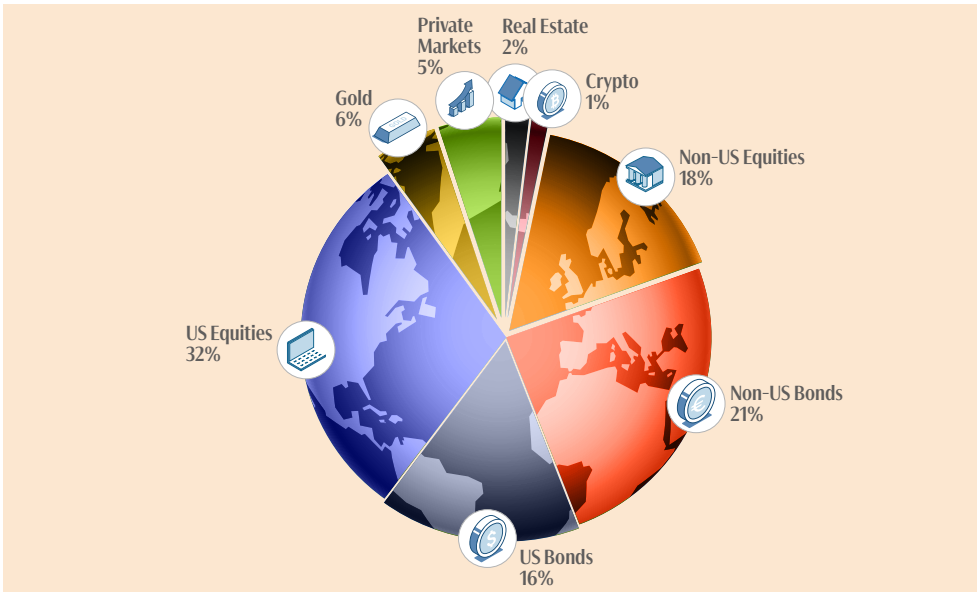
GLOBAL STRATEGY PAPER **NO. 74**

Investing in Everything, Everywhere, All at Once



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- The World Portfolio is the sum of all investable assets globally, which we currently estimate to be roughly US$250trn, or 200% of world GDP. It can be a useful benchmark for multi-asset portfolio performance and investor asset allocations. Persistent shifts in asset weights are often closely linked to macro trends, like inflation boosting Gold relative to equity and bond markets during the 1970s, or equity bubbles like the Tech Bubble during the late 1990s.
- Currently there are three major trends visible: (1) the equity weight relative to bonds has increased materially since the GFC but it remains below levels from the 1990s, (2) both in equities and bonds the US has accrued a larger weight and is very dominant and (3) alternatives such as private markets, Gold and cryptocurrencies have grown relative to public equities and bonds (but remain relatively small).
- Benchmarks like the World Portfolio are a major influence on investors' asset allocations. However, following benchmarks is not necessarily a good idea – even over longer horizons the World Portfolio has seldom been optimal and performance varied materially with structural macro regimes. Value-weighted benchmarks miss out on diversification benefits from smaller assets and, while US asset dominance was a tailwind in recent years, regional performance varied historically.
- We recommend strategies to improve the risk/reward vs. the World Portfolio by managing the equity/bond/Gold mix, as well as US exposure, including FX hedging –we introduce a new strategic tilting framework for more realistic benchmark tilts in practice. We also provide a framework for harvesting diversification benefits from smaller assets and alternatives.

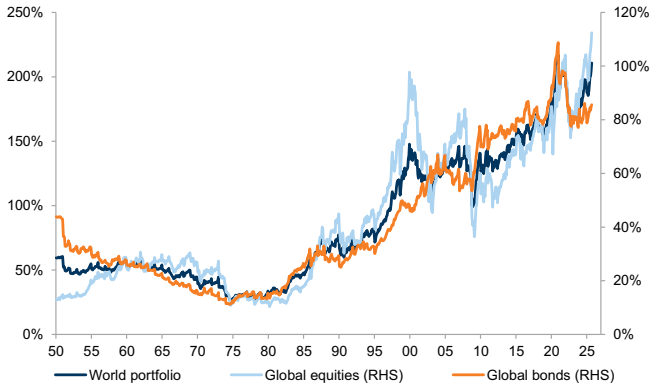
What's inside

For our asset allocation frameworks, see our dedicated Balanced Bear page >

Summary

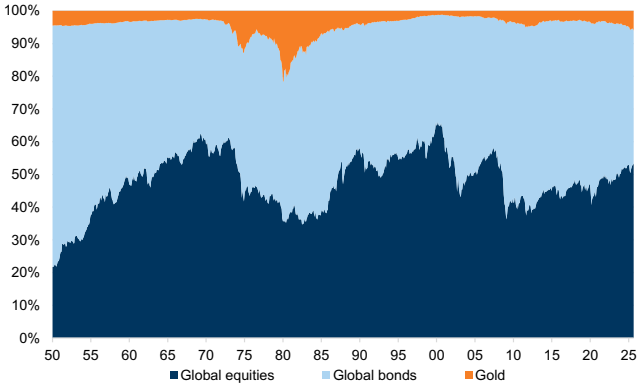
- The World Portfolio is the sum of all assets globally. It can be a useful benchmark for multi-asset portfolio performance and investor asset allocations. The sizes of assets in the World Portfolio indicate liquidity and importance in investor portfolios. Persistent shifts in asset weights are often closely linked to macro regimes.
- We create two versions of the World Portfolio: (1) a long-term proxy since 1950 using monthly data for a reconstructed, historical universe of global equities and bonds (mostly sovereign) and Gold, and (2) an investable index since 1990 using mostly daily data for a universe comprising benchmark indices for global equities, sovereign bonds, credit, real estate, private markets, cryptocurrencies and Gold.
- Currently there are three major trends visible: (1) the equity weight relative to bonds has increased materially since the GFC although it remains below levels from the 1990s, (2) both in equities and bonds the US has gotten a larger weight and is very dominant, and (3) alternatives such as private markets, Gold and cryptocurrencies have grown relative to public equities and bonds (but remain relatively small).
- Benchmarks like the World Portfolio are a major influence on investors' asset allocations. Investors usually start their strategic asset allocation from a similar benchmark and there has been material growth in passive investing. In line with the World Portfolio we find investors currently have higher allocations to equities and to US assets, both of which have materially picked up since the GFC.
- However, following benchmarks is not necessarily a good idea – even over longer horizons the World Portfolio was not efficient and performance varied materially. A simple 60/40 portfolio or a risk parity strategy delivered better Sharpe ratios since 1950. Also, since 1990, a risk parity strategy, including smaller assets such as private markets and cryptocurrencies, outperformed materially on a risk-adjusted basis.
- And while US asset dominance was a tailwind in recent years, regional performance has varied historically. Higher FX risk can also weigh on risk-adjusted returns based on investor domicile – portfolio risk for non-US investors has increased YTD.
- We use a new strategic tilting framework for the World Portfolio to incorporate forward return views and extract implicit return assumptions. The current equity weight implies an equity risk premium of c.6%, which is above the long-run average. Owing to elevated equity valuations this will be difficult to achieve – investors need to balance potential tailwinds from innovation with risks from inflation.
- Similarly, the US needs to outperform non-US by 4-5% to justify its current equity weight in the World Portfolio, which is difficult with elevated relative valuations, ROE and concentration. Also, the Dollar might become a larger drag on US asset performance. We revisit benefits from international diversification and introduce an optimal FX hedging framework to mitigate Dollar risk for non-US investors.
- Finally, the World Portfolio misses out on diversification benefits from smaller assets or alternatives. We show risk-adjusted returns can be enhanced by introducing tilts towards smaller assets including bitcoin, private markets and alternatives including hedge funds and alternative risk premia such as commodity carry.

Exhibit 1: Since the 1990s, the World Portfolio has grown from 75% to over 200% of world GDP
Market values as a proportion of world GDP



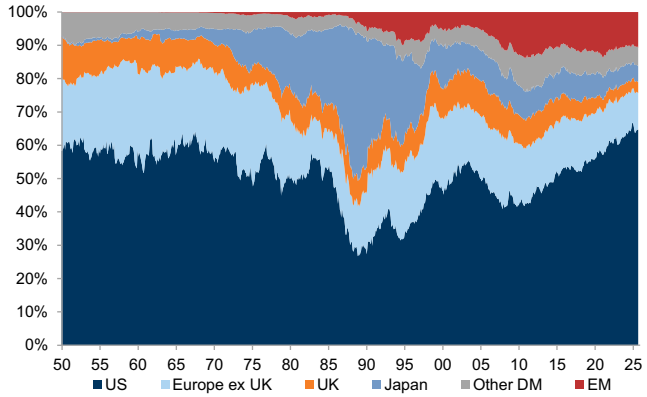
Source: Haver Analytics, Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 2: The equity weight relative to bonds has increased materially since the GFC
Relative asset weights in the World Portfolio (current coverage US$247trn assets)



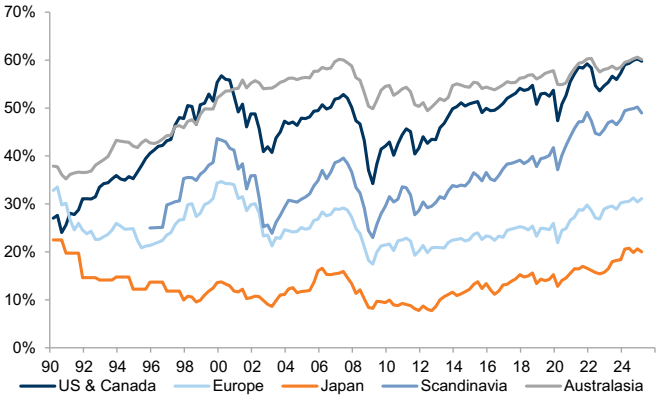
Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 3: The US has gotten a larger weight within global equities (but also bonds)
Relative regional weights within global equities (based on MSCI AC World)



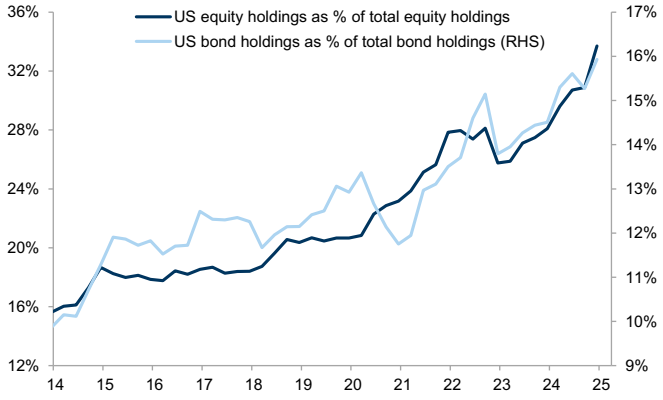
Source: Datastream, Bloomberg, Goldman Sachs Global Investment Research

Exhibit 4: Equity allocations from global investors have picked up and are near highs from the 1990s
Aggregate global investors' equity allocation



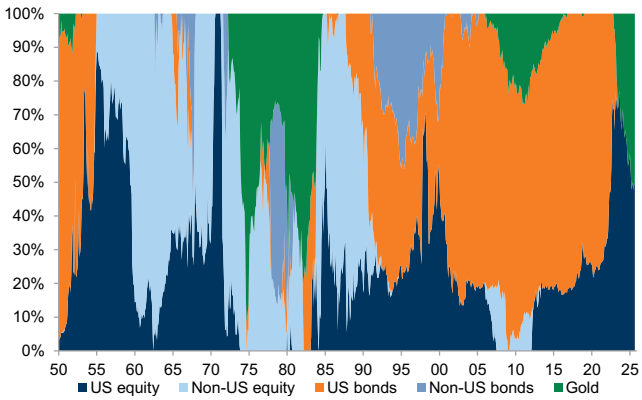
Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 5: US assets have also become increasingly dominant in global investor portfolios
Non-US investor (G10 ex US) allocation to US equities and bonds



Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 6: The optimal portfolio shifted notably over time, deviating materially from the World Portfolio
10-year rolling optimal asset weights of the components of the World Portfolio (for US$ investors)



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

The World Portfolio — everything, everywhere, all at once

The World Portfolio is the sum of all assets globally (also called the global capital stock or market portfolio). It can be a useful benchmark for multi-asset portfolio performance and investor allocations. The sizes of different assets in the World Portfolio indicate potential liquidity and importance in global investor portfolios. Persistent shifts in relative asset values are closely linked to macro regimes and trends, such as inflation boosting Gold relative to equity and bond markets during the 1970s, or equity bubbles like the Tech Bubble during the late 1990s.

