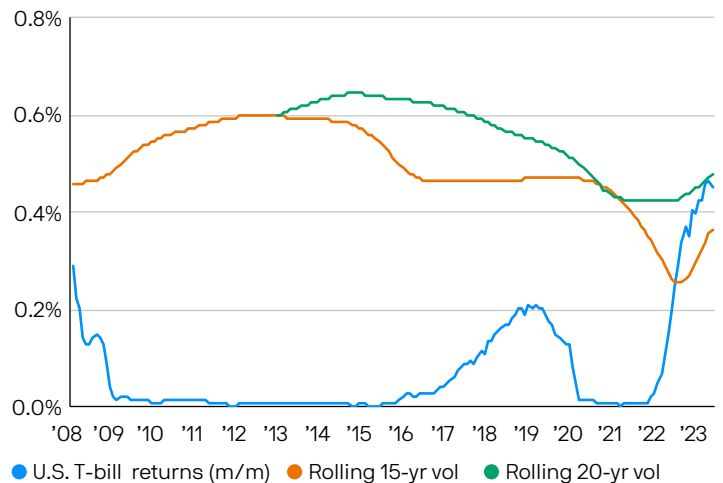


Source: J.P. Morgan Asset Management; data as of September 30, 2023.

These increases, however, merely bring cash volatility back in line with the period before the GFC, a time when cash was not a zero-return asset.

As cash rates rise again above zero, cash volatility returns to pre-GFC levels

Exhibit 6: U.S. cash returns and volatility



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2023. U.S. T-bill returns represented by FTSE 3 Month US T-Bill returns (m/m).

We apply a volatility adjustment to select credit assets because historical data often misrepresent current credit risk and duration risk and, more importantly, misrepresent them over our forecast horizon. We adjust our volatility forecasts to account for average, expected credit quality and maturity profiles over our LTCMA horizon. The result is a slightly higher volatility forecast for investment grade corporate bonds vs. history. All else equal, the end of European Central Bank purchases, which offered support to the high quality fixed income market, is also likely to increase volatility over our forecast horizon. In contrast, the volatility of high yield bonds benefits from forecasted higher credit quality vs. long-term history, resulting in a lower risk forecast.

Alternatives

Our volatility assumptions for financial alternatives are broadly unchanged, in line with the stable risk of the underlying public market beta. Private equity and venture capital continue to be the asset classes with the highest volatility and manager dispersion within the alternative investment universe.

We forecast stable return volatility for other alternatives, with the exception of commodities. We raise our assumption for commodities price volatility, which is elevated vs. history. Major supply constraints coincide with a worldwide energy transition involving significant technological shifts, issues further compounded by climate's effects on agricultural complexes.

We keep stable our volatility assumptions for core real assets, reflecting their resilient nature and portfolio diversification benefits. We expect infrastructure and transport will continue to deliver attractive risk-adjusted returns. Our real estate forecasts generally demonstrate a similar level of risk-adjusted return across regions.

This year's LTCMAs include our inaugural forecast for commercial mortgage loans, which are typically first-lien mortgage loans backed by institutional-quality commercial real estate. We forecast risk in the mid-single digits, close to investment grade bonds.

Sharpe ratio

We lower our Sharpe ratio forecasts for most fixed income and equities as return assumptions fall and cash rate assumptions rise. Sharpe ratios are little changed for most alternative assets except real estate. Sharpe ratios improve for real estate, given a meaningfully improved return outlook.

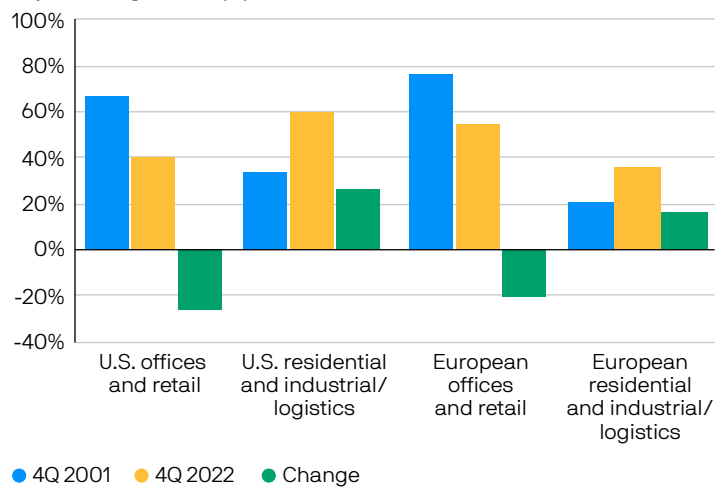
Special topic: Structural change in the real estate universe

Commercial real estate is attracting investors' attention. Concerns about downside risks are the result of the sector's incomplete recovery in the aftermath of COVID, and recent turmoil in the banking sector. We identify a potentially meaningful change in the composition of private real estate markets globally, linked to the impact of environmental, social and governance (ESG) considerations; e-commerce; and hybrid working arrangements.

The broad private real estate market can be classified into four broad categories: office, industrial and logistics, retail and residential. Over the past 20 years, these categories have undergone significant compositional change (**Exhibit 7**).

Significant shifts in private real estate sector exposures highlight a changing landscape for the market

Exhibit 7: U.S. and European institutional real estate holdings exposure, by sector (%)



Source: J.P. Morgan Asset Management; data as of December 31, 2022.

In 2001, 30% of institutionally owned European real estate was in retail assets; by the end of 2022, that had fallen to 14%. Over the same period, the share of European office assets held by institutions had fallen from 46% to 39%. These changes were offset by increased exposure to residential and industrial/logistics real estate.

Trends in the U.S. have been even more dramatic. Office and retail fell from more than a 66% share of invested assets in 2001 to less than 40% today. Residential and industrial/logistics increased from 34% to more than 60%. A significant proportion of this shift has taken place over the past few years; the growth of hybrid working arrangements and e-commerce contributed to the change.

The return performance of the different forms of real estate can be explained by economic and institutional factors, so dramatic shifts in the composition of investment in the market might be associated with changes in correlation and volatility. For example, while rental values in the office sector tend to be driven by office-based demand, residential rents are exposed to a wider range of economic drivers, potentially suggesting more diversified and stable cash flows.

So what is the impact of these shifts on risk across real estate sectors?

Although residential real estate has exhibited different characteristics from the other categories historically, including lower levels of volatility in some regional markets, our analysis suggests that changes in composition have not materially altered either volatility or correlation. In both the U.S. and Europe, the smoothed volatility of a portfolio with fixed 2001 weights is essentially identical to that of a portfolio with 2022 weights. Although returns from the latter were slightly higher, our analysis suggests that this can be attributed to historical rather than prospective factors.

Nevertheless, although changes to the composition of U.S. and European real estate markets don't impact prospective volatility, they do impact the asset class's factor exposures. For example, the shift to residential means investors have greater exposure to the household sector. The reduction in office exposure reduces real estate's sensitivity to the services sector, which historically has been a driver of occupier demand and returns. Finally, while a lower exposure to retail might imply that real estate investors are now less exposed to consumers, that is not the case. Logistics properties' rise is driven by occupier demand from online retailers and, as such, logistics real estate provides exposure to the retail sector in a different way.



Portfolio implications

Short-term imbalances, long-term stability

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In brief

- As investors navigate a world in transition, they wonder: Should they hold fast to a well-anchored long-term strategy or adjust their allocations across time to reflect near-term signals? In this paper, we seek to balance those twin objectives.
- Our long-term risk and return assumptions are anchored to cycle-neutral levels that move slowly over time. The 2024 Long-Term Capital Market Assumptions (LTCMAs) suggest a generally benign investing environment with limited need to restructure asset allocations. But some current market imbalances and trends could exert significant influence on returns and risk over a shorter horizon. Investors can adjust their portfolio strategy in the short term to take advantage of the opportunities – and manage the risks – inherent in those market imbalances.
- These imbalances include: the role of cash as a store of liquidity and optionality within broader fixed income allocations; the rising cost of leverage and its impact on alternative strategies; the increasingly visible distinctions between China and non-China emerging markets; and, finally, the degree of concentration in U.S. equity markets.

Our LTCMAs aim to help guide the creation of efficient strategic allocations. The 10- to 15-year investment horizon allows for greater confidence in both the accuracy as well as the year-to-year stability of the research output over time.

As investors allocate capital, however, they confront a macroeconomic and market environment that exhibits a high degree of short-term volatility. We believe investors are navigating a world in transition – most visibly from persistent disinflation, accommodative monetary policy and fiscal restraint to two-way inflation risk, more traditional monetary policy and more active fiscal authorities.

Investors operating in a time of transition may wonder: Should they hold fast to a well-anchored long-term strategy or adjust their allocations across time to reflect near-term signals? It's not a simple question.

In this paper, we seek to balance the two objectives:

- We first assess how likely it is that projected long-term returns mapped against a prudently diversified strategic asset allocation will allow investors to reach their strategic return targets with an acceptable level of risk.
- When return assumptions for individual asset classes have changed materially on a year-over-year basis, we consider potential allocation changes that may help to maintain an optimal portfolio strategy.
- We also explore the current environment to identify short-term market imbalances or significant trends that may be obscured by the extended time horizon used in the LTCMAs' empirical analysis; we then identify investment approaches that may be able to take advantage of those imbalances or trends.

Our analysis finds a generally benign investing environment in which diversified portfolios are likely to provide returns consistent with long-term objectives and with limited need for significant changes to asset allocations. Despite the generally favorable backdrop, the modestly lower projected returns suggest that identifying managers that can deliver excess returns – a challenging exercise even for the most skilled allocators – is of increasing importance.

Additionally, we note some visible market imbalances that signal a potential opportunity for targeted changes in asset allocation over a shorter horizon. Timely responses to such signals may allow investors to improve performance relative to the long-term strategic benchmark. We are reminded that balancing investors' twin objectives requires both focus and flexibility.