The World Portfolio is typically estimated based on investable financial assets such as public equities and bonds. The actual investment universe could be much larger if alternatives, derivatives or private assets such as residential real estate, farmland, commodities, collectables or even intellectual property / human capital are included. However, many of these are relatively small or illiquid, not readily tradable, or lack transparent market values. Also, in some cases they are based on other assets, e.g. hedge funds, alternative risk premia and derivatives, and thus there is a risk of double-counting.

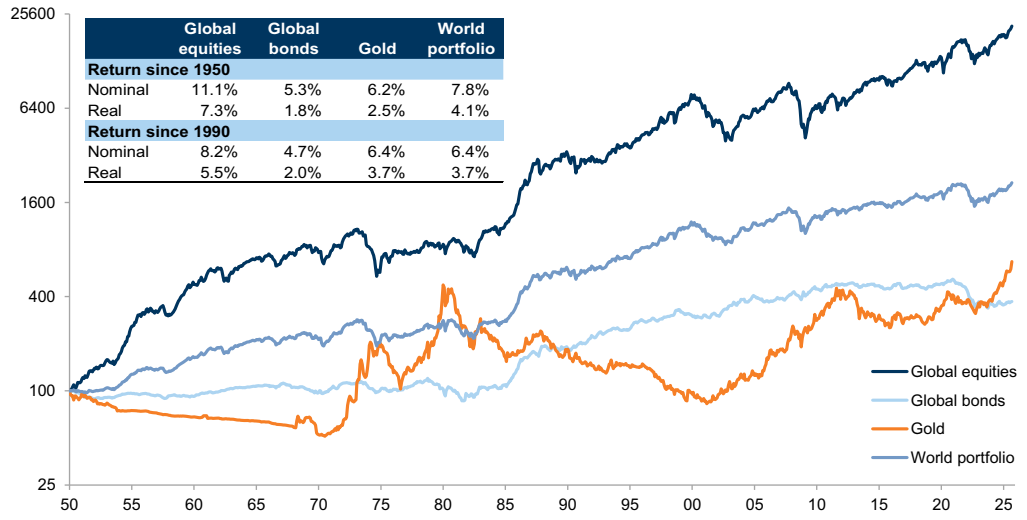
We create two versions of the World Portfolio: (1) a long-term proxy since 1950 using monthly data for a reconstructed, historical universe of global equities and bonds (mostly sovereign) and Gold, (2) an investable index since 1990 using mostly daily data for a broader universe comprising benchmark indices for global equities, sovereign bonds, credit, real estate, private markets, cryptocurrencies and Gold.

(1) The World Portfolio since 1950 — it is not what it used to be

Our long-term World Portfolio proxy, combining historical data for global equities, bonds and Gold, has returned 7.8% nominal and 4.1% in real terms annually since 1950 (Exhibit 7). Real returns during disinflationary periods were higher than during inflationary ones like the 1970s stagflation. Equities led performance overall, but Gold outperformed during the 1970s and around the GFC. Since 1990, returns have slowed to 6.4% nominal and 3.7% real. This shows that the starting point for investing matters, even when buying the World Portfolio. The current value of all assets included is US$247trn. *For details on the construction of the World Portfolio proxy, see Appendix 1.*

Since the 1990s, global financial assets have grown from 75% to over 200% of world GDP (Exhibit 8). After WWII, the size of bond markets surpassed equities due to the financing needs for reconstruction, but equities have been dominant since. A combination of growth in financial markets, i.e., equity and bond issuance, but also a more productive, profitable and globally exposed large cap corporate sector and falling bond yields, has boosted market values vs. GDP since the 1990s. The main setbacks for financial assets were due to equity bear markets and poor bond performance after the 1940s bond bubble burst up until the early 1980s.

Exhibit 7: The World Portfolio has delivered a real return near 4% since WW2
Cumulative real total return indices (log scale, US$)



Source: Bloomberg, Datastream, World Gold Council, Goldman Sachs Global Investment Research

Exhibit 8: Financial assets have become a larger proportion of world GDP
Market values as a proportion of world GDP

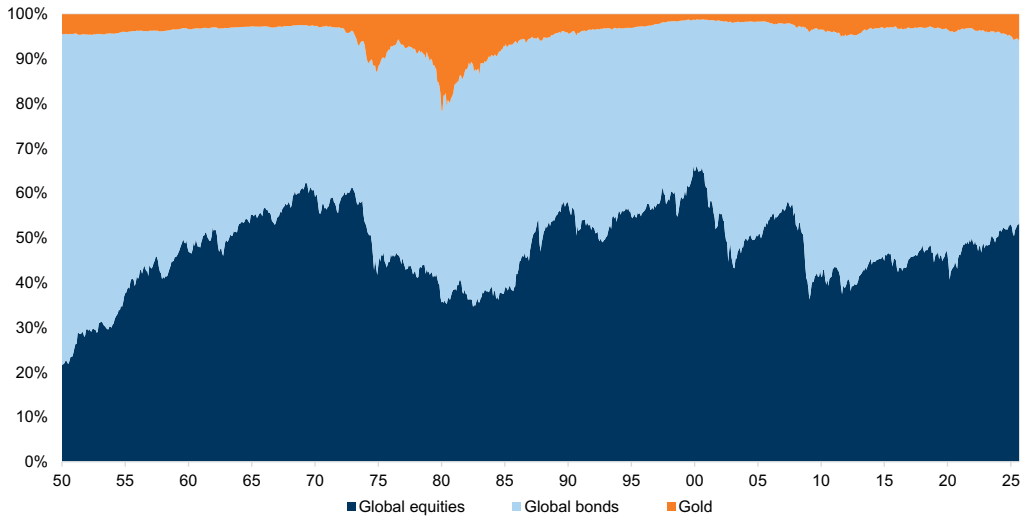
Source: Haver Analytics, Bloomberg, Datastream, Goldman Sachs Global Investment Research

Since 1950, the World Portfolio has been roughly 48% in equities and bonds and 4% in Gold on average (Exhibit 9). Most of the larger shifts in relative weights were due to material divergences in performance, often reflecting shifts in the business cycle, such as recessions or structural macro regimes. Changing net equity and bond issuance and Gold supply growth have also driven some composition changes over time.

After dominating the World Portfolio in 1950, bonds lost ground to equities during the Golden 1950s and 1960s, boosted by international cooperation post WW2 and rising productivity. During the 1970s both equities and bonds lost ground to Gold. Helped by the Great Moderation, Globalisation and Tech optimism, equities peaked near 60% again in the late 1990s. In the 2000s the equity weight trended down when the Tech Bubble burst and owing to the GFC. And since the GFC the combination of QE and

strong growth for US mega cap Tech stocks has boosted the equity weight again.

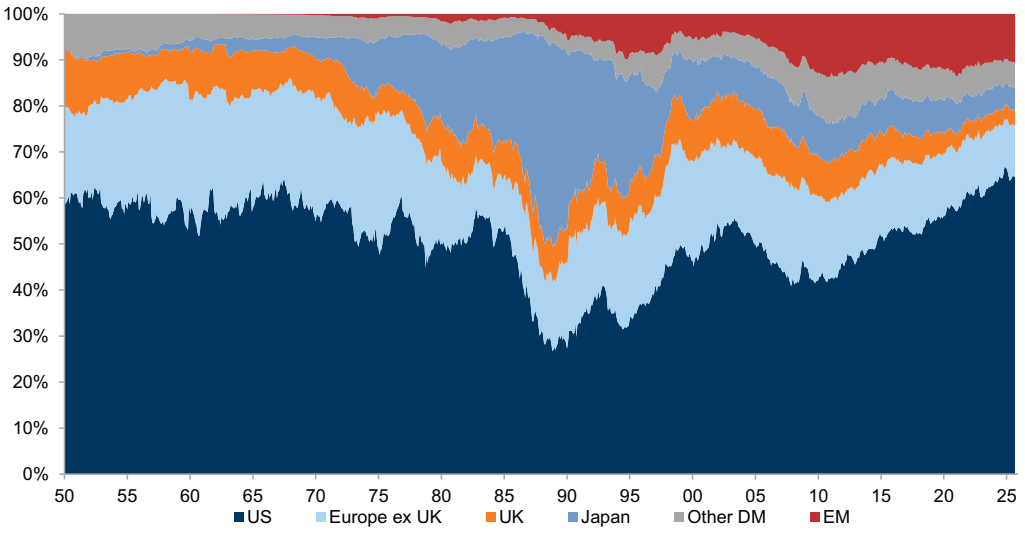
Exhibit 9: Relative asset weights often shift materially around different macro regimes
Relative asset weights in the World Portfolio (current coverage US$247trn assets)



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Regional weights within global equity and bond benchmarks have also varied materially over time. Since 1950, US equities had on average a 50% weight in the global benchmark (Exhibit 10). However, the US briefly fell below 30% in the 1980s when Japan surged during its asset bubble. After Japan's bubble burst, the US regained its dominance, supported by the strength of its economy and technology sector. Europe's weight has declined since the GFC, while emerging markets have grown, in part due to rising net issuance and more investor access to markets such as China. Since the GFC US equities have materially outperformed non-US markets, helped by rising corporate profitability, especially for the large-cap US Tech sector but also a stronger Dollar.

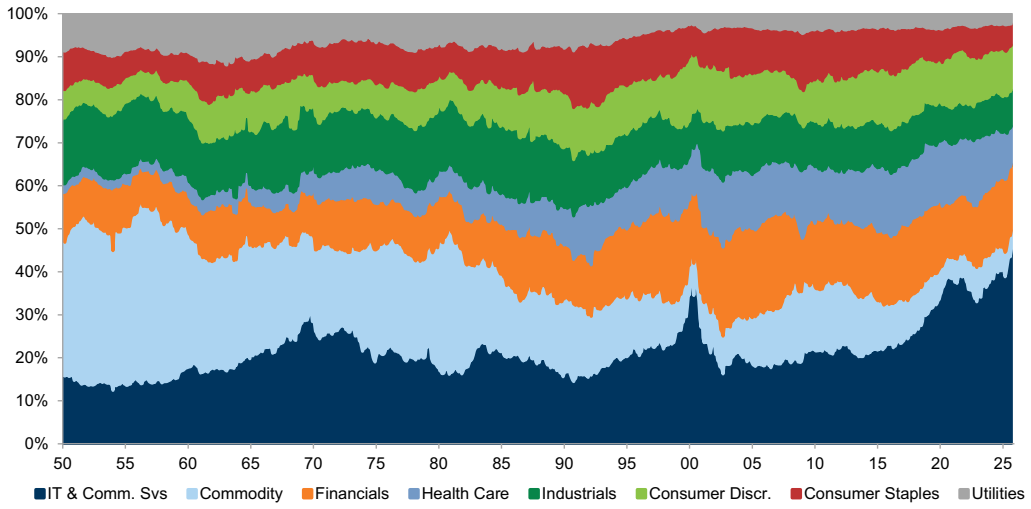
Exhibit 10: The US has been dominant within global equities most of the time but not always
Relative regional weights within global equities (based on MSCI AC World)



Source: Datastream, Bloomberg, Goldman Sachs Global Investment Research

Structural cycles in the Tech sector were a key driver of the equity weight, notably during the PC boom of the 1960s, the 1990s Internet bubble, and the rise of the Magnificent 7 since the GFC (Exhibit 11). The Tech sector has again the largest weight within US equities, driven mainly by mega cap Tech stocks. In the 1950s, commodity sectors such as energy and materials dominated, while Financials have gained ground since the 1990s, helped by more financialisation of the global economy.

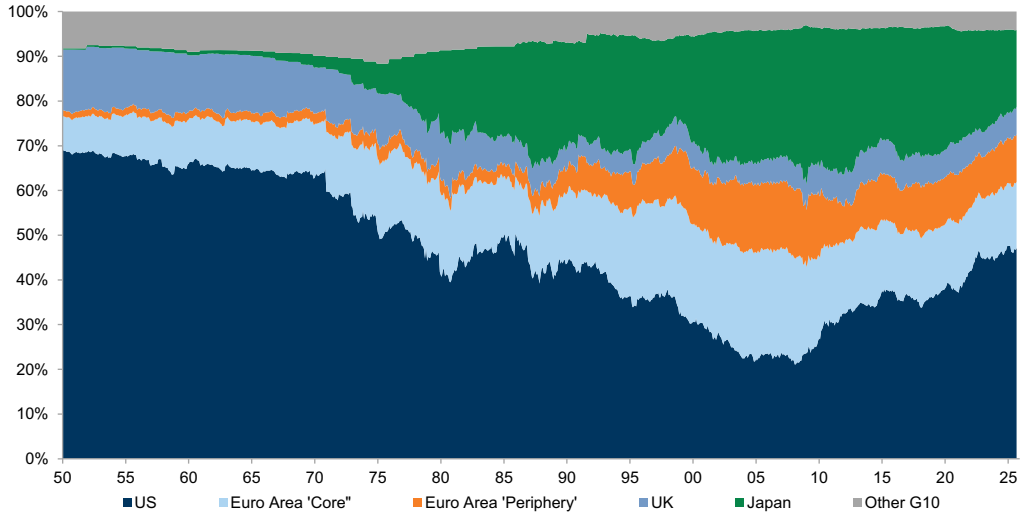
Exhibit 11: Technology and Financials are dominant, while commodity sectors have shrunk
Relative sector weights within US equities (based on S&P 500)



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

The US has also long dominated global bond markets, with Japan only briefly surpassing it (Exhibit 12). Since the GFC the US bond weight generally picked up due to higher yields compared with the Rest of World given a better post-GFC recovery, with the Fed avoiding negative rates and a strong Dollar. While the UK had a large weight post WW2, Euro area bonds have become larger in recent years.

Exhibit 12: US has also been dominant in global bond markets but less than historically
Relative regional weights in G10 sovereign bonds (based on Bloomberg treasuries indices)



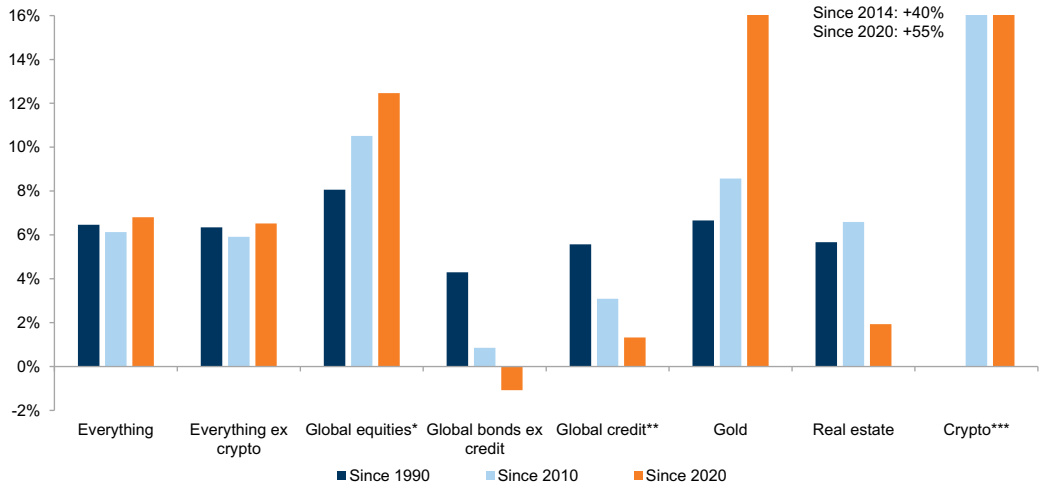
Source: Bloomberg, Datastream, Haver Analytics, Goldman Sachs Global Investment Research

(2) The World Portfolio since 1990 — the rise of Tech and alternatives

We also create an investable, more comprehensive World Portfolio index with daily data since 1990. Besides using benchmarks for global equities (MSCI AC World) and global bonds (Bloomberg Global Aggregate, Global Inflation-Linked, Global High Yield, Municipal Bonds, Global high yield credit), we include private markets indices (from Preqin) as well as estimates for the value of investable Gold and the 10 largest cryptocurrencies. To better reflect different asset classes we split out real estate from global equities and private markets and corporate credit from bonds. For most of those benchmarks there are liquid instruments available, such as tradeable ETFs.[1] *For details on the construction of the World Portfolio index, see Appendix 1.*

The combined value of our World Portfolio index is currently US$261trn and it would have delivered a return of roughly 6% p.a. since 1990 (3.7% real, below the 4.1% average since 1950). While returns were similar during different periods (since 1990, since 2010 and since 2020), the drivers of returns varied materially, with stronger equity returns post the GFC and weaker bond returns, especially since 2020. Also, Gold and cryptocurrencies have performed strongly since the COVID-19 crisis.

Exhibit 13: World Portfolio performance has been stable since 1990 but drivers varied
Annualised returns (US$)



Note: *Both global equities and private markets exclude real estate. **Global Corporate IG + HY. ***Performance since 2014.

Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

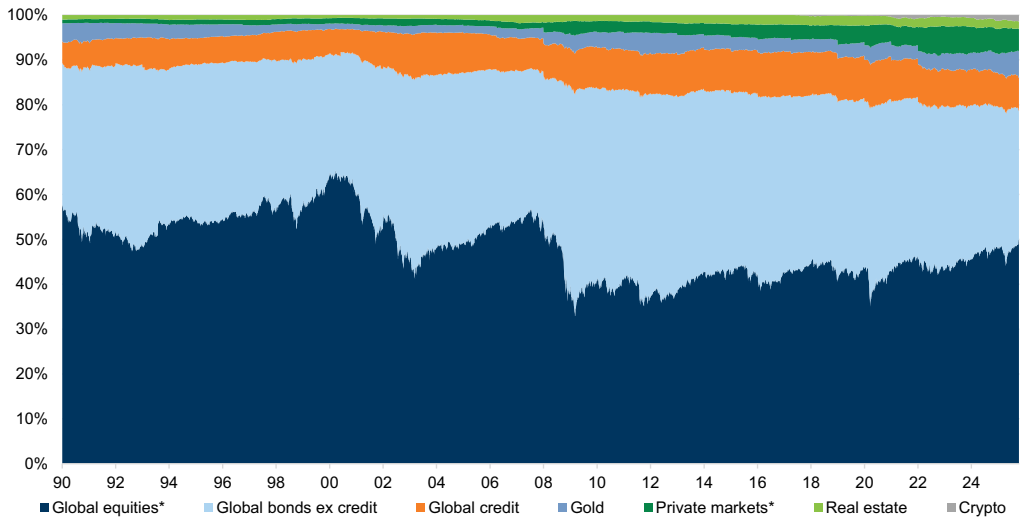
Since 1990, equities have had on average the largest weight at 48%, followed by global bonds (ex credit) at 37% and credit markets at 8% (Exhibit 14). More detailed data since 1990 allows us to break down equity and bond markets further by country and sector (Exhibit 15). Over half of the global bonds are sovereign, a fifth are credit and nearly half are from the US. In sovereign bonds we include US MBS (c.3%) and global index-linked bonds (c.2%) and in global credit we include global high yield (c.15%), none of which are included in the Bloomberg Global Aggregate Index.

Smaller assets such as private markets, Gold and cryptocurrencies have become larger in the World Portfolio since 1990. We do not include commodities outside of

[1] To gain exposure to private markets investors could either use evergreen funds or listed private equity indices such as the LPX 50 as a proxy. For cryptocurrencies there are ETFs available for Bitcoin and Ethereum. Of course this might introduce some tracking error to our index due to management fees and other transaction costs.

Gold – while the size of the physical commodity market is large, the financial commodity market is relatively small (futures open interest excluding Gold has been around US$200-300bn). Other markets such as convertibles, AT1s, leveraged loans, CAT bonds, carbon credits and farmland could also be included but are relatively small (less than 1% weight) or have limited historical data available.

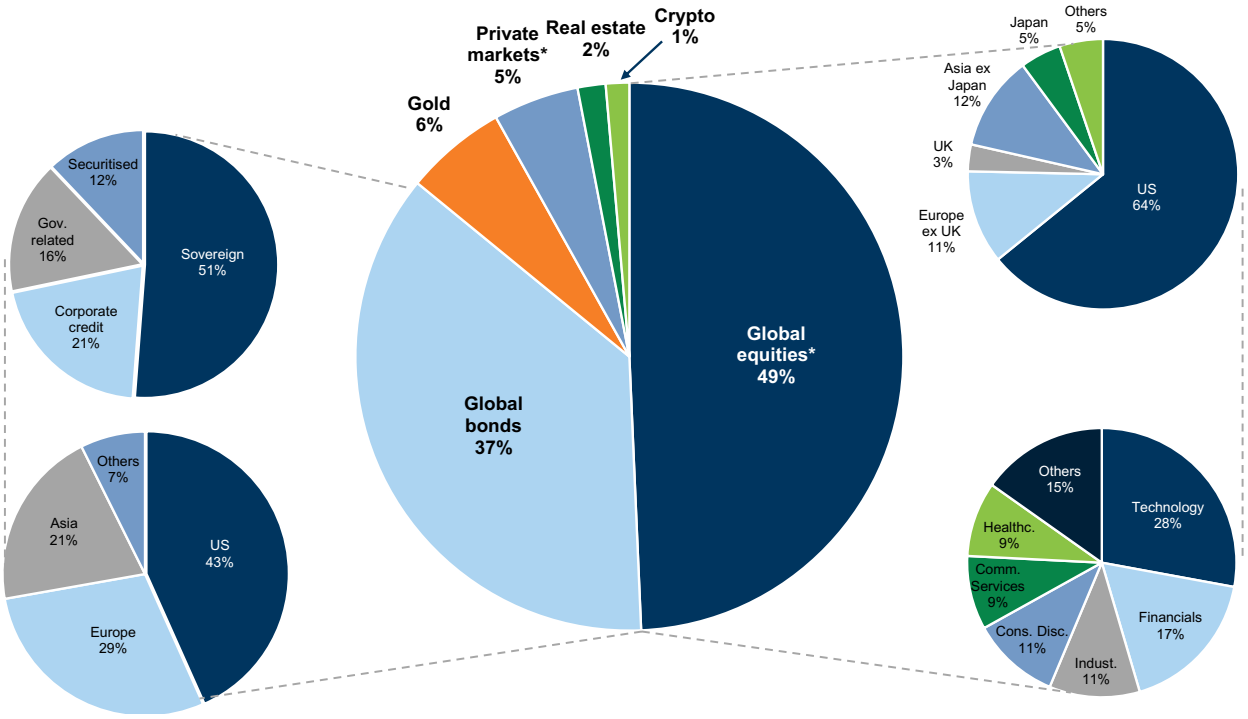
Exhibit 14: In the 1990s the equity/bond split was 60/40 but it shifted to 40/60 post the GFC
Split of the World Portfolio (current value of assets covered is US$261trn)



Note: *Both global equities and private markets exclude real estate.