Gauging risk and return

Our 2024 LTCMAs project that returns on broadly diversified allocations will be generally consistent with investors reaching their objectives. Across asset classes, we make mostly modest year-over-year revisions to the 2023 LTCMA analysis, suggesting that significant changes to allocations are not needed.

However, the decline in public market equity return expectations relative to last year – following strong recent performance – signals that fixed income and alternatives may have a larger role to play going forward. Within alternative allocations, the impact of higher leverage costs and the recognition of valuation changes have led to significant shifts in expectations across different subsectors.

Our long-term risk and return assumptions are anchored to cycle-neutral levels that move slowly over time. But some current market imbalances and trends could exert significant influence on returns and risk over a shorter horizon. These imbalances include: the role of cash as a store of liquidity and optionality within broader fixed income allocations; the rising cost of leverage and its impact on alternative strategies; the increasingly visible distinctions between China and non-China emerging markets; and, finally, the degree of concentration in U.S. equity markets.

Baseline portfolios and stock-bond frontiers

Our LTCMAs project a 7.0% return for a 60/40 stock-bond portfolio,¹ down from 7.2% in 2023. Although it is overly simplified, a 60/40 portfolio serves as a useful jumping-off point for discussions of asset allocation. The analysis below illustrates a series of asset allocations along the stock-bond frontier, placing some reasonable boundaries around risk and return expectations for investors (**Exhibit 1**).

¹ Stock-bond portfolios are proxied by MSCI AC World Total Return Index and Bloomberg US Aggregate Total Return Index. A 60/40 stock-bond portfolio is 60% allocated to stocks and 40% allocated to bonds.

The stock-bond frontier flattens in 2024; alternative allocation improves performance expectation

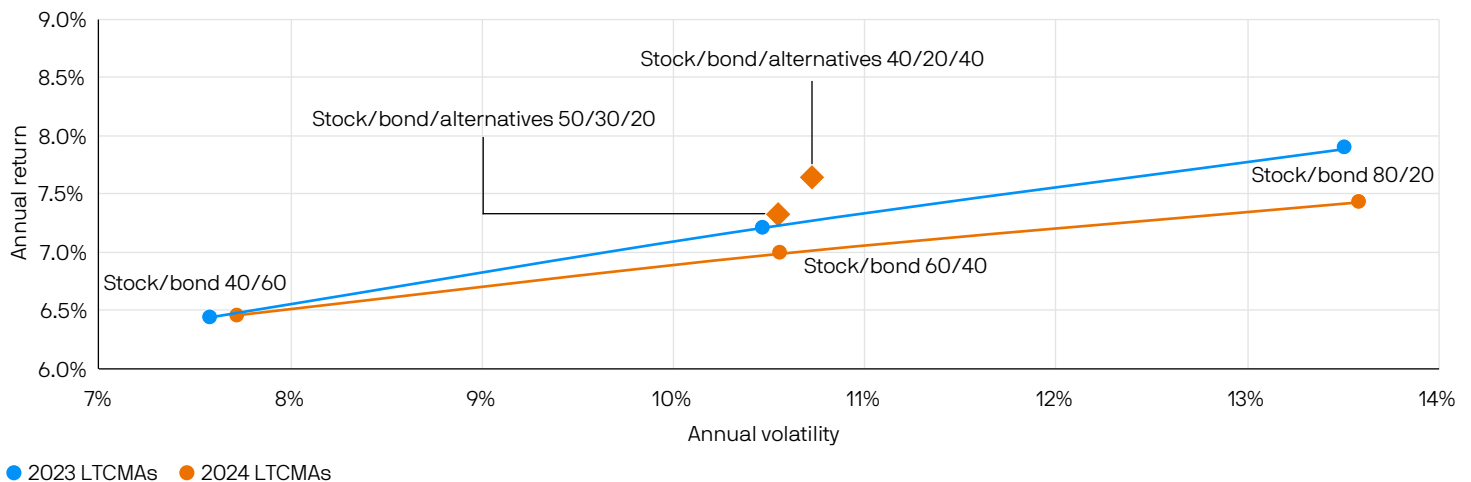
Exhibit 1: Portfolios and stock-bond frontier using 2024 vs. 2023 LTCMA forecasts

	Stock/bond portfolio (% weights)			Stock/bond/alts portfolio (% weights)	
2023 LTCMAs	40/60	60/40	80/20	50/30/20	40/20/40
Annual return	6.4%	7.2%	7.9%	7.5%	7.7%
Annual volatility	7.6%	10.5%	13.5%	10.4%	10.6%
Sharpe ratio	0.57	0.51	0.47	0.53	0.55
CVaR 95	-13.7%	-19.4%	-25.3%	-19.2%	-19.5%
CVaR 99	-18.3%	-25.7%	-33.5%	-25.5%	-25.9%
2024 LTCMAs	40/60	60/40	80/20	50/30/20	40/20/40
Annual return	6.5%	7.0%	7.4%	7.3%	7.7%
Annual volatility	7.7%	10.6%	13.6%	10.5%	10.7%
Sharpe ratio	0.50	0.44	0.40	0.47	0.49
CVaR 95	-14.0%	-19.6%	-25.6%	-19.5%	-19.7%
CVaR 99	-18.6%	-26.0%	-33.8%	-25.8%	-26.2%

Source: J.P. Morgan Asset Management; data as of September 30, 2023. MSCI ACWI (stocks); Bloomberg US Aggregate Index (bonds); Alternatives: private equity (30%), diversified hedge funds (10%), direct lending (10%), U.S. core real estate (10%), European core real estate (6%), Asia Pacific core real estate (4%), global core infrastructure (20%), global core transport (5%), global timberland (5%).

Broadly diversified portfolios can reach strategic return targets without excessive risk

Exhibit 2: Asset allocation scenarios, annual returns and volatility



Source: J.P. Morgan Asset Management; data as of September 30, 2023.

We begin with a set of public market portfolios ranging from conservative (40/60 stock-bond) to traditional (60/40) to aggressive (80/20). Of course, few investors today are limited exclusively to public markets. To illustrate the impact of adding alternative investments, we examine two additional portfolios: The first adds a 20% sleeve of alternatives, resulting in a 50/30/20 stock-bond-alternatives allocation; the second doubles

the alternatives allocation, resulting in a 40/20/40 allocation. The alternatives allocation is broadly diversified across a range of private investment vehicles.² While far from comprehensive, in our experience this range would incorporate most investor approaches to broad allocation.

² The alternative allocation represents a diversified basket of alternative assets, balanced between real assets and financial alternatives.

The stock-bond frontier is flatter in 2024 (**Exhibit 2**). Returns for diversified portfolios are lower, while the volatilities are very similar. The range of returns and Sharpe ratios has compressed from 2023 to 2024, given lower returns and rising cash (risk-free) rates. This suggests that top-down asset allocation changes across stocks and bonds are going to be somewhat less impactful, and investors looking to improve absolute or risk-adjusted returns may want to seek performance enhancement from active manager selection.

The relative efficiency of fixed income – following the rise in yields in 2022 and 2023 – makes lower risk public market strategies more compelling on a risk-adjusted basis. The 40/60 portfolio offers a higher Sharpe ratio than other public market strategies, and one that is virtually equivalent to the 50/30/20 strategy that incorporates alternatives. Higher yields are not only additive to returns; fixed income is now positioned to offer potential downside protection vs. equities.

A very low or negative stock-bond correlation is useful for managing risk in public market portfolios that rely primarily on equity exposure to drive returns. In 2022, this relationship reversed from negative to positive, with grave consequences for asset returns. Currently, however, with bond yields materially higher and the Federal Reserve (Fed) appearing to be in the final stages of its hiking cycle, we think that the value of traditional diversification has likely been restored.

Nevertheless, relying solely on equity to drive higher returns remains somewhat inefficient. Consider that while the 80/20 portfolio offers the highest absolute returns, it also offers the lowest Sharpe ratio. Aside from being inefficient, this allocation offers extreme downside risk that may be too high for comfort.

Performance expectations improve materially for allocations that use alternatives. Return levels are higher than allocations using only public markets, while volatilities are similar to that of a traditional 60/40 portfolio. The expanded opportunity set of alternative assets offers an attractive return-risk contribution, making a case for larger overall allocations to private alternatives (up to the point that liquidity constraints apply). The 40/20/40 allocation offers potential returns that are virtually identical to those of the 80/20 public market portfolio but with much lower volatility (and correspondingly higher Sharpe ratios) and downside risk (as proxied by CVaR³).

Despite the general year-on-year decline in projected returns, investors can take comfort that broadly diversified portfolios – using either public markets alone or public and private markets to varying degrees – have the potential to reach strategic return targets without excessive risk. Keep in mind that these are beta returns only – our analysis does not account for excess returns from active management.

Market imbalances

Traditional portfolio strategies should be effective over the long run. But in a world in transition, we see a meaningful potential for short-term market imbalances to emerge and drive performance. It is essential that investors identify market imbalances and consider the direction in which they are likely to correct over time. They can adjust their portfolio strategies in the short term to take advantage of the opportunities – and manage the risks – arising from those market imbalances.

Cash and duration in an inverted curve environment

Today's most pronounced market imbalance may be the inversion of the yield curve and the exceptionally high interest rates available on the safest and most defensive fixed income strategies. Cash and similarly defensive fixed income assets currently yield above 5%. At the time of writing, inflation pressures seem to be subsiding (though they have not disappeared), and the Fed appears close to the end of its rate-hiking cycle. While it may be some time yet before rates decline meaningfully, the era of cash outperformance may be nearing its conclusion.