Source: Bloomberg, Datastream, Preqin, World Gold Council, Goldman Sachs Global Investment Research

Exhibit 15: US assets are dominant in the World Portfolio, both in equities and bonds
Current coverage US$261trn assets

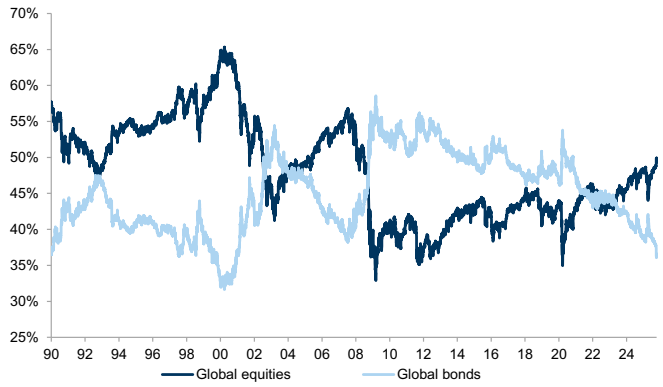


Note: *Both global equities and private markets exclude real estate.

Source: Bloomberg, Datastream, Preqin, World Gold Council, Goldman Sachs Global Investment Research

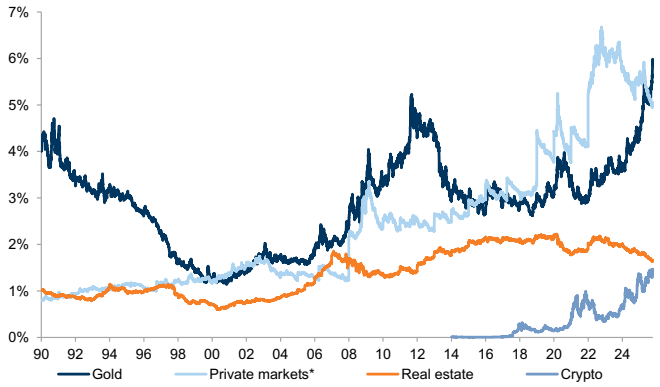
During the 1990s, the equity/bond split in the global portfolio was about 60% equities and 40% bonds, but after the GFC, this flipped to 40% equities and 60% bonds (Exhibit 16). Although equities have since regained some ground, their share remains below late-1990s levels, in part due to the major IPO boom in the late 1990s, while in recent years buybacks have dominated. Gold's portfolio share has risen since the GFC, unlike real estate, which has lost ground recently due to higher rates and headwinds for commercial real estate (Exhibit 17). Private markets and cryptocurrencies gained a larger share, though private markets have underperformed public markets since 2023 after outperforming in the 60/40 drawdown in 2022.

Exhibit 16: The current global equity weight is still below that during the 1990s
Weights in the World Portfolio



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 17: Alternative assets have gotten a larger weight in the last decade with the exception of real estate
Weights in the World Portfolio



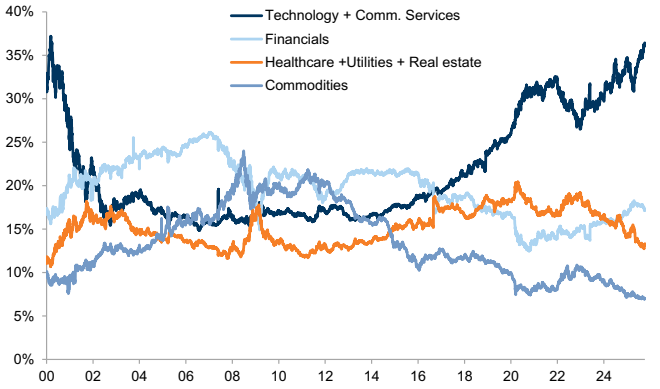
Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

The MSCI AC World equity benchmark has been increasingly dominated by the US, at a c.65% weight now (Exhibit 18). Non-US markets have lower weights, largely due to free-float adjustments, especially in China. As mentioned earlier, the US dominance is closely tied to its Tech sector, which lost a lot of weight when the Tech bubble burst but has fully recovered its peak weight in recent years. The global Tech sector (we combine Technology and Communication Services) now holds a similar weight to during the Tech Bubble, while Commodity and Defensive sectors have lost share (Exhibit 19). Financials, which lost ground after the GFC, have started to recover since the COVID-19 crisis.

Exhibit 18: US equities have gotten a much larger weight within global equities
US weight within MSCI AC World

Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 19: Technology stocks gained most weight within global equities and, more recently, Financials
Sector weights within global equities



Source: Bloomberg, Goldman Sachs Global Investment Research

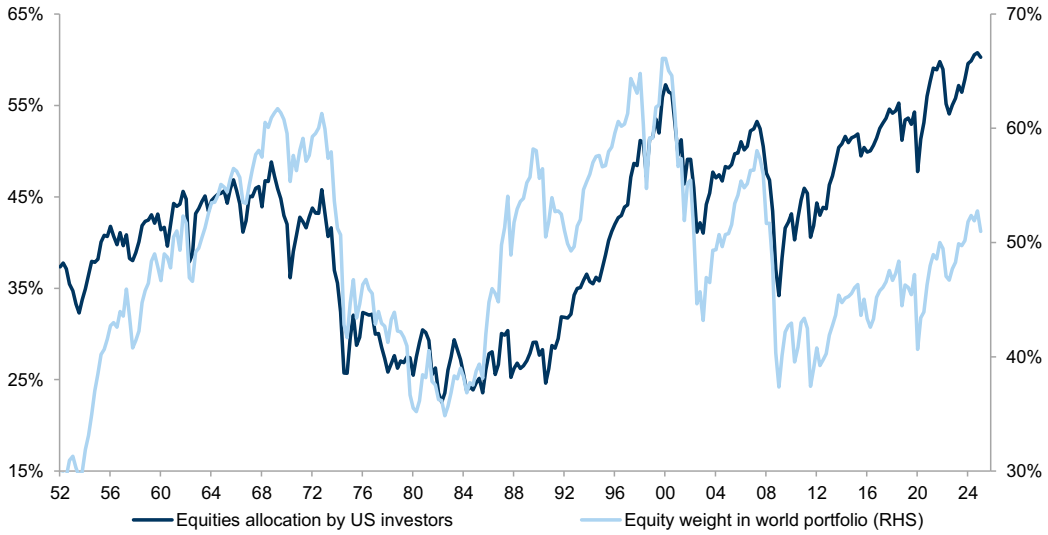
Benchmark Affair — Investor Allocations Mirror the World Portfolio

Record high investor equity allocations mirror the World Portfolio

According to the famous Capital Asset Pricing Model (CAPM)[2], in equilibrium the World Portfolio is optimal. The idea of market efficiency (coupled with lower fees and mixed performance of active managers) has supported the growth in passive investing based on benchmarks in the last 25 years – more than half of assets under management in equity funds are now passive. In practice the World Portfolio also guides strategic asset allocation as asset sizes condition liquidity of investment opportunities.

US investor allocations to equities have picked up in line with shifts in the World Portfolio (Exhibit 20). Historical asset allocations often mirror past trends in the World Portfolio, such as high equity weights in the late 1960s and 1990s, increased cash in the 1970s, and more bonds in the 1980s. However, while equity allocations from US investors are very high and above levels seen during the late 1990s, they own far fewer US bonds relative to the large weight of US bonds in the World Portfolio.

Exhibit 20: US investor equity allocations are higher than during the Tech Bubble
Aggregate US investors' equity allocation (households, pension and insurance and investment funds)

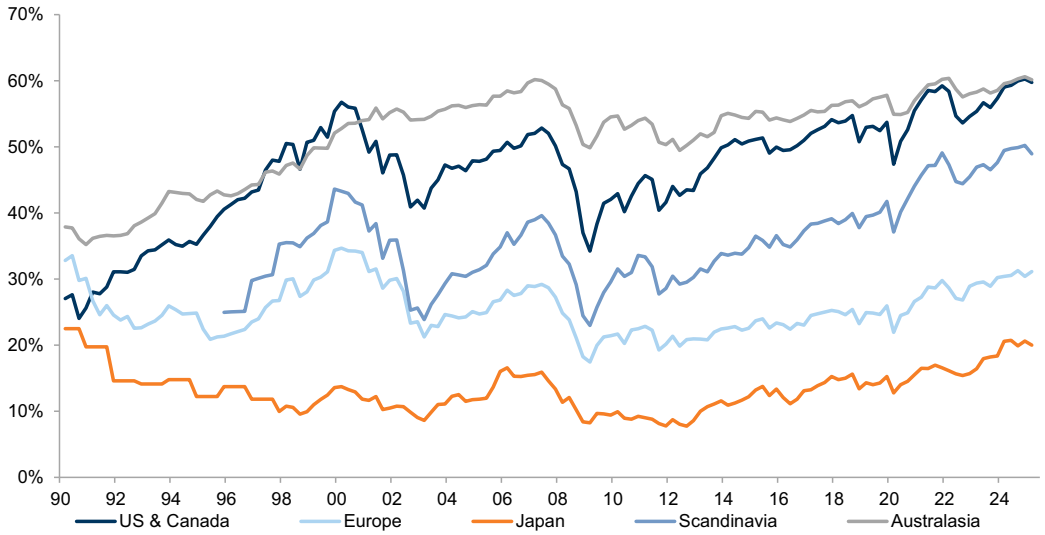


Source: Haver Analytics, Goldman Sachs Global Investment Research

Outside of the US, investor allocations to equities are generally lower but in most markets they have also increased materially since the GFC (Exhibit 21). Notably, aggregate equity allocations now surpass previous peaks from the late 1990s, with cash and bond holdings at record lows. Although investor portfolios will differ based on local factors and individual drivers such as risk tolerance and institutional constraints, in aggregate they have been closely linked to the World Portfolio. *For details on the data and construction of investor asset allocations see Appendix 2.*

[2] In his seminal paper, Markowitz (1952) first introduced the Modern Portfolio Theory (MPT), which postulates that the risk/reward of a portfolio with uncorrelated assets can be optimised. Then Tobin (1958) combined MPT with the concept of economic utility, suggesting that there exists only one super-efficient portfolio in which a reasonable level of return can be achieved at a reasonable level of risk. And eventually Sharpe (1964) developed the CAPM suggesting there was a market equilibrium where return and risk are optimized and this could be achieved by holding all the stocks and bonds in the world in proportion to their relative values.

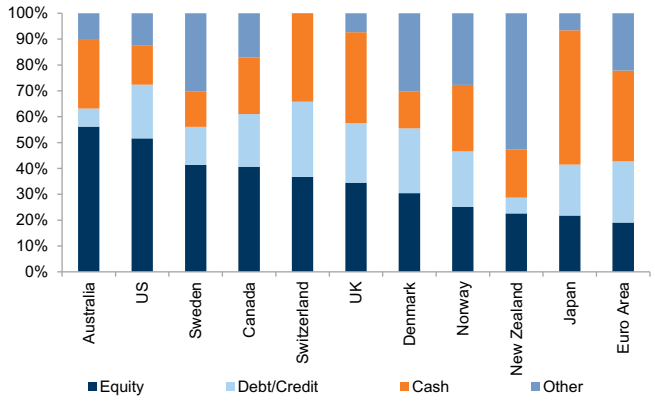
Exhibit 21: Equity allocations from global investors are nearing the highs from the 1990s
Aggregate global investors' equity allocation (households, pension and insurance and investment funds)



Source: Haver Analytics, Goldman Sachs Global Investment Research

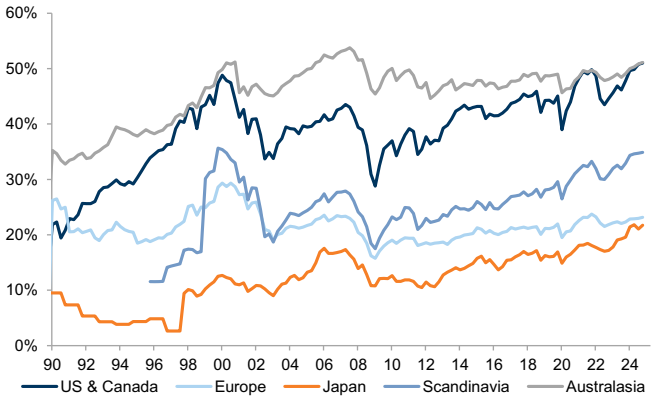
In a lot of countries, households hold fewer equities than the share in the world portfolio. The highest allocations are in the US, Australia, and Sweden, and the lowest are in Europe and Japan[3], where cash holdings are notably larger (Exhibit 22). These differences stem from factors such as demographics, cultural differences, tax policies[4], historical equity performance, and the size of domestic equity markets. European households especially favour cash and bonds, reflecting both smaller domestic equity markets, less risk tolerance and weaker equity performance since the Tech Bubble and GFC (Exhibit 23). As our economists recently highlighted, this is in part as EU financial markets are underdeveloped, heavily reliant on banks and fragmented.