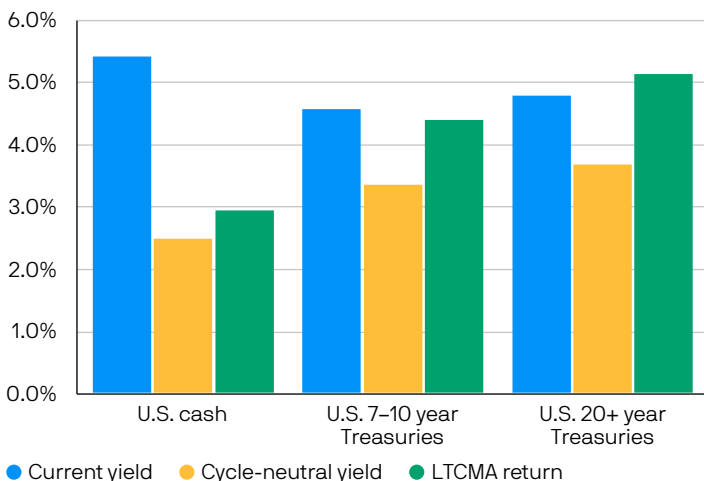
This presents an opportunity, and a challenge, to allocators in the near term. Should they remain in cash, preserving liquidity and optionality while earning attractive short-term returns? Or should they move to longer-duration fixed income strategies that provide somewhat less yield today but potentially higher future returns if yields fall?

³ Conditional Value at Risk (CVaR), also known as the expected shortfall, is a risk assessment measure that quantifies the amount of tail risk contained in an investment portfolio. CVaR is commonly used in portfolio optimization for effective risk management.

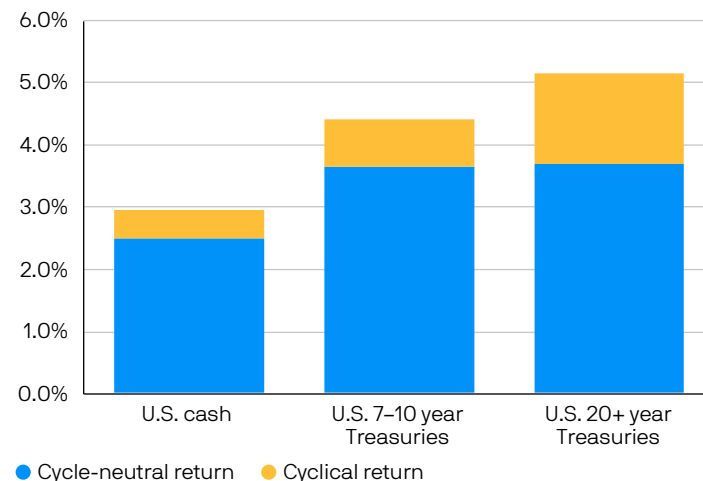
For allocators, cash offers optionality, but extending duration may deliver higher returns

Exhibit 3: Current and cycle-neutral yields and return forecasts across fixed income

U.S. fixed income yields & returns



U.S. fixed income return breakdown, cycle-neutral and cyclical



Source: J.P. Morgan Asset Management; data as of September 30, 2023.

The LTCMA cycle-neutral rate for cash is 2.5%, far below current yields. But the low duration of the asset means that the migration back to cycle-neutral will not generate much additional return – just lower and lower yield over time. Over the full forecast horizon, we expect cash to return a very modest 2.9%.

Longer-duration fixed income, while offering lower interest rates today, will benefit from the migration back to a lower cycle-neutral rate over time. Intermediate and long Treasuries are projected to deliver 4.4% and 5.2%, respectively, over the forecast horizon (**Exhibit 3**). We note as well that the ability to benefit from falling rates allows bonds to diversify risk elsewhere in portfolios – an attribute that was missing in 2022 but may prove valuable again.

The question for investors is therefore whether the liquidity and optionality provided by cash will continue to outweigh the additional returns and risk diversification earned by longer-duration bonds. As long-term rates have risen, the trade-off seems to tilt against cash and in favor of adding duration to portfolios – particularly in high quality and highly liquid Treasury and securitized sectors that offer defensive risk management benefits.

Adjusting to an environment of costly leverage

It has been observed that leverage operates in the shadows of the financial markets. This is true to some extent in the LTCMA process, as leverage costs are a somewhat obscured component of the models used to project the long-term “headline” returns across alternative asset classes.

Certainly, the past two years have witnessed a sharp transition from an era of widely available low cost leverage to an era of scarcer and more costly financing. What had long been a tailwind to investment performance is now a headwind as legacy assets are refinanced at higher rates and new investments face a higher cost of capital.

Investors should assess which sectors have adjusted valuations to reflect this new reality and which have yet to do so. On a deeper level, they will also want to consider if higher financing costs are directly offset by higher returns or instead function as a tax on future performance of the underlying investments. While we do not expect rates to remain elevated over the full forecast horizon, any extended period of higher financing costs will have a material impact on particular strategies.

Exhibit 4 considers a spectrum of alternative asset classes in this context.

LTCMAs suggest a larger and more diversified exposure to alternative asset classes

Exhibit 4: Use of leverage for selected alternative asset classes

Asset class	Use of leverage	2024 return change	2024 Sharpe ratio	Discussion of future return drivers
U.S. core real estate	Moderate	+180bps	0.48	The impact of lower prices and higher forward-looking cap rates offsets the expectation of more costly financing over the forecast horizon
Direct lending	Moderate	+70bps	0.48	The gain from higher interest rates on new loans is partially – but not fully – offset by rising credit losses
Infrastructure	Moderate	+50bps	0.40	Use of long-term financing and the ability to pass through inflation to end users insulates the asset class from higher rates
Hedge funds	High	+0bps	0.39	Higher financing costs are felt immediately, but the increase in volatility and dispersion may be positive for performance
Private equity	High	-20bps	0.43	The slow pace of adjustment to underlying asset prices has yet to be felt; reduced public equity returns limit future performance

Source: J.P. Morgan Asset Management; data as of September 30, 2023.

In the case of **U.S. core real estate**, higher rates lead to a downward adjustment in prices, with a steep drop in some sectors plagued by weaker fundamentals. Even for properties that have not yet required refinancing, prospective buyers factor such costs into the prices they are willing to pay. As prices have adjusted, forward-looking returns have improved, up from 5.7% to 7.5% over the past year.

For **direct lending**, the higher cost of leverage is directly offset by higher interest rates on new loans. The question for investors is whether there will come a reckoning in the form of rising default rates as the underlying borrowers absorb high debt service costs. Even if the level of outright default remains low, revised loan terms and the use of payment-in-kind (PIK) debt could depress returns. Taking the various scenarios into account, we see overall returns from direct lending rising from 7.8% to 8.5%.

Core infrastructure is well insulated from the rise in interest rates, due to the use of long-term financing for most assets (which are themselves long-lived and generally intended to be held for the duration of their useful lives). There is limited pass-through from higher rates into mark-to-market adjustments to legacy assets. Further, many energy sector providers can pass through higher commodity costs to end users, delivering a partial hedge to rising rates. Our estimate for core infrastructure returns moves up modestly, from 6.30% to 6.8%.

Hedge fund strategies are highly idiosyncratic by nature, but in general they make extensive use of short-term leverage. These costs adjust rapidly to prevailing interest rates, a potential headwind to performance in the near term. However, higher leverage costs will likely be offset by the improved investment opportunity from higher market volatility, security-level dispersion and higher returns on cash allocations. Our projected return for multistrategy hedge funds is thus unchanged at 5.0%.

Private equity makes widespread use of leverage and will face a headwind to returns from higher financing costs. Not all categories of private equity use leverage to the same extent, however. Sectors such as leveraged buyouts require high levels of borrowing to generate returns, whereas strategies focused on small and midsize companies tend to use less leverage. We also observe that private equity owners have not yet made significant adjustments in portfolio valuations to reflect the current market environment. As a result, we see no reason to “mark up” future returns. We lower our private equity return assumption from 9.9% to 9.7%.

In sum, our LTCMAs make the case for a larger and more diversified exposure to alternative asset classes. Such an approach recognizes the ways in which particular alternatives categories respond to changes in inflation and interest rates – both with respect to short-term valuation changes and to longer-term return drivers.

A growing separation between China and the broader emerging market complex

Investors have long viewed China's large weight in broader emerging market (EM) benchmarks as a possible source of performance distortion. China's rapid economic development, unusual demographics and high degree of geopolitical exposure diverge meaningfully from the remaining constituents of the broader EM opportunity set. At the same time, the growth and accessibility of Chinese domestic markets allow investors to separate their investment decisions vis-à-vis China from the remaining EM economies, few of which offer similarly deep local markets.

Recent trends in global trade dynamics reinforce the case for a differentiated approach to China. Supply chains are shifting as firms are diversifying their production and seeking shorter supply chains to reach consumers. Non-China Asia is benefiting from this process (which stops short of fully fledged deglobalization), as are Mexico and Eastern Europe. More broadly, emerging economies with key natural resources (copper, aluminum, nickel, cobalt and lithium) are being more fully integrated into the global economy.

For long-term investors, these trends will matter – but they must also be evaluated in the context of other return drivers, notably market valuations and currency dynamics.

In our equity return assumptions, we examine the relative returns across the broader emerging markets as well as the China and non-China components, breaking down these expectations into cycle-neutral returns, cyclical adjustments reflecting current valuations and currency effects when returns are measured in U.S. dollar terms (**Exhibit 5**).

Non-China EM equity exhibits a higher long-term cycle-neutral return relative to China, pointing to favorable fundamentals. However, after adjusting for the relative cheapness of Chinese equities and the expectation that the renminbi will outperform the U.S. dollar over the forecast horizon, the advantage flips in favor of China.

Thus, over the near term, investors may be wise to maintain strategic China exposures at current levels but also look for opportunities to rebalance in favor of non-China EM equities. Investors may opt for a top-down separation of EM allocations into distinct China and non-China components or deploy an active manager able to reweight exposures across time to account for both long-term fundamentals and short-term valuation signals.

Our analysis suggests investors maintain China equities in the near term but rebalance for non-China EM equities in the long run

Exhibit 5: Return forecast breakdown for EM and China equities

	Cycle-neutral return	Cyclical adjustment	Local return	Currency adjustment	USD total return
Broad EM (100%)	7.70%	0.40%	8.10%	0.70%	8.80%
MSCI China (37%)	6.70%	1.70%	8.40%	1.90%	10.30%
EM ex-China (63%)	8.20%	-0.30%	7.90%	0.00%	7.90%

Source: J.P. Morgan Asset Management; data as of September 30, 2023.