Exhibit 22: In Europe and Japan households hold a large amount of cash vs. the equity/bond investments
Weights as % of household financial assets



Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 23: European households have allocated much less to equities in the last 25 years
Equity allocation as % of household financial assets



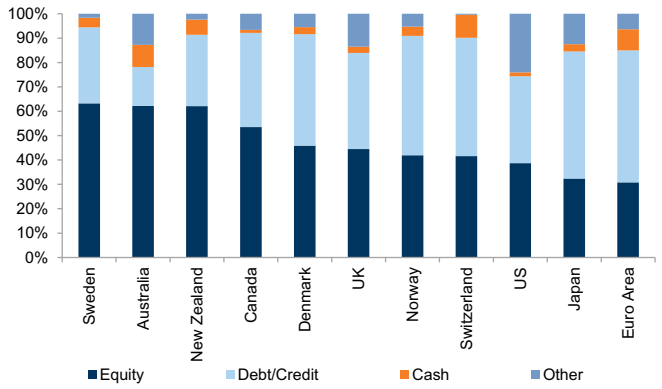
Source: Haver Analytics, Goldman Sachs Global Investment Research

[3] In Europe and Japan households have a lot of insurance and pension savings products. We do a lookthrough approach based on aggregate national data on asset allocations for insurance and pensions to estimate indirect equity/bond exposure. We do the same for investment fund holdings by households, which we break down into the asset classes based on the aggregate national data on their asset allocations.

[4] For example in Australia the dividend imputation system makes equities much more attractive relative to fixed income, which helps explain the much larger allocation to equities.

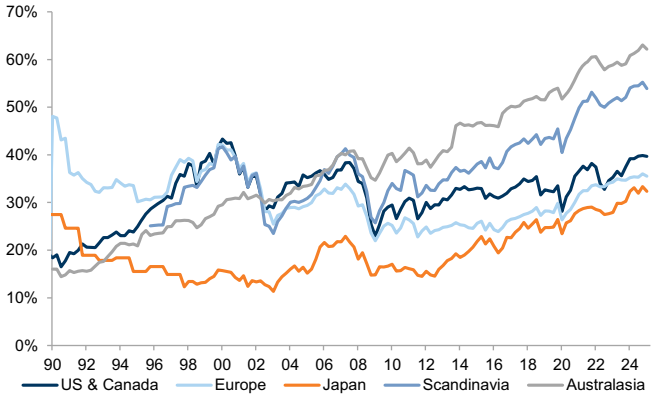
Asset allocations also differ notably between pension funds and insurance companies around the world. Australasia and Scandinavia generally hold more equities, while Europe and Japan hold less (Exhibit 24). While in the US, equity allocations have been relatively stable since the 1990s, they have declined in Europe and picked up in Australasia and Scandinavia (Exhibit 25). Regulatory changes like IAS 19 and Solvency II have encouraged defined benefit pension plans and insurers to reduce equity exposure, especially in Europe – in Australasia and Scandinavia, pension funds and insurance companies have faced less pressure due to more industry-wide and defined contribution schemes. In Japan, pension and insurance allocations to equities picked up from very low levels after the introduction of Abenomics in 2012.

Exhibit 24: Australasian and Scandinavian pension & insurance investors tend to have larger equity allocations
Weights as % of insurance and pensions' total assets



Source: Haver Analytics, Goldman Sachs Global Investment Research

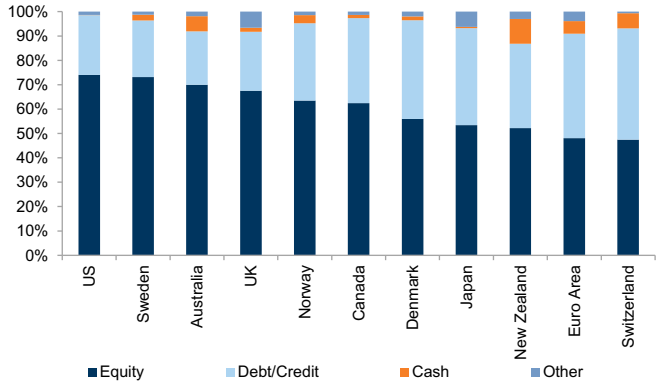
Exhibit 25: Scandi and Australasian pension and insurance investors have increased equity allocations
Equity allocation as % of total assets for insurance and pensions



Source: Haver Analytics, Goldman Sachs Global Investment Research

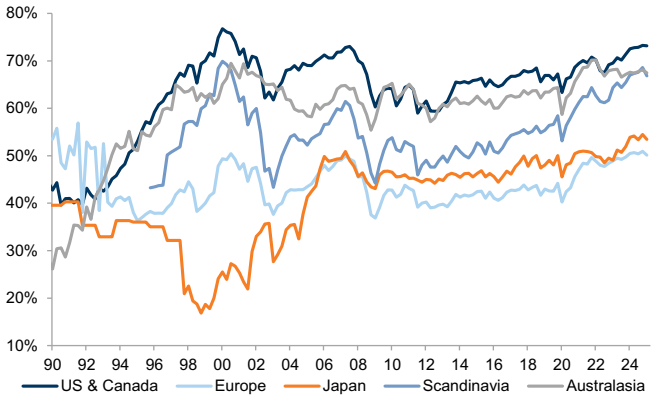
In most countries, around half of investment fund assets are in equities, with higher proportions in the US, UK, and Scandinavia (Exhibit 26). Equity assets under management have generally grown more since the COVID-19 crisis, especially in Australasia and Scandinavia – they have been somewhat stable in Europe and the US (Exhibit 27). Those shifts reflect both relative asset weights due to performance but also domestic demand for different fund products.

Exhibit 26: Fewer assets in equity funds in Europe
Weights as % of investment funds' total assets



Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 27: US investment funds more focused on equities
Equity weight for investment funds' assets under management

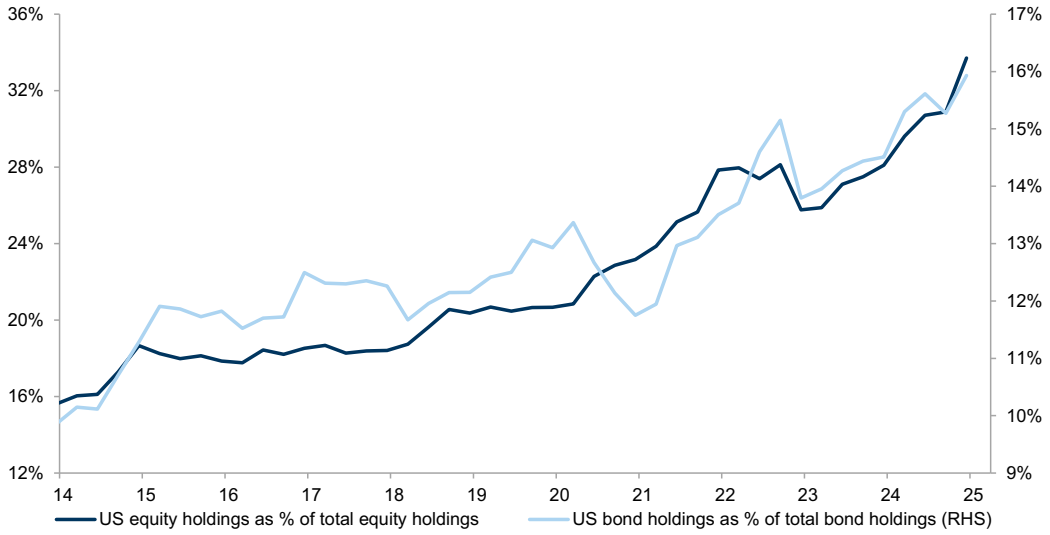


Source: Haver Analytics, Goldman Sachs Global Investment Research

Global investor portfolios reflect growing US asset dominance

US assets have also become increasingly dominant in global investor portfolios, in line with the growing weight of both US equities and bonds in the World Portfolio (Exhibit 28). Based on national accounts, central bank and Fed data we estimate the aggregate allocation from non-US investors to US equities and bonds doubled in the last decade. Those allocations are still below the US weights in World Portfolio, indicating continued home bias for most investors.

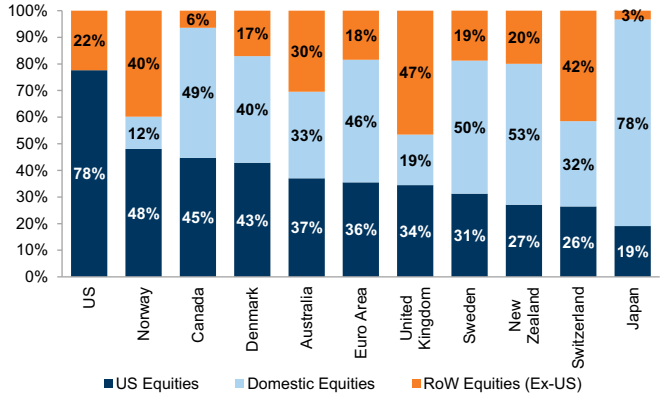
Exhibit 28: US asset dominance in benchmarks has conditioned global investor allocations
Non-US investor (G10 ex US) allocation to US equities and bonds



Source: Haver Analytics, Goldman Sachs Global Investment Research

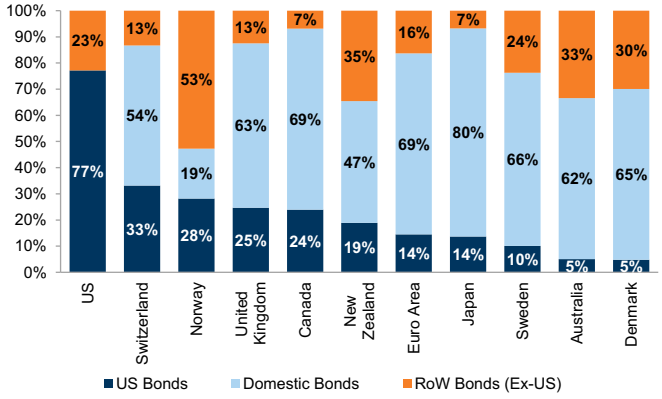
US asset allocations vary significantly by country, as shown in Exhibit 29 and Exhibit 30. The US has the largest home bias in equities and bonds, reflecting the size of their markets and strong performance. In equities, most non-US investors have relatively large US equity allocations but below the benchmark weights – Canada and Denmark have particularly large US equity allocations. In bonds, there is more of a home bias with mostly countries that have smaller economies and bond markets allocating more to non-domestic bonds due to their larger size and liquidity.

Exhibit 29: Non-US investors have material allocations in foreign and US equities
Regional equity allocation across investors



Source: Haver Analytics, Goldman Sachs Global Investment Research, RBNZ, NZ Superfund

Exhibit 30: In bonds there is usually more of a home bias
Regional bond allocation across investors



Source: Haver Analytics, Goldman Sachs Global Investment Research, RBNZ, NZ Superfund

Benchmark Despair — The World is Not Enough

The World is not enough — mixed performance for a global benchmark

Market-value weighted benchmarks are not necessarily a good starting point for both active and passive multi-asset portfolios. In recent years there has already been a trend away from benchmarks towards the so-called Total Portfolio Approach (TPA) to allow more effective multi-asset portfolio management.[5] This entails more flexibility for the investment team to deviate from benchmarks and instead the risk/reward of new investments is assessed in the context of the portfolio goals and risk factors.