Concentration in U.S. equity benchmarks

U.S. large cap equity remains among the most widely held asset classes across global portfolios, and for good reason: It has long been one of the most liquid and best-diversified equity benchmarks available. Many investors point to the transparency and efficiency of the U.S. equity market as a reason to use capitalization-weighted passive strategies – implicitly trusting the market to handle security allocation within this sector.

But recently, this faith in the market's efficiency has been tested. Rapid increases in valuations across a small number of large, technology-focused firms have increased market concentration to levels that exceed the tech bubble of the late 1990s. As shown in **Exhibit 6**, the top 10 companies in the S&P 500 (by definition, 2% of the total number of S&P 500 companies) now account for more than 30% of the index value. Indeed, the current levels of concentration are about 3 standard deviations away from historical norms. Fundamentals justify the underlying valuations to some extent – these are generally profitable firms with significant growth prospects – but the magnitude of the index concentration and the dominance of a single market sector are cause for concern.

Outside the U.S., the picture changes. It appears that the U.S. is something of an outlier in this regard. Ex-U.S. developed equity markets exhibit lower concentration and more sector diversification when compared with the S&P 500 (**Exhibit 7**).

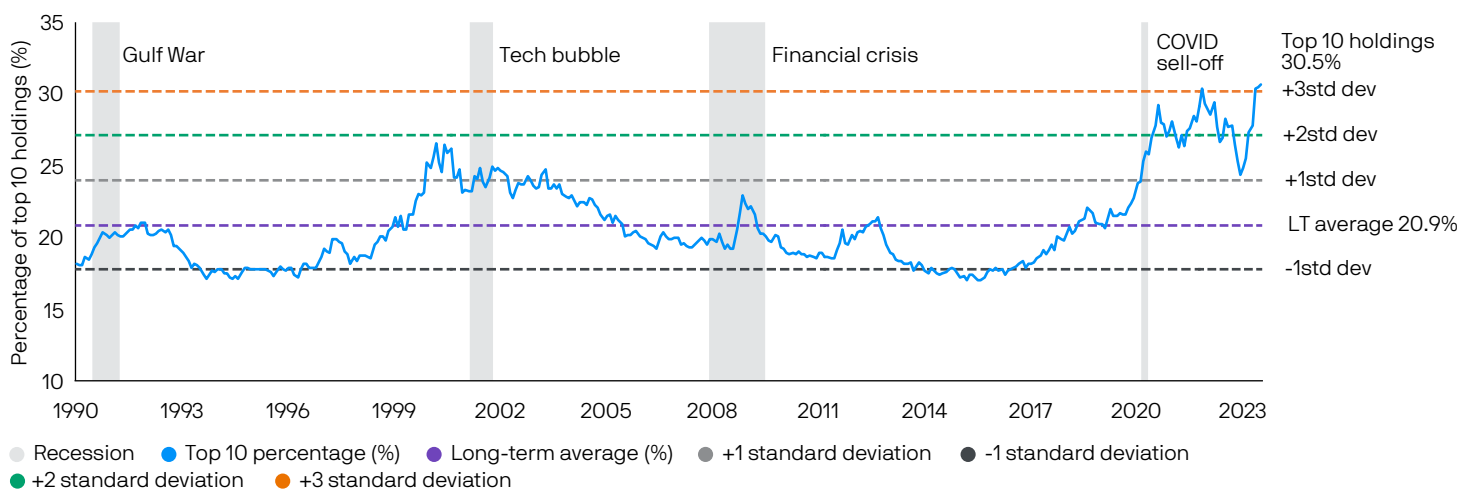
Even as higher valuations partly account for our lower U.S. equity return projections, we note that the S&P 500 overall – while trading at a higher P/E than a year ago – has not risen by the same degree as these top 10 stocks. As a result, the modest adjustment to LTCMA projections may mask a greater degree of short-term risk. History suggests previous episodes of extreme concentration signaled a subsequent market decline.

We see a few plausible responses to this challenge. First, investors may find this an opportune moment to employ active managers that are able to pivot away from market cap leaders and toward companies with more reasonable valuations. Investors may also consider managers that use an alternatively weighted index approach by diversifying risk at the sector, stock and factor levels.

Second, investors may want to shift some of their U.S. equity exposure to non-U.S. markets that are less exposed to concentration risk and may also benefit from a longer-term decline in the value of the U.S. dollar.

Current levels of concentration are about 3 standard deviations away from historical norms

Exhibit 6: Concentration in the U.S. equity market



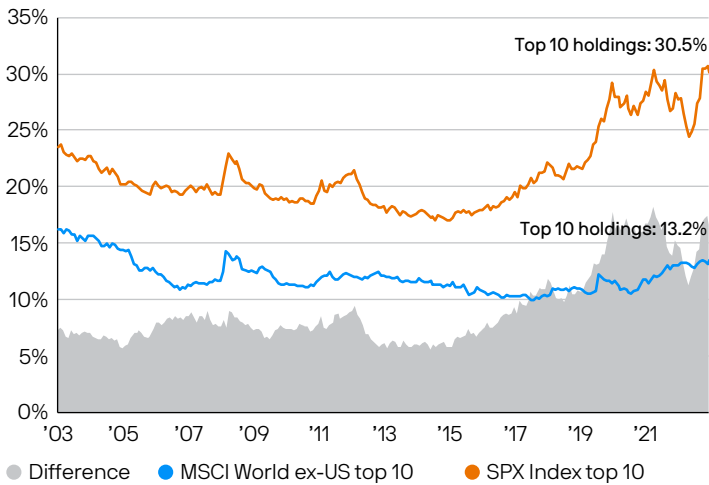
Source: J.P. Morgan Asset Management; data as of July 31, 2023.

The U.S. stock market is an outlier in terms of index concentration

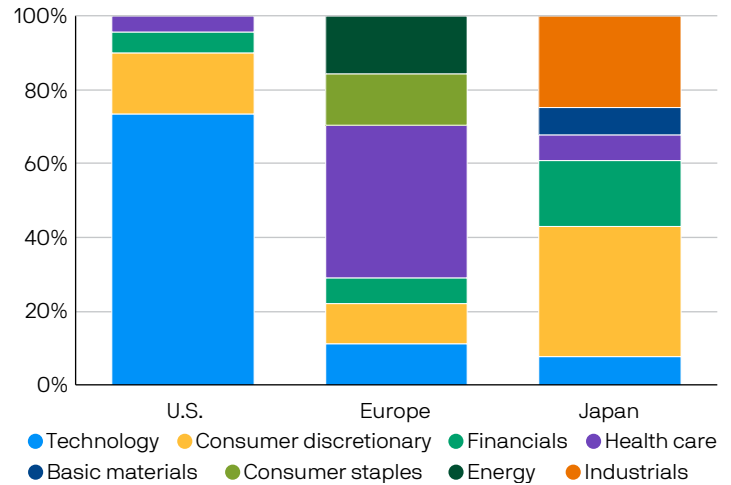
Exhibit 7: Sector exposure in U.S. and other developed countries

U.S. and MSCI ex-U.S. market concentration

Percentage of top 10 holdings (%)



Top 10 companies – sector composition by region



Source: Bloomberg, J.P. Morgan Asset Management; data as of July 31, 2023. * S&P 500 Index, MSCI World Europe, MSCI World Japan, and by Industry Classification Benchmark (ICB).

Conclusion

It's not always easy but, in our view, investors should strive to remain thoughtful and circumspect when considering changes in asset allocation. The 10- to 15-year horizon of our LTCMAs supports a patient approach by anchoring projected asset class returns to cycle-neutral values derived from economic fundamentals, giving allocators confidence to put capital to work over the long term. But it remains critical to observe market conditions across time and adjust as needed.

As we've discussed, the 2024 LTCMAs suggest a benign environment, with limited need to restructure asset allocations. We anticipate modestly lower returns on equities and stable returns on fixed income over the forecast horizon such that overall returns on balanced portfolios should enable investors to reach their strategic objectives. In the absence of obvious portfolio improvements at the strategic level, the use of active managers may be more important as a means of driving performance. It remains clear that incorporating diversified alternatives will likely achieve target returns more efficiently than approaches that use public markets alone.

Yet several market imbalances deserve attention. The pivot to higher interest rates and the approaching conclusion of central bank hiking cycles suggest that bond portfolio duration should extend. The slow adjustment to higher financing costs will be felt across credit markets and alternative asset classes that employ leverage, implying a re-underwriting of exposure to key subsectors. The fading of globalization, and the growing separation of China from trading partners in the developed world, may warrant an investment strategy that differentiates exposures within emerging markets. Finally, the pronounced concentration of U.S. equity markets may suggest a move away from passive market capitalization benchmarks and/or a shift from the U.S. in favor of global markets.



III Assumption matrices

		Compound Return 2023 (%)				Annualized Volatility (%)																						
		Arithmetic Return 2024 (%)				Compound Return 2024 (%)																						
Fixed Income		2.50	2.51	1.52	2.60	U.S. Inflation	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries	U.S. Aggregate Bonds	U.S. Securitized	U.S. Short Duration Government/Credit	U.S. Long Duration Government/Credit	U.S. Inv Grade Corporate Bonds	U.S. Long Corporate Bonds	U.S. High Yield Bonds	U.S. Leveraged Loans	World Government Bonds hedged	World Government Bonds	World ex-U.S. Government Bonds hedged	World ex-U.S. Government Bonds	Emerging Markets Sovereign Debt	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds	U.S. Muni 1-15 Yr Blend	U.S. Muni High Yield		
		2.90	2.90	0.59	2.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Inflation	2.50	2.51	1.52	2.60	1.00	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries	U.S. Aggregate Bonds	U.S. Securitized	U.S. Short Duration Government/Credit	U.S. Long Duration Government/Credit	U.S. Inv Grade Corporate Bonds	U.S. Long Corporate Bonds	U.S. High Yield Bonds	U.S. Leveraged Loans	World Government Bonds hedged	World Government Bonds	World ex-U.S. Government Bonds hedged	World ex-U.S. Government Bonds	Emerging Markets Sovereign Debt	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds	U.S. Muni 1-15 Yr Blend	U.S. Muni High Yield		
	U.S. Cash	2.90	2.90	0.59	2.40	-0.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Intermediate Treasuries	3.90	3.95	3.27	3.60	-0.26	0.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Long Treasuries	5.20	5.92	12.39	4.20	-0.21	0.06	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	TIPS	4.60	4.76	5.75	4.30	0.00	0.04	0.61	0.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Aggregate Bonds	5.10	5.19	4.28	4.60	-0.24	0.10	0.83	0.83	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Securitized	5.30	5.35	3.34	4.80	-0.22	0.12	0.79	0.73	0.69	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Short Duration Government/Credit	3.90	3.91	1.58	3.60	-0.29	0.26	0.83	0.58	0.61	0.82	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Long Duration Government/Credit	5.70	6.24	10.76	5.20	-0.20	0.04	0.72	0.89	0.68	0.93	0.79	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Inv Grade Corporate Bonds	5.80	6.04	7.14	5.50	-0.17	0.02	0.49	0.56	0.70	0.85	0.73	0.64	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Long Corporate Bonds	6.00	6.64	11.70	5.80	-0.17	0.01	0.48	0.64	0.65	0.85	0.71	0.58	0.90	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. High Yield Bonds	6.50	6.83	8.36	6.80	0.01	-0.07	-0.06	-0.06	0.46	0.35	0.35	0.26	0.30	0.64	0.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	U.S. Leveraged Loans	6.50	6.79	7.89	6.20	0.18	-0.09	-0.39	-0.31	0.18	0.03	0.03	-0.07	0.02	0.37	0.32	0.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	World Government Bonds hedged	4.20	4.27	3.74	3.70	-0.28	0.10	0.85	0.86	0.60	0.86	0.77	0.71	0.83	0.63	0.66	0.07	-0.22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	World Government Bonds	4.80	5.03	6.91	4.40	-0.15	0.10	0.74	0.63	0.67	0.79	0.71	0.73	0.72	0.67	0.66	0.30	-0.06	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
	World ex-U.S. Government Bonds hedged	4.00	4.07	3.71	3.60	-0.27	0.09	0.71	0.73	0.55	0.77	0.68	0.61	0.76	0.61	0.64	0.15	-0.12	0.96	0.63	1.00	1.00	1.00	1.00	1.00	1.00		
	World ex-U.S. Government Bonds	4.90	5.25	8.61	4.60	-0.13	0.09	0.63	0.52	0.64	0.72	0.66	0.68	0.65	0.66	0.64	0.38	0.03	0.62	0.98	0.58	1.00	1.00	1.00	1.00	1.00		
	Emerging Markets Sovereign Debt	6.80	7.23	9.64	7.10	-0.12	0.03	0.27	0.30	0.61	0.63	0.58	0.47	0.59	0.81	0.76	0.74	0.47	0.40	0.57	0.42	0.62	1.00	1.00	1.00	1.00		
	Emerging Markets Local Currency Debt	6.00	6.69	12.23	7.10	-0.03	0.12	0.19	0.14	0.44	0.45	0.41	0.39	0.41	0.60	0.57	0.62	0.36	0.23	0.60	0.25	0.66	0.80	1.00	1.00	1.00		
	Emerging Markets Corporate Bonds	6.70	7.08	9.01	7.00	-0.05	-0.03	0.16	0.19	0.53	0.54	0.48	0.42	0.50	0.79	0.72	0.72	0.57	0.27	0.45	0.29	0.49	0.89	0.72	1.00	1.00		
	U.S. Muni 1-15 Yr Blend	4.00	4.07	3.89	3.70	-0.16	0.09	0.52	0.49	0.57	0.71	0.68	0.55	0.62	0.68	0.64	0.40	0.18	0.58	0.53	0.57	0.52	0.61	0.37	0.48	1.00		
	U.S. Muni High Yield	5.80	6.14	8.49	5.20	0.20	-0.04	0.11	0.20	0.46	0.39	0.39	0.17	0.35	0.53	0.47	0.48	0.50	0.24	0.22	0.26	0.24	0.55	0.29	0.55	0.62	1.00	
Equities	U.S. Large Cap	7.00	8.19	16.19	7.90	0.01	-0.04	-0.11	-0.10	0.29	0.21	0.20	0.09	0.21	0.46	0.44	0.74	0.58	0.03	0.26	0.12	0.34	0.60	0.59	0.56	0.20	0.30	
	U.S. Mid Cap	7.60	9.08	18.13	8.00	0.01	-0.05	-0.16	-0.12	0.28	0.19	0.19	0.07	0.19	0.47	0.44	0.78	0.63	-0.01	0.22	0.08	0.31	0.60	0.59	0.57	0.21	0.30	
	U.S. Small Cap	7.20	9.07	20.44	8.10	-0.02	-0.07	-0.19	-0.19	0.18	0.11	0.12	0.01	0.10	0.36	0.34	0.71	0.56	-0.07	0.15	0.02	0.23	0.50	0.52	0.47	0.14	0.21	
	Euro Area Large Cap	9.70	11.83	22.15	10.50	-0.02	0.05	-0.06	-0.10	0.27	0.25	0.24	0.19	0.22	0.48	0.45	0.72	0.53	0.02	0.39	0.08	0.47	0.67	0.72	0.62	0.24	0.28	
	Japanese Equity	9.30	10.39	15.62	10.40	-0.07	-0.03	-0.05	-0.03	0.25	0.26	0.26	0.18	0.25	0.50	0.47	0.66	0.49	0.04	0.30	0.09	0.37	0.58	0.62	0.56	0.21	0.26	
	Hong Kong Equity	9.90	11.80	20.89	7.50	-0.03	-0.01	-0.06	-0.06	0.23	0.26	0.25	0.20	0.23	0.49	0.45	0.60	0.50	-0.03	0.29	-0.02	0.35	0.60	0.67	0.65	0.24	0.33	
	UK Large Cap	8.60	10.01	17.76	9.10	0.05	-0.02	-0.17	-0.18	0.23	0.17	0.17	0.09	0.15	0.44	0.41	0.72	0.61	-0.09	0.29	-0.02	0.39	0.61	0.66	0.60	0.18	0.33	
	EAFE Equity	9.20	10.58	17.64	9.80	-0.01	0.01	-0.08	-0.09	0.30	0.26	0.25	0.19	0.24	0.52	0.49	0.77	0.59	0.01	0.39	0.07	0.47	0.68	0.74	0.65	0.24	0.31	
	Chinese Domestic Equity	10.80	14.38	29.33	11.80	-0.05	0.10	-0.05	-0.03	0.11	0.16	0.16	0.11	0.14	0.29	0.26	0.35	0.29	0.01	0.15	0.02	0.18	0.34	0.35	0.40	0.10	0.18	
	Emerging Markets Equity	8.80	10.77	21.20	10.10	0.00	0.02	-0.07	-0.06	0.32	0.27	0.25	0.21	0.25	0.52	0.48	0.72	0.57	0.01	0.38	0.05	0.46	0.69	0.80	0.70	0.22	0.35	
	AC Asia ex-Japan Equity	8.90	10.83	20.98	10.00	-0.05	0.01	-0.04	-0.02	0.31	0.30	0.28	0.23	0.28	0.54	0.50	0.70	0.54	0.04	0.37	0.06	0.44	0.67	0.75	0.69	0.23	0.35	
	AC World Equity	7.80	9.05	16.68	8.50	0.00	-0.01	-0.10	-0.10	0.31	0.25	0.23	0.15	0.23	0.52	0.49	0.79	0.62	0.02	0.34	0.09	0.43	0.67	0.71	0.64	0.22	0.32	
	U.S. Equity Value Factor	8.40	9.76	17.42	10.10	-0.02	-0.07	-0.16	-0.16	0.22	0.16	0.17	0.07	0.14	0.41	0.38	0.74	0.58	-0.03	0.21	0.07	0.30	0.56	0.59	0.53	0.16	0.24	
	U.S. Equity Momentum Factor	7.90	9.14	16.62	8.90	0.02	-0.03	-0.12	-0.07	0.33	0.23	0.21	0.08	0.23	0.49	0.46	0.76	0.62	0.03	0.24	0.12	0.32	0.61	0.56	0.56	0.24	0.34	
	U.S. Equity Quality Factor	7.00	8.00	14.81	7.80	0.00	-0.02	-0.09	-0.08	0.30	0.23	0.21	0.10	0.22	0.47	0.45	0.73	0.56	0.05	0.27	0.13	0.35	0.61	0.60	0.55	0.22	0.29	
	U.S. Equity Minimum Volatility Factor	7.40	8.17	12.98	8.20	-0.01	-0.08	-0.07	-0.04	0.29	0.24	0.22	0.10	0.25	0.47	0.45	0.71	0.54	0.08	0.28	0.16	0.35	0.61	0.61	0.53	0.24	0.30	
	U.S. Equity Dividend Yield Factor	8.00	9.17	16.15	8.90	0.00	-0.08	-0.12	-0.11	0.27	0.19	0.19	0.08	0.19	0.45	0.43	0.73	0.58	0.00	0.25	0.09	0.33	0.59	0.61	0.54	0.22	0.27	
	Global Convertible Bonds hedged	7.90	8.53	11.78	9.10	-0.08	-0.04	-0.12	-0.07	0.32	0.28	0.25	0.17	0.27	0.58	0.53	0.82	0.69	0.04	0.26	0.12	0.33	0.69	0.61	0.69	0.28	0.36	
	Alternatives	U.S. Core Real Estate	7.50	8.02	10.60	5.70	0.31	-0.17	-0.25	-0.16	0.11	-0.08	-0.02	-0.20	-0.09	0.05	0.02	0.38	0.45	-0.16	-0.13	-0.12	-0.10	0.15	0.15	0.24	-0.16	0.39
		U.S. Value-Added Real Estate	9.70	11.08	17.66	7.70	0.31	-0.17	-0.25	-0.16	0.11	-0.08	-0.02	-0.20	-0.09	0.05	0.02	0.38	0.45	-0.16	-0.13	-0.12	-0.10	0.15	0.15	0.24	-0.16	0.39
European Core Real Estate		7.30	8.06	12.84	6.80	0.31	-0.16	-0.35	-0.31	0.17	-0.10	-0.04	-0.15	-0.14	0.14	0.07	0.53	0.56	-0.24	-0.03	-0.17	0.04	0.29	0.31	0.39	-0.06	0.36	
Asia Pacific Core Real Estate		8.70	9.75	15.32	8.10	0.22	-0.05	-0.27	-0.26	0.24	0.04	0.07	-0.04	0.01	0.33	0.27	0.67	0.65	-0.20	0.16	-0.14	0.25	0.49	0.53	0.55	0.14	0.48	
U.S. REITs		8.20	9.36	16.05	6.80	0.00	-0.06	0.05	0.13	0.36	0.35	0.34	0.15	0.36	0.51	0.51	0.67	0.43	0.21	0.34	0.26	0.38	0.58	0.57	0.50	0.29	0.33	
Commercial Mortgage Loans		6.30	6.58	7.78	-	0.11	0.00	0.18																				