Although the World Portfolio significantly influences global investors, its makeup reflects past performance and supply of assets but not necessarily fundamentals. Historically, while it has resembled a 60/40 portfolio (60% equities/ 40% bonds), a regularly rebalanced 60/40 portfolio outperformed on a risk-adjusted basis since 1950 (Exhibit 31). A global risk parity strategy[6] including Gold achieved similar Sharpe ratios but outperformed during the 1970s stagflation and on average since the 1990s. This shows it is possible to outperform the World Portfolio over prolonged periods of time, challenging traditional CAPM assumptions.[7]

Exhibit 31: Since 1950 a global 60/40 portfolio outperformed, since 1990 risk parity did
Performance statistics (based on monthly returns)

	World portfolio	60/40 portfolio	Global risk parity	Global equities	Global bonds	Gold
Since 1950						
Return (p.a.)	**7.8%**	**9.0%**	**7.2%**	**11.1%**	**5.3%**	**6.2%**
Volatility	8.3%	9.2%	6.9%	13.6%	5.6%	17.0%
Sharpe ratio	**0.43**	**0.51**	**0.44**	**0.50**	**0.21**	**0.12**
5% CVaR (monthly)	*-5.0%*	*-5.6%*	*-3.8%*	*-8.8%*	*-3.0%*	*-9.2%*
95% CVaR (monthly)	*5.7%*	*6.5%*	*5.2%*	*8.9%*	*4.4%*	*13.7%*
Real return (p.a.)	**4.1%**	**5.3%**	**3.6%**	**7.3%**	**1.8%**	**2.5%**
Lowest ann. return	*-27%*	*-33%*	*-18%*	*-48%*	*-21%*	*-38%*
Highest ann. return	*50%*	*57%*	*41%*	*72%*	*44%*	*179%*
Since 1990						
Return (p.a.)	**6.4%**	**7.1%**	**6.2%**	**8.2%**	**4.7%**	**6.4%**
Volatility	9.3%	10.3%	7.7%	15.0%	6.6%	17.3%
Sharpe ratio	**0.39**	**0.42**	**0.45**	**0.36**	**0.30**	**0.21**
5% CVaR (monthly)	*-5.7%*	*-6.5%*	*-4.1%*	*-10.1%*	*-3.4%*	*-8.4%*
95% CVaR (monthly)	*5.5%*	*6.5%*	*4.7%*	*9.2%*	*3.8%*	*10.7%*
Real return (p.a.)	**3.7%**	**4.3%**	**3.5%**	**5.5%**	**2.0%**	**3.7%**
Lowest ann. return	*-27%*	*-33%*	*-18%*	*-48%*	*-21%*	*-27%*
Highest ann. return	*30%*	*39%*	*28%*	*59%*	*21%*	*58%*

Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

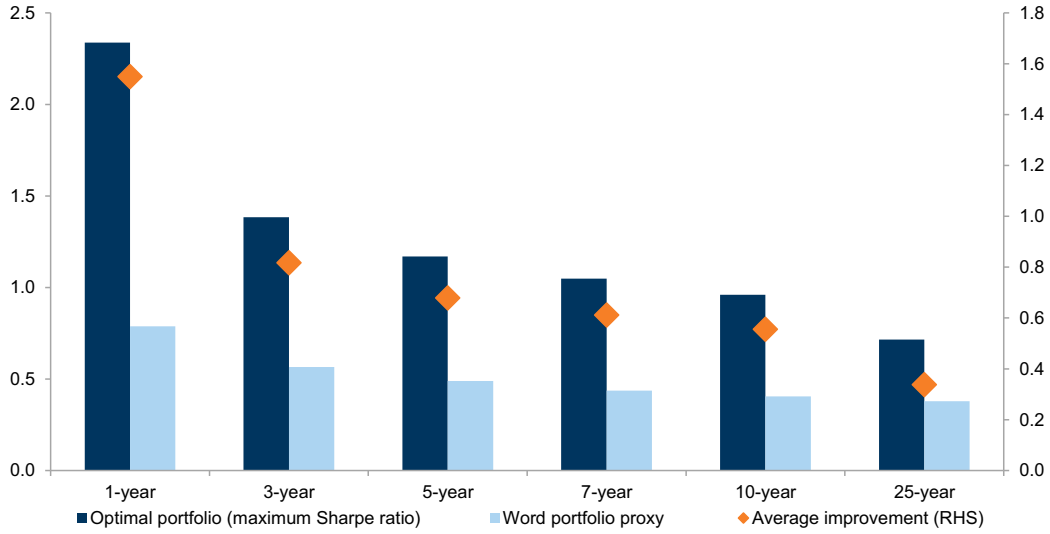
Over practical investment horizons, the World Portfolio usually lags the most efficient portfolio. We split the World Portfolio into 5 parts, US and non-US equities and bonds as well as Gold, and run Markowitz optimal portfolios – unsurprisingly, over shorter horizons, like 1-3 years, potential Sharpe ratios for the optimal portfolios are much higher as business cycle swings and bear markets can drive large market timing opportunities (Exhibit 32). However, even on 10-year or 25-year horizons Sharpe ratios for the optimal portfolio were much higher compared to the World Portfolio.

[5] See Anson (2024) and for a recent overview.

[6] Risk parity portfolios allocate to assets mainly based on their risk. We use a simple risk parity strategy that weighs assets based on the inverse of their long-run average volatility of monthly returns since 1950.

[7] Markowitz (2005) made a similar point himself – the CAPM makes several unrealistic assumptions such as investors are rational, there are no taxes and transaction costs, unlimited borrowing is possible and all investors have the same information.

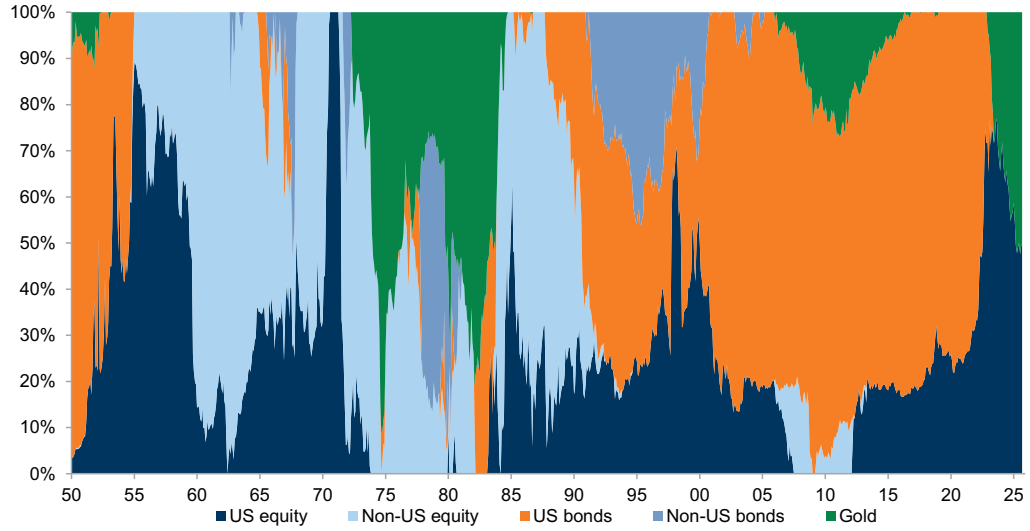
Exhibit 32: Even over long horizons the World Portfolio was not optimal
Average of rolling Sharpe ratios (data since 1950)



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Over 10-year rolling horizons, the optimal portfolio shifted notably over time, deviating materially from the World Portfolio benchmark (Exhibit 33). After the GFC and before the COVID-19 crisis, a US risk parity portfolio (30-40% equities, 60-70% bonds) had the highest risk-adjusted returns. The highest Sharpe ratio portfolio in the last 10 years would have been roughly half in US equities and half in Gold. Since the COVID-19 crisis the World Portfolio has benefited from its relatively large US equity weight but has arguably had too much non-US equities, bonds and too little Gold – the optimal portfolio was roughly 50% in US equities and 50% in Gold.

Exhibit 33: Optimal portfolio is very dynamic – recently it was 50/50 US equities and Gold
10-year rolling optimal asset weights of the components of the World Portfolio (for US$ investors)



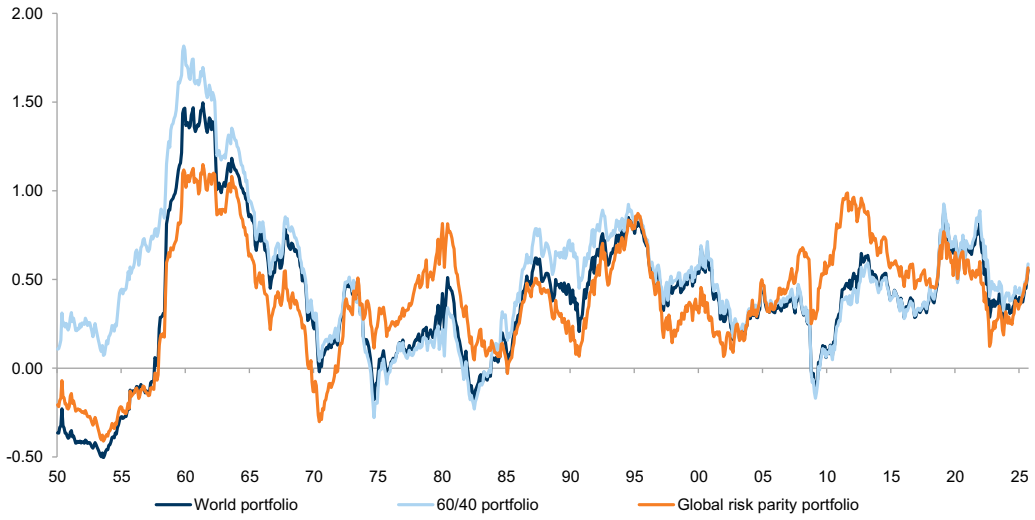
Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

We think there are three key issues with the current World Portfolio that investors need to address in their portfolio construction:

(1) Imbalanced portfolios — the impact of structural macro regimes

As we showed in our Strategic Balanced Bear research, while a 60/40 portfolio performed strongly for the last generation of investors, historical performance varied materially in function of structural macro regimes (Exhibit 34). A 'Goldilocks' backdrop where global GDP growth was strong and inflation anchored resulted in the best performance for a balanced portfolio like the World Portfolio (Exhibit 35). Such periods included the Golden 1950s, early 1960s and 1990s. However, there are multiple prolonged periods when the World Portfolio, which is mostly in global equities and bonds, delivered poor risk-adjusted returns – thus balanced portfolios are not necessarily a good starting point for portfolio construction.