		Compound Return 2023 (%)				Annualized Volatility (%)		Arithmetic Return 2024 (%)				Compound Return 2024 (%)															
						Euro Inflation	Euro Cash	U.S. Aggregate Bonds hedged	Euro Aggregate Bonds	U.S. Inv Grade Corporate Bonds hedged	Euro Inv Grade Corp Bonds	U.S. High Yield Bonds hedged	Euro High Yield Bonds	U.S. Leveraged Loans hedged	Euro Government Bonds	Euro Govt Inflation-Linked Bonds	World Government Bonds hedged	World Government Bonds	World ex-Euro Government Bonds hedged	World ex-Euro Government Bonds	Global Multiverse Bonds hedged	Emerging Markets Sovereign Debt hedged	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds hedged	European Large Cap		
		2.20	2.21	1.05	1.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Fixed Income	Euro Inflation	2.20	2.21	1.05	1.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	Euro Cash	2.20	2.20	0.60	1.30	-0.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	U.S. Aggregate Bonds hedged	4.30	4.39	4.33	3.50	-0.28	0.19	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	Euro Aggregate Bonds	3.60	3.70	4.54	3.00	-0.23	0.18	0.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	U.S. Inv Grade Corporate Bonds hedged	5.00	5.25	7.22	4.30	-0.24	0.11	0.86	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	Euro Inv Grade Corp Bonds	4.00	4.12	5.07	3.60	-0.19	0.07	0.64	0.81	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	U.S. High Yield Bonds hedged	5.80	6.14	8.46	5.70	-0.01	-0.03	0.34	0.28	0.62	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	Euro High Yield Bonds	5.70	6.13	9.59	5.70	-0.01	-0.06	0.22	0.30	0.53	0.68	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	U.S. Leveraged Loans hedged	5.70	5.99	7.88	5.10	0.07	-0.10	0.05	0.07	0.36	0.46	0.79	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	Euro Government Bonds	3.50	3.62	5.03	2.80	-0.22	0.18	0.70	0.98	0.60	0.69	0.16	0.17	-0.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	Euro Govt Inflation-Linked Bonds	3.20	3.36	5.79	2.60	-0.01	0.10	0.52	0.75	0.59	0.72	0.44	0.41	0.21	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	World Government Bonds hedged	3.40	3.47	3.74	2.60	-0.27	0.21	0.85	0.87	0.64	0.56	0.06	-0.01	-0.21	0.89	0.57	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	World Government Bonds	3.10	3.34	7.00	2.30	-0.13	0.14	0.39	0.54	0.24	0.26	-0.18	-0.13	-0.20	0.56	0.24	0.61	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	World ex-Euro Government Bonds hedged	3.40	3.47	3.74	2.50	-0.27	0.15	0.86	0.68	0.59	0.40	-0.01	-0.14	-0.30	0.71	0.40	0.94	0.55	1.00	1.00	1.00	1.00	1.00	1.00			
	World ex-Euro Government Bonds	2.90	3.32	9.36	2.10	-0.11	0.12	0.26	0.36	0.09	0.10	-0.27	-0.21	-0.24	0.38	0.08	0.46	0.96	0.45	1.00	1.00	1.00	1.00	1.00			
	Global Multiverse Bonds hedged	3.90	3.96	3.60	3.10	-0.27	0.21	0.95	0.89	0.86	0.77	0.39	0.31	0.11	0.85	0.67	0.91	0.47	0.83	0.31	1.00	1.00	1.00	1.00			
	Emerging Markets Sovereign Debt hedged	6.00	6.44	9.68	6.00	-0.19	0.06	0.63	0.52	0.78	0.70	0.74	0.60	0.46	0.43	0.55	0.40	-0.06	0.34	-0.21	0.66	1.00	1.00	1.00			
	Emerging Markets Local Currency Debt	4.30	4.68	8.94	5.00	-0.03	0.12	0.32	0.38	0.44	0.50	0.45	0.45	0.38	0.32	0.38	0.23	0.27	0.12	0.18	0.41	0.56	1.00	1.00			
	Emerging Markets Corporate Bonds hedged	6.00	6.37	8.94	5.80	-0.19	0.01	0.55	0.43	0.76	0.70	0.74	0.66	0.57	0.31	0.44	0.23	-0.08	0.22	-0.21	0.57	0.90	0.54	1.00			
	Equities	European Large Cap	7.30	8.33	15.06	7.70	0.04	-0.17	0.13	0.21	0.40	0.53	0.71	0.76	0.65	0.11	0.40	-0.05	-0.18	-0.16	-0.26	0.21	0.54	0.47	0.54		
European Small Cap		8.10	9.55	18.00	9.20	-0.01	-0.16	0.14	0.20	0.43	0.56	0.74	0.80	0.69	0.09	0.38	-0.06	-0.18	-0.15	-0.26	0.22	0.54	0.40	0.56			
U.S. Large Cap		5.30	6.35	15.09	5.80	0.08	-0.21	0.05	0.22	0.27	0.45	0.57	0.60	0.56	0.15	0.33	-0.02	0.11	-0.14	0.04	0.17	0.35	0.48	0.35			
U.S. Large Cap hedged		6.30	7.51	16.24	6.80	0.04	-0.17	0.21	0.23	0.44	0.53	0.73	0.66	0.57	0.15	0.40	0.03	-0.28	-0.06	-0.40	0.27	0.60	0.36	0.57			
Euro Area Large Cap		8.00	9.34	17.26	8.40	0.02	-0.14	0.16	0.21	0.40	0.51	0.70	0.73	0.60	0.13	0.41	-0.03	-0.26	-0.13	-0.35	0.23	0.56	0.43	0.55			
Euro Area Small Cap		8.30	9.79	18.25	9.30	0.00	-0.14	0.14	0.19	0.41	0.52	0.72	0.77	0.65	0.09	0.39	-0.07	-0.26	-0.16	-0.35	0.22	0.55	0.38	0.56			
UK Large Cap		6.90	7.93	15.01	7.00	0.09	-0.20	0.03	0.12	0.31	0.46	0.63	0.72	0.66	0.02	0.30	-0.16	-0.11	-0.26	-0.17	0.10	0.42	0.47	0.47			
UK Large Cap hedged		6.50	7.34	13.49	6.40	0.01	-0.11	0.14	0.14	0.37	0.43	0.62	0.61	0.53	0.06	0.35	-0.06	-0.30	-0.13	-0.37	0.20	0.54	0.41	0.53			
Japanese Equity		7.60	8.54	14.38	8.30	-0.05	-0.13	0.10	0.22	0.33	0.45	0.48	0.54	0.48	0.15	0.31	-0.01	0.14	-0.13	0.10	0.18	0.31	0.50	0.36			
Japanese Equity hedged		7.90	9.28	17.56	8.70	0.04	-0.16	-0.07	0.02	0.19	0.30	0.52	0.55	0.52	-0.04	0.24	-0.23	-0.42	-0.33	-0.48	-0.01	0.35	0.30	0.38			
Chinese Domestic Equity		9.10	12.46	28.11	9.70	-0.11	0.01	0.08	0.10	0.19	0.22	0.25	0.30	0.28	0.07	0.06	-0.02	-0.02	-0.09	-0.04	0.09	0.20	0.25	0.29			
Emerging Markets Equity		7.10	8.41	17.02	8.00	-0.04	-0.09	0.17	0.19	0.44	0.50	0.68	0.70	0.64	0.09	0.33	-0.04	-0.15	-0.14	-0.24	0.22	0.58	0.63	0.74			
AC Asia ex-Japan Equity		7.20	8.58	17.46	7.90	-0.10	-0.09	0.22	0.22	0.46	0.51	0.63	0.65	0.59	0.12	0.31	0.01	-0.09	-0.08	-0.17	0.26	0.55	0.59	0.61			
AC World Equity		6.10	7.03	14.19	6.40	0.05	-0.19	0.11	0.23	0.38	0.54	0.68	0.73	0.66	0.14	0.39	-0.04	-0.01	-0.16	-0.09	0.21	0.47	0.55	0.49			
AC World ex-EMU Equity		5.90	6.82	14.14	6.30	0.05	-0.19	0.10	0.23	0.37	0.53	0.67	0.71	0.66	0.14	0.37	-0.04	0.03	-0.16	-0.05	0.20	0.45	0.56	0.47			
Developed World Equity		6.00	6.96	14.42	6.30	0.06	-0.20	0.09	0.23	0.36	0.52	0.66	0.70	0.64	0.14	0.38	-0.03	0.01	-0.16	-0.07	0.20	0.44	0.52	0.45			
Global Convertible Bonds hedged		7.10	7.74	11.84	8.00	-0.11	-0.06	0.28	0.28	0.58	0.62	0.80	0.77	0.69	0.18	0.42	0.04	-0.26	-0.06	-0.39	0.34	0.68	0.40	0.69			
Global Credit Sensitive Convertible hedged		5.20	5.49	7.87	6.10	-0.02	-0.13	0.20	0.31	0.38	0.48	0.41	0.49	0.42	0.22	0.23	0.11	-0.04	0.03	-0.14	0.28	0.38	0.22	0.39			
Alternatives		U.S. Core Real Estate	5.80	6.53	12.57	3.60	0.10	-0.36	-0.08	-0.05	-0.01	0.08	0.28	0.29	0.38	-0.07	0.06	-0.12	0.11	-0.14	0.12	-0.07	0.06	0.27	0.17		
		European Core Real Estate	5.60	6.09	10.19	4.70	0.04	-0.28	-0.14	-0.08	0.06	0.16	0.45	0.44	0.54	-0.14	0.09	-0.24	-0.16	-0.30	-0.19	-0.11	0.20	0.22	0.33		
	European Value-Added Real Estate	7.50	8.75	16.66	6.70	0.09	-0.29	-0.25	-0.21	-0.02	0.07	0.42	0.40	0.52	-0.26	0.01	-0.36	-0.24	-0.40	-0.25	-0.23	0.13	0.17	0.28			
	Asia Pacific Core Real Estate	7.00	7.85	13.60	6.00	0.14	-0.32	-0.06	-0.07	0.20	0.27	0.52	0.53	0.60	-0.16	0.10	-0.24	-0.01	-0.26	0.00	-0.03	0.30	0.42	0.41			
	Global REITs	6.80	7.66	13.73	4.90	0.00	-0.19	0.25	0.32	0.45	0.55	0.65	0.66	0.56	0.25	0.46	0.13	0.11	0.04	0.03	0.34	0.50	0.57	0.47			
	Commercial Mortgage Loans	4.60	5.17	11.00	-	-0.04	-0.06	0.04	0.09	-0.07	-0.05	-0.08	-0.07	0.02	0.12	-0.05	0.14	0.62	0.12	0.65	0.07	-0.11	0.34	-0.09			
	Global Core Infrastructure	5.10	5.85	12.71	4.20	0.23	-0.20	-0.15	-0.11	0.01	0.07	0.34	0.37	0.51	-0.15	0.07	-0.24	0.05	-0.28	0.05	-0.12	0.17	0.35	0.24			
	Global Core Transport	6.00	6.90	14.00	5.40	0.20	-0.10	-0.18	-0.13	-0.39	-0.33	-0.30	-0.27	-0.17	-0.05	-0.17	0.00	0.41	0.02	0.49	-0.17	-0.37	0.12	-0.35			
	Global Timberland	4.50	5.24	12.56	4.60	0.21	-0.02	-0.18	-0.12	-0.15	-0.09	-0.04	-0.02	0.05	-0.11	-0.02	-0.03	0.31	-0.14	0.35	-0.14	-0.11	0.34	-0.09			
	Commodities	2.10	3.34	16.12	1.00	0.23	-0.16	-0.15	-0.14	0.03	0.10	0.32	0.30	0.40	-0.20	0.15	-0.29	-0.09	-								