Exhibit 34: The World Portfolio often underperformed 60/40 or risk parity portfolios
10-year rolling Sharpe ratio



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 35: The World Portfolio delivered the best returns with good growth and anchored inflation
Annualised 10-year rolling performance

World Portfolio nominal return

Inflation \ Real GDP growth	< 2%	2% to 3%	> 3%	Avg.
< 2%	4.3%	5.8%	6.8%	6.1%
2% to 3%	5.7%	4.4%	6.6%	6.0%
> 3%	-1.6%	6.8%	8.8%	8.0%
Avg.	4.5%	6.1%	7.8%	6.9%

World Portfolio real return

Inflation \ Real GDP growth	< 2%	2% to 3%	> 3%	Avg.
< 2%	2.5%	4.0%	5.1%	4.3%
2% to 3%	3.2%	1.7%	3.9%	3.4%
> 3%	-5.7%	1.1%	3.5%	2.6%
Avg.	2.2%	1.7%	3.9%	3.2%

World Portfolio Sharpe ratio

Inflation \ Real GDP growth	< 2%	2% to 3%	> 3%	Average
< 2%	0.40	0.71	0.92	0.77
2% to 3%	0.39	0.35	0.39	0.38
> 3%	-0.37	0.11	0.27	0.21
Avg.	0.33	0.26	0.44	0.38

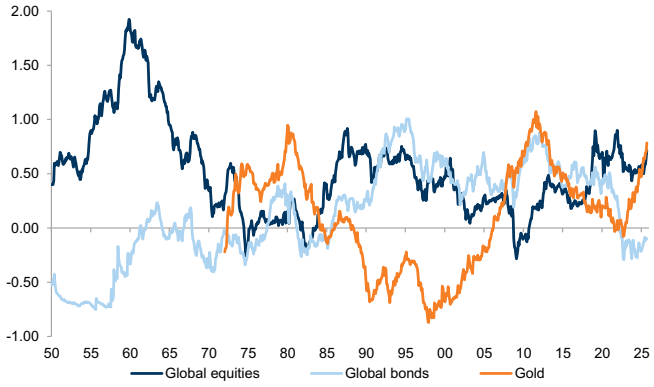
Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Even over long investment horizons equity and bond returns varied materially. During the Golden 1950s, early 1960s and 1990s, higher equity allocations were better. But in the 2000s, equities suffered in the two bear markets around the Tech Bubble and the GFC (Exhibit 36). Since the late 1990s, balanced portfolios have delivered unusually strong Sharpe ratios, helped by negative equity/bond correlations and high risk-adjusted returns for bonds due to low inflation – in fact, a risk parity strategy with higher bond allocations would have mostly outperformed a 60/40 portfolio on a risk-adjusted basis.

Balanced portfolios are vulnerable to extreme macro scenarios such as stagflation of valuation bubbles. In 2022, simple 60/40 portfolios had large drawdowns, illustrating their vulnerability to inflationary regimes (Exhibit 37). During periods of high and rising inflation, like the 1970s stagflation and in 2022, both equities and bonds tend

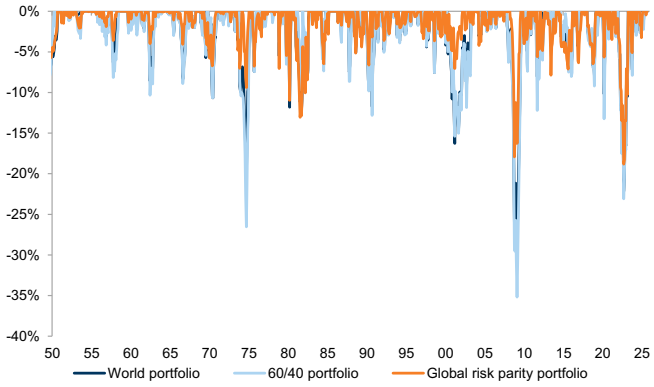
to suffer. Higher allocations to Gold in a risk parity strategy would have helped risk-adjusted returns relative to the World Portfolio, especially recently – the same was true during and after the GFC due to concerns around debt and the financial system.

Exhibit 36: Sharpe ratios for different assets varied materially
10-year rolling Sharpe ratios



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 37: Risk parity strategy had generally smaller drawdowns
1-year rolling maximum drawdown

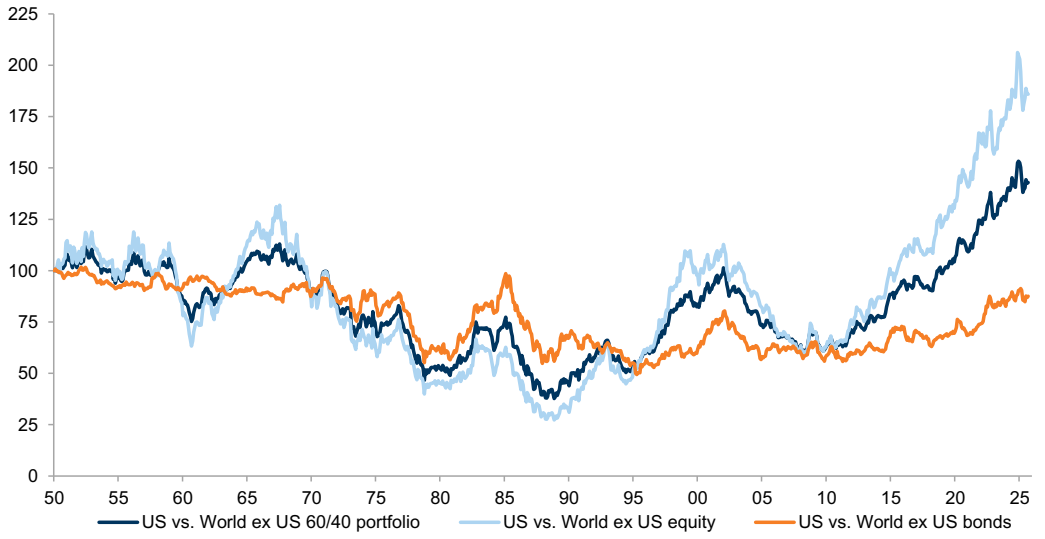


Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

(2) US dominance — exceptions to US exceptionalism

While US asset dominance in the World Portfolio has been a tailwind for performance post GFC, it can also be a headwind. While a US 60/40 portfolio outperformed relative to the Rest of World since the 1990s, performance before was mixed (Exhibit 38). US bonds have actually lagged since 1950 and the better performance since the GFC was helped by the stronger Dollar trend – most of the relative performance of US bonds vs. RoW has been closely linked to FX, suggesting a little reason to invest in US bonds unless there is a strong Dollar like in the early 1980s, late 1990s and post GFC. Most of the better performance of a US 60/40 portfolio has been due to strong US equity returns since the 1990s.

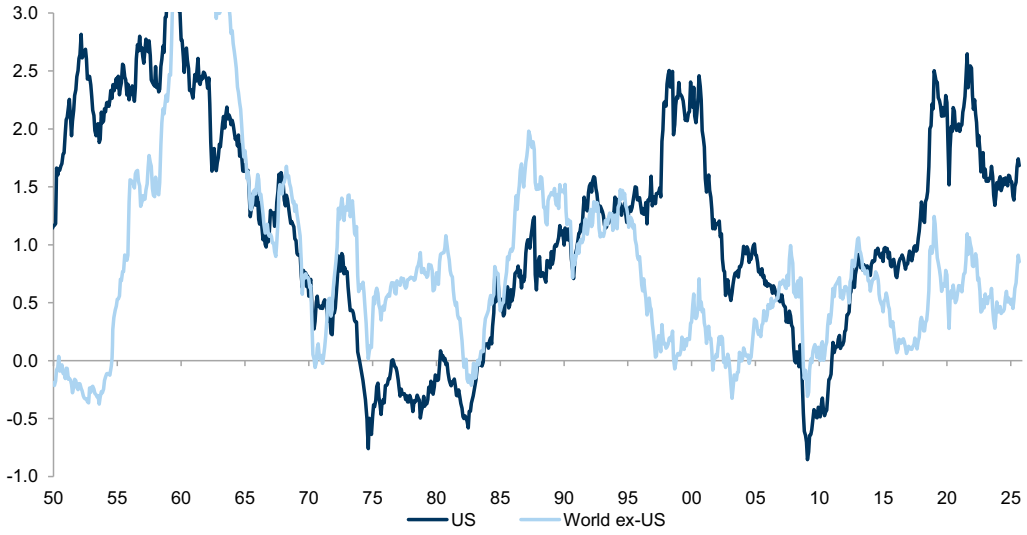
Exhibit 38: A US 60/40 portfolio has materially outperformed vs. RoW
Relative total return performance (in US$)



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

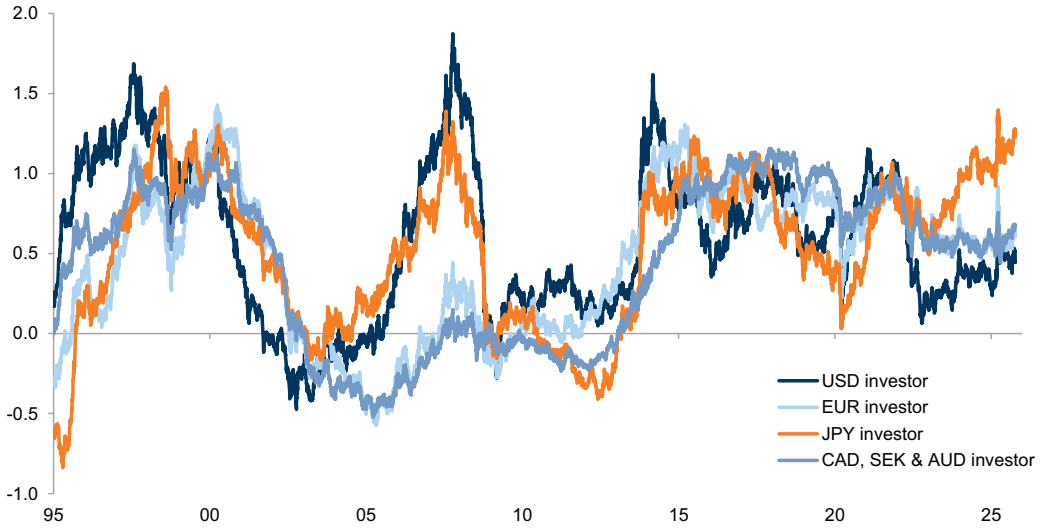
The S&P 500 Sharpe ratio was boosted by rising profit margins, extending a trend that started in the early 1980s (Exhibit 39). US corporate profitability increased owing to the fast-growing large cap US Tech sector but also due to falling interest costs, low labour cost inflation, tax cuts and share buybacks. As we wrote in The Strategic Balanced Bear, rising ROEs coupled with low and anchored inflation further boosted equity valuations. However, this has also resulted in the concentration in a few mega cap Tech stocks, which dominate earnings and market cap within the US index, leading to more idiosyncratic risk in US equity benchmarks.

Exhibit 39: Since the 1990s US equities mostly outperformed RoW but not before
10-year rolling Sharpe ratios for equities (in US$)



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 40: Risk-adjusted returns since the 1990s were different based on investor domicile
5-year rolling Sharpe ratios for the World Portfolio



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Risk-adjusted performance of the World Portfolio also varied materially based on investor domicile (Exhibit 40). With large US weights in global equity and bond benchmarks, the Dollar becomes a core driver of performance. For example in the early 1990s and into the GFC, the Dollar was a key performance drag over multiple years for

non-US investors. On the flipside, the stronger Dollar since the GFC boosted Sharpe ratios for non-US investors. And, of course, since the beginning of this year the weaker Dollar and US fiscal concerns have sparked a debate on the appropriate levels of US asset exposure and more broadly on how to address country risk in asset allocation.

(3) Missing out on benefits from broader diversification

The World Portfolio also misses out on benefits from broader diversification, e.g. from assets with smaller weights or alternatives. A risk parity strategy with a more granular split for assets including private markets and cryptocurrencies consistently delivered a higher Sharpe ratio than both the World Portfolio or a simple 60/40 portfolio since 1990 (Exhibit 41). Private markets boosted risk-adjusted performance in the 1990s, real estate and Gold had high Sharpe ratios into the GFC, and allocations to Gold and cryptocurrencies boosted performance in particular since the COVID-19 crisis. Benchmarks based on market value weights miss out on diversification benefits from smaller asset classes or alternatives.