		Compound Return 2023 (%)				Annualized Volatility (%)				Arithmetic Return 2024 (%)				Compound Return 2024 (%)																					
Fixed Income	UK Inflation	2.40	2.42	1.78	2.40	1.00				UK Inflation																									
	UK Cash	2.80	2.80	0.69	2.20	-0.13	1.00			UK Cash																									
	U.S. Aggregate Bonds hedged	4.90	4.99	4.31	4.40	-0.23	0.19	1.00		U.S. Aggregate Bonds hedged																									
	Euro Aggregate Bonds hedged	4.20	4.30	4.51	4.00	-0.26	0.15	0.74	1.00	Euro Aggregate Bonds hedged																									
	U.S. Inv Grade Corporate Bonds hedged	5.60	5.84	7.14	5.30	-0.20	0.09	0.85	0.69	1.00	U.S. Inv Grade Corporate Bonds hedged																								
	Euro Inv Grade Corp Bonds hedged	4.60	4.72	4.98	4.60	-0.17	0.04	0.63	0.80	0.83	1.00	Euro Inv Grade Corp Bonds hedged																							
	UK Inv Grade Corporate Bonds	5.40	5.71	8.17	5.70	-0.03	-0.05	0.64	0.65	0.79	0.82	1.00	UK Inv Grade Corporate Bonds																						
	U.S. High Yield Bonds hedged	6.40	6.73	8.44	6.60	-0.07	-0.05	0.35	0.28	0.63	0.64	0.56	1.00	U.S. High Yield Bonds hedged																					
	Euro High Yield Bonds hedged	6.20	6.60	9.21	6.70	-0.04	-0.10	0.24	0.29	0.55	0.68	0.57	0.89	1.00	Euro High Yield Bonds hedged																				
	Global Credit hedged	5.30	5.44	5.44	5.10	-0.21	0.07	0.86	0.78	0.98	0.89	0.84	0.63	0.56	1.00	Global Credit hedged																			
	U.S. Leveraged Loans hedged	6.30	6.59	7.90	6.00	-0.06	-0.14	0.03	0.05	0.35	0.45	0.41	0.77	0.85	0.35	1.00	U.S. Leveraged Loans hedged																		
	Euro Government Bonds hedged	4.10	4.22	5.05	3.80	-0.26	0.16	0.70	0.98	0.59	0.68	0.55	0.15	0.15	0.67	-0.08	1.00	Euro Government Bonds hedged																	
	UK Gilts	4.50	4.80	7.96	4.20	-0.13	0.14	0.72	0.68	0.54	0.43	0.65	0.05	-0.02	0.58	-0.17	0.69	1.00	UK Gilts																
	UK Inflation-Linked Bonds	5.30	5.88	11.17	3.80	-0.17	0.04	0.64	0.56	0.58	0.49	0.60	0.33	0.22	0.62	0.15	0.53	0.74	1.00	UK Inflation-Linked Bonds															
	World Government Bonds hedged	4.00	4.07	3.76	3.50	-0.24	0.23	0.86	0.87	0.63	0.54	0.54	0.07	-0.01	0.69	-0.23	0.89	0.84	0.65	1.00	World Government Bonds hedged														
	World Government Bonds	3.20	3.56	8.65	2.50	-0.17	0.23	0.44	0.39	0.19	0.05	0.12	-0.27	-0.35	0.21	-0.47	0.45	0.57	0.39	0.63	1.00	World Government Bonds													
	World ex-UK Government Bonds hedged	3.90	3.96	3.60	3.50	-0.24	0.23	0.86	0.87	0.63	0.55	0.52	0.08	0.00	0.69	-0.22	0.90	0.81	0.62	1.00	0.61	1.00	World ex-UK Government Bonds hedged												
	World ex-UK Government Bonds	3.10	3.49	9.06	2.40	-0.17	0.23	0.43	0.38	0.18	0.04	0.10	-0.29	-0.36	0.20	-0.48	0.44	0.55	0.38	0.61	0.99	0.59	1.00	World ex-UK Government Bonds											
	Emerging Markets Sovereign Debt hedged	6.60	7.03	9.67	6.90	-0.20	-0.07	0.63	0.53	0.80	0.72	0.65	0.74	0.64	0.82	0.44	0.43	0.32	0.46	0.04	0.05	0.41	0.03	1.00	Emerging Markets Sovereign Debt hedged										
	Emerging Markets Local Currency Debt	4.40	4.96	10.85	5.30	-0.15	0.24	0.39	0.33	0.40	0.33	0.31	0.29	0.24	0.42	0.11	0.31	0.25	0.30	0.31	0.42	0.31	0.43	0.54	1.00	Emerging Markets Local Currency Debt									
Emerging Markets Corporate Bonds hedged	6.60	6.97	8.98	6.80	-0.20	0.01	0.55	0.44	0.77	0.71	0.62	0.73	0.68	0.77	0.55	0.32	0.19	0.38	0.28	-0.05	0.29	-0.07	0.89	0.45	1.00	Emerging Markets Corporate Bonds hedged									
Equities	UK All Cap	7.20	8.03	13.45	7.60	0.07	-0.13	0.15	0.16	0.41	0.47	0.48	0.67	0.67	0.42	0.55	0.06	0.02	0.19	-0.05	-0.19	-0.05	-0.19	0.59	0.42	0.57	1.00	UK All Cap							
	UK Large Cap	7.00	7.83	13.49	7.30	0.09	-0.13	0.13	0.13	0.37	0.43	0.45	0.64	0.64	0.38	0.52	0.05	0.00	0.18	-0.07	-0.17	-0.07	-0.16	0.55	0.44	0.54	0.99	1.00	UK Large Cap						
	UK Small Cap	7.90	9.21	17.09	9.40	0.03	-0.14	0.19	0.20	0.45	0.54	0.51	0.71	0.71	0.47	0.59	0.09	0.05	0.20	-0.02	-0.26	-0.02	-0.28	0.59	0.27	0.59	0.87	0.81	UK Small Cap						
	U.S. Large Cap	5.40	6.36	14.40	6.10	0.03	-0.12	0.17	0.24	0.34	0.42	0.42	0.56	0.50	0.37	0.41	0.19	0.17	0.32	0.09	0.08	0.09	0.06	0.46	0.47	0.41	0.76	0.74	U.S. Large Cap						
	U.S. Large Cap hedged	6.90	8.09	16.19	7.70	-0.03	-0.15	0.20	0.24	0.45	0.54	0.49	0.74	0.68	0.47	0.57	0.14	0.06	0.23	0.02	-0.31	0.02	-0.32	0.60	0.27	0.56	0.81	0.77	U.S. Large Cap hedged						
	Euro Area Large Cap	8.10	9.61	18.37	8.70	0.00	-0.05	0.23	0.21	0.43	0.45	0.46	0.64	0.63	0.45	0.44	0.13	0.07	0.23	0.04	-0.06	0.05	-0.06	0.61	0.52	0.55	0.88	0.87	Euro Area Large Cap						
	Euro Area Large Cap hedged	8.60	9.93	17.27	9.40	0.02	-0.14	0.15	0.21	0.41	0.52	0.49	0.70	0.74	0.43	0.60	0.12	0.00	0.15	-0.04	-0.35	-0.03	-0.35	0.56	0.29	0.54	0.88	0.85	Euro Area Large Cap hedged						
	Euro Area Small Cap	8.40	10.09	19.50	9.50	0.00	-0.08	0.21	0.17	0.43	0.44	0.47	0.67	0.66	0.44	0.49	0.08	0.05	0.21	0.00	-0.07	0.00	-0.08	0.61	0.47	0.58	0.87	0.84	Euro Area Small Cap						
	Euro Area Small Cap hedged	8.90	10.39	18.30	10.20	0.01	-0.16	0.13	0.17	0.41	0.51	0.50	0.73	0.78	0.42	0.65	0.07	-0.03	0.13	-0.08	-0.35	-0.07	-0.36	0.55	0.25	0.55	0.86	0.81	Euro Area Small Cap hedged						
	Japanese Equity	7.70	8.51	13.34	8.50	-0.10	-0.06	0.21	0.23	0.37	0.38	0.36	0.45	0.41	0.37	0.31	0.17	0.09	0.22	0.09	0.09	0.09	0.10	0.41	0.47	0.39	0.62	0.61	Japanese Equity						
	Japanese Equity hedged	8.50	9.88	17.61	9.60	0.04	-0.16	-0.07	0.02	0.19	0.31	0.26	0.53	0.54	0.20	0.51	-0.05	-0.20	-0.01	-0.24	-0.52	-0.23	-0.52	0.34	0.13	0.38	0.65	0.62	Japanese Equity hedged						
	AC Asia ex-Japan Equity	7.30	8.76	17.99	8.20	-0.09	-0.02	0.29	0.20	0.48	0.44	0.38	0.58	0.54	0.47	0.42	0.12	0.08	0.26	0.08	0.00	0.08	0.01	0.61	0.57	0.62	0.68	0.67	AC Asia ex-Japan Equity						
	Chinese Domestic Equity	9.20	12.49	27.81	10.00	-0.12	0.06	0.14	0.11	0.22	0.18	0.11	0.22	0.22	0.21	0.17	0.08	0.00	0.04	0.04	-0.06	0.04	-0.05	0.25	0.21	0.31	0.25	0.25	Chinese Domestic Equity						
	Emerging Markets Equity	7.20	8.66	18.01	8.30	-0.05	-0.03	0.24	0.18	0.46	0.43	0.39	0.63	0.58	0.46	0.47	0.09	0.05	0.25	0.03	-0.02	0.04	-0.01	0.65	0.61	0.65	0.73	0.72	Emerging Markets Equity						
	AC World Equity	6.20	7.08	13.80	6.70	0.00	-0.09	0.22	0.24	0.44	0.48	0.48	0.66	0.61	0.45	0.48	0.16	0.13	0.31	0.07	0.02	0.07	0.01	0.59	0.55	0.55	0.87	0.86	AC World Equity						
	AC World ex-UK Equity	6.10	7.00	13.98	6.70	0.00	-0.09	0.22	0.24	0.43	0.48	0.47	0.65	0.59	0.45	0.47	0.17	0.14	0.32	0.08	0.04	0.08	0.03	0.59	0.56	0.54	0.86	0.84	AC World ex-UK Equity						
	Developed World Equity	6.10	6.99	13.86	6.50	0.01	-0.10	0.21	0.24	0.42	0.47	0.48	0.64	0.59	0.44	0.47	0.17	0.14	0.31	0.07	0.03	0.07	0.02	0.56	0.52	0.51	0.86	0.85	Developed World Equity						
	Global Convertible Bonds hedged	7.70	8.34	11.81	8.90	-0.12	-0.07	0.27	0.26	0.57	0.61	0.52	0.82	0.78	0.57	0.68	0.15	0.03	0.22	0.02	-0.30	0.03	-0.31	0.69	0.30	0.70	0.77	0.71	Global Convertible Bonds hedged						
	Global Credit Sensitive Convertible hedged	5.80	6.12	8.20	7.00	0.00	-0.16	0.16	0.29	0.34	0.47	0.44	0.37	0.45	0.38	0.40	0.21	0.02	0.12	0.10	-0.16	0.11	-0.17	0.34	0.12	0.37	0.40	0.38	Global Credit Sensitive Convertible hedged						
	Alternatives	U.S. Core Real Estate	5.90	6.38	10.15	3.90	0.18	-0.35	-0.11	-0.05	-0.06	0.06	0.11	0.24	0.22	-0.02	0.34	-0.07	-0.07	0.20	-0.12	-0.31	-0.11	-0.33	0.02	-0.16	0.12	0.15	0.15	U.S. Core Real Estate					
European Core Real Estate		5.70	6.30	11.31	5.00	0.01	-0.26	-0.15	-0.07	0.04	0.14	0.13	0.41	0.37	0.05	0.47	-0.11	-0.15	0.20	-0.21	-0.38	-0.21	-0.40	0.18	-0.12	0.31	0.34	0.33	European Core Real Estate						
European Core Real Estate hedged		6.20	6.71	10.46	5.60	0.05	-0.28	-0.18	-0.11	0.02	0.14	0.11	0.45	0.42	0.04	0.56	-0.17	-0.20	0.13	-0.28	-0.55	-0.28	-0.57	0.18	-0.22	0.31	0.32	0.30	European Core Real Estate hedged						
UK Core Real Estate		6.50	7.25	12.77	5.50	-0.04	-0.26	-0.08	0.01	0.10	0.20	0.12	0.43	0.41	0.11	0.46	-0.04	-0.12	0.15	-0.16	-0.41	-0.16	-0.42	0.17	-0.26	0.28	0.25	0.23	UK Core Real Estate						
European Value-Added Real Estate		7.60	9.01	17.68	6.90	0.07	-0.28	-0.27	-0.20	-0.06	0.05	0.03	0.38	0.33	-0.05	0.47	-0.25	-0.26	0.10	-0.35	-0.47	-0.35	-0.48	0.11	-0.18	0.25	0.34	0.33	European Value-Added Real Estate						
European Value-Added Real Estate hedged		8.10	9.35	16.67	7.60	0.10	-0.28	-0.28	-0.22	-0.05	0.06	0.04	0.42	0.38	-0.05	0.54	-0.28	-0.29	0.05	-0.39	-0.61	-0.39	-0.62	0.12	-0.26	0.26	0.32	0.31	European Value-Added Real Estate hedged						
Global REITs		6.90	7.80	14.03	5.10	0.00	-0.12	0.32	0.31	0.48	0.50	0.55	0.63	0.56	0.51	0.42	0.25	0.27	0.40	0.20	0.11	0.20	0.10	0.58	0.54	0.51	0.75	0.74	Global REITs						
Global Core Infrastructure		5.20	5.74	10.73	4.50	0.23	-0.13	-0.07	-0.04	-0.03	-0.01																								



IV Appendix

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Glossary

Alternatives Nontraditional assets, including financial assets (such as private equity, private credit and hedge funds) and real assets (real estate, infrastructure, transport, timberland) that have historically mitigated portfolio volatility and reduced equity beta across time.

Capital stock The machinery, equipment, intellectual property and so on used in business production processes.

Cycle-neutral (cycle-neutral yield, cycle-neutral spread) The level of a key parameter that we expect to prevail after an initial period of normalization.

Deglobalization The stalling and/or reversal of globalization – defined as the openness of markets and economies – as some nations now race to secure domestic production of crucial inputs such as vaccines, critical minerals and semiconductors. See also Reshoring.

Energy transition Global, long-term shift away from carbon-intensive fuels toward renewable energy sources.

Externalities An economic activity's side effects that are not reflected in the activity's cost. May be positive or negative; today, many would regard climate change as the global economy's most important negative externality.

Generative artificial intelligence (AI) A category of artificial intelligence algorithms that can generate new content based on existing data to produce novel, human-like output in the form of text, images and three-dimensional models.

Industrial policy State-directed support for particular industries, accelerated recently, affecting sectors including industrials, utilities and infrastructure.

Mean-variance optimization (MVO) A process for selecting an ideal portfolio balancing risk and return, given a set of expected returns and a covariance matrix.

Multiples on invested capital (MOIC) An investment return metric that states an investment's current value as a multiple of the amount of the initial investment, regardless of the length of the investment period.

Net zero The target of negating the amount of greenhouse gases produced by human activity, to be achieved by reducing emissions and absorbing carbon dioxide from the atmosphere. A state in which the greenhouse gases going into the atmosphere are balanced by their removal.

Non-accelerating inflation rate of unemployment (NAIRU) The lowest unemployment rate that can be sustained without excess inflation.

Reshoring Companies bringing supply chains back to domestic sites; likely to stimulate domestic industrial sectors. See also Deglobalization.

Risk premia Excess returns associated with risk factors (such as carry, value, size and momentum) or market anomalies driven by behavioral biases or structural inefficiencies (such as merger arbitrage, index inclusion, over-extrapolation of trends and leverage aversion/constraints, etc.).

Sharpe ratio A measure of an investment's return relative to price risks involved. It is calculated by subtracting a risk-free rate of return (generally on cash) from the investment's expected or realized return and dividing the result by the investment's expected or realized price fluctuation.

Total factor productivity (TFP) Productivity growth that is not explained by capital stock accumulation or the labor force (increased hours worked) but rather captures the efficiency or intensity with which inputs are utilized. A residual that likely reflects technological change.

ZIRP Zero interest rate policy. An unconventional central bank tool in which benchmark overnight interest rates are set at or close to zero, to promote the resumption of sustainable growth.

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