Exhibit 41: Since the 1990s, a broad risk parity strategy has outperformed relative to the world or a 60/40 portfolio
Performance statistics (based on daily returns)

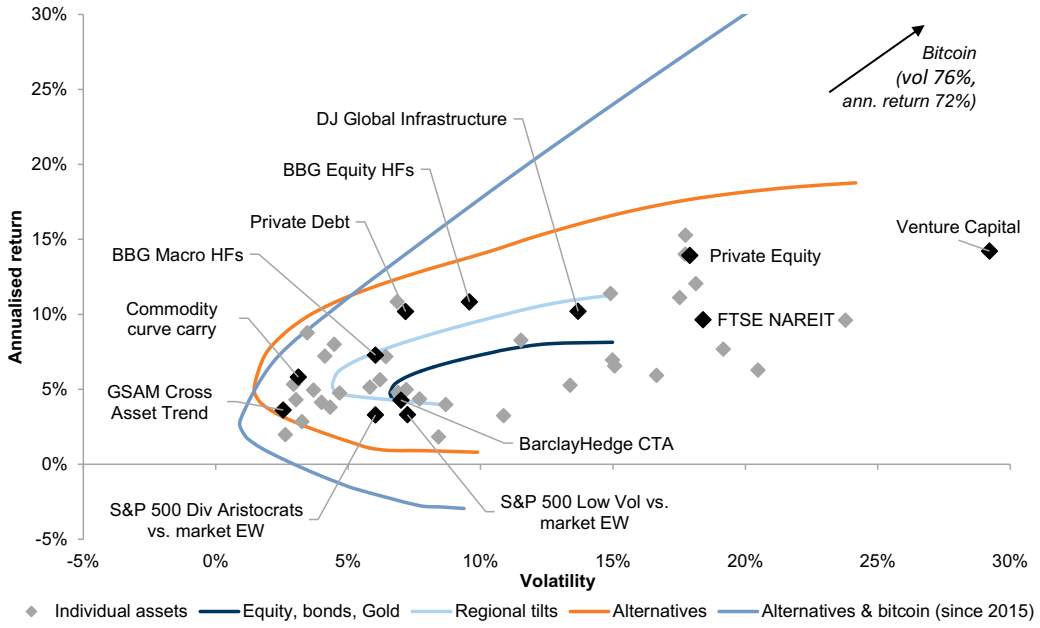
	World portfolio	60/40 portfolio	Global risk parity**	Global equities*	Global bonds ex credit	Global credit	Gold	Private markets*	Real estate	Crypto***
Since 1990										
Return (p.a.)	**6.5%**	**7.0%**	**7.0%**	**8.1%**	**4.3%**	**5.6%**	**6.7%**	**10.5%**	**5.7%**	**na**
Volatility	7.9%	9.1%	6.0%	14.7%	5.8%	5.3%	15.4%	21.3%	15.1%	na
Sharpe ratio	**0.47**	**0.46**	**0.71**	**0.36**	**0.27**	**0.54**	**0.25**	**0.36**	**0.19**	**na**
5% CVaR (monthly)	*-6.0%*	*-6.9%*	*-4.7%*	*-11.0%*	*-3.4%*	*-4.0%*	*-8.6%*	*-12.7%*	*-12.0%*	*na*
95% CVaR (monthly)	*6.0%*	*6.8%*	*5.2%*	*10.0%*	*4.4%*	*4.4%*	*11.5%*	*12.3%*	*10.7%*	*na*
Since 2010										
Return (p.a.)	**6.1%**	**7.1%**	**6.3%**	**10.5%**	**0.9%**	**3.1%**	**8.6%**	**9.4%**	**6.6%**	**39.8%**
Volatility	7.5%	8.9%	6.3%	14.4%	5.2%	5.1%	15.2%	22.3%	14.0%	59.0%
Sharpe ratio	**0.66**	**0.66**	**0.81**	**0.65**	**-0.06**	**0.37**	**0.48**	**0.36**	**0.38**	**0.64**
5% CVaR (monthly)	*-5.8%*	*-6.9%*	*-5.0%*	*-10.5%*	*-4.0%*	*-4.3%*	*-8.2%*	*-11.9%*	*-10.3%*	*-29.4%*
95% CVaR (monthly)	*6.0%*	*6.9%*	*5.6%*	*9.4%*	*4.3%*	*4.7%*	*11.6%*	*12.1%*	*10.1%*	*54.6%*
Since 2020										
Return (p.a.)	**6.8%**	**7.5%**	**6.4%**	**12.5%**	**-1.1%**	**1.3%**	**18.4%**	**7.7%**	**1.9%**	**53.9%**
Volatility	9.3%	10.4%	7.7%	16.8%	5.8%	6.3%	15.4%	26.9%	17.2%	51.4%
Sharpe ratio	**0.49**	**0.50**	**0.52**	**0.61**	**-0.58**	**-0.16**	**1.00**	**0.19**	**-0.02**	**0.99**
5% CVaR (monthly)	*-8.1%*	*-9.1%*	*-7.1%*	*-13.0%*	*-4.7%*	*-5.9%*	*-6.3%*	*-15.5%*	*-13.8%*	*-27.5%*
95% CVaR (monthly)	*6.8%*	*7.7%*	*6.1%*	*11.1%*	*4.7%*	*5.7%*	*11.0%*	*12.6%*	*9.6%*	*46.2%*

Notes: *Excluding real estate. ** Volatility estimated on monthly returns for risk parity weights to account for autocorrelation in returns. ***Performance since 2014.

Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Larger allocations to smaller assets can enhance diversification as illustrated by a risk parity strategy. The same is true for alternatives, which are often based on long/short strategies or leveraged versions of assets in the World Portfolio. The benefits of diversification among a broader universe of assets are well-known and documented (see also our Balanced Bear research). As Exhibit 42 shows, broader diversification across markets, including real assets, private markets and other alternatives, as well as within markets, across regions, sectors, styles, duration and credit quality could materially improve the risk/reward of the World Portfolio since 1990.

Exhibit 42: Smaller assets and alternatives would have enhanced the investment opportunity set and shifted the efficient frontier up
Data since 1990 (assets are added when data becomes available)



Source: Bloomberg, Datastream, Preqin, Goldman Sachs Global Investment Research

Benchmark Repair — Fixing the World (Portfolio)

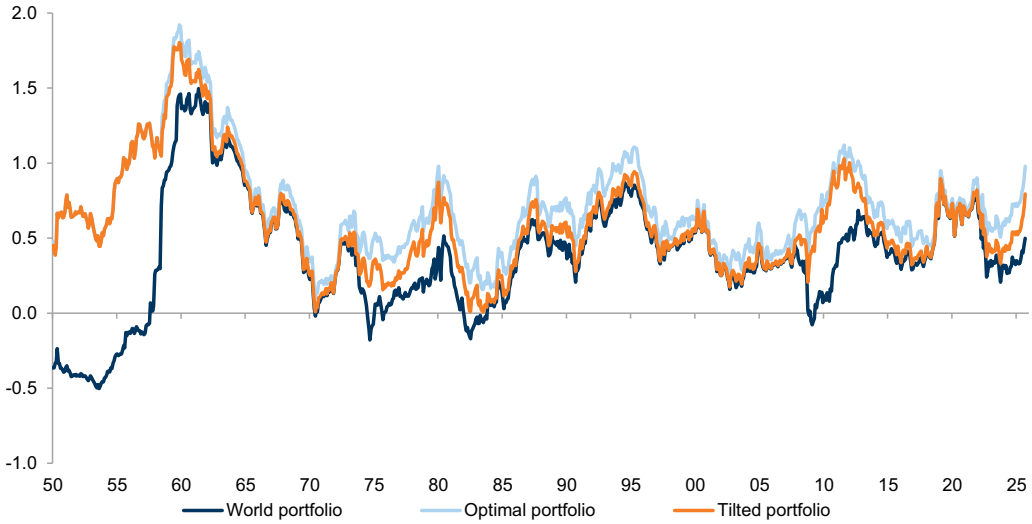
Fixing the World (Portfolio) — strategic tilting of global benchmarks

The current World Portfolio is unlikely to be optimal for most investors in the medium term. We recommend strategies to improve the risk/reward of the World Portfolio by actively managing the equity/bond/Gold mix, US exposure and harvesting diversification benefits from smaller assets and alternatives. We apply a strategic tilting strategy to the World Portfolio, which increases allocations based on prospective Sharpe ratio improvements – this allows us to incorporate return forecasts, extract implied returns and compare current World Portfolio weights to an optimised weights that are realistic in practice. *For details see Appendix 3 for on our strategic tilting methodology.*

(1) Finding the right balance — strategic tilting of equity/bond/Gold mix

Actively adjusting the mix of equities, bonds and Gold would have improved risk-adjusted returns materially vs. the World Portfolio benchmark (Exhibit 43). The average 10-year rolling Sharpe ratio of the World Portfolio benchmark since 1950 was 0.38 – the average of the optimal portfolio's Sharpe ratio (with the maximum Gold allocation is capped at 1/3) would have been 0.71 and our strategic tilting methodology captured a large amount of that improvement with an average of 0.61. This illustrates potential benefits from strategic tilting of the asset mix relative to a passive benchmark in order to adjust to structural macro regimes.

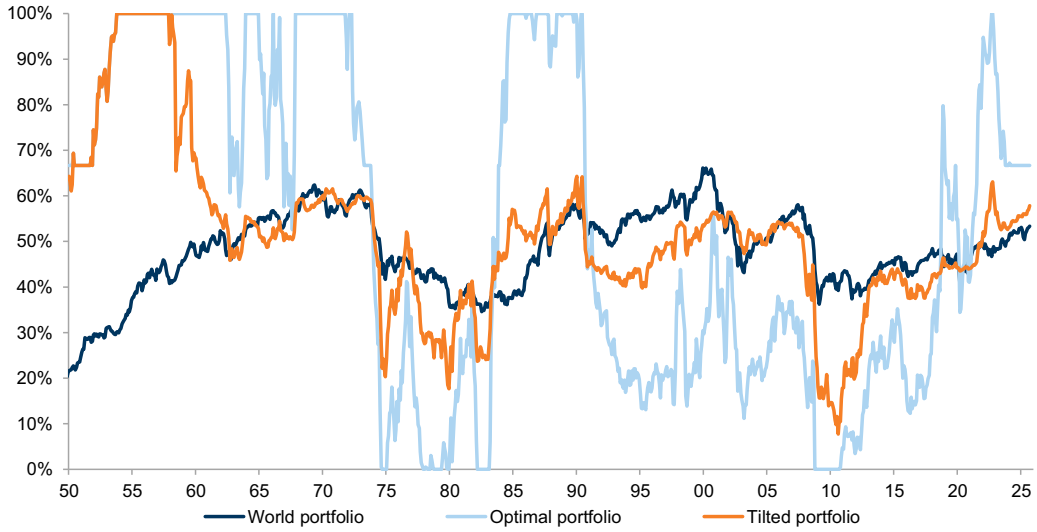
Exhibit 43: An actively tilted World Portfolio materially outperformed the benchmark
10-year rolling Sharpe ratios



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Avoiding the large equity bear markets during the 1970s, early 1990s, the Tech Bubble burst and the GFC, added most to Sharpe ratios but those are difficult to capture (Exhibit 44). However, prolonged favourable structural regimes, like the Golden 1950s and the post-GFC cycle, have also created opportunities to tilt more to equities. More recently, with strong equity performance coming out of the COVID-19 crisis, the benchmark weight in equities was similar to both the optimal portfolio and the result from our strategic tilting strategy, reflecting a more supportive structural macro regime.

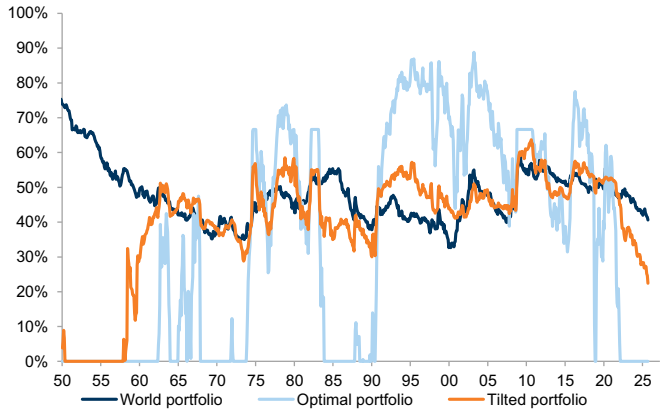
Exhibit 44: The equity weight in the World Portfolio has very seldom been optimal
10-year rolling optimal equity weight



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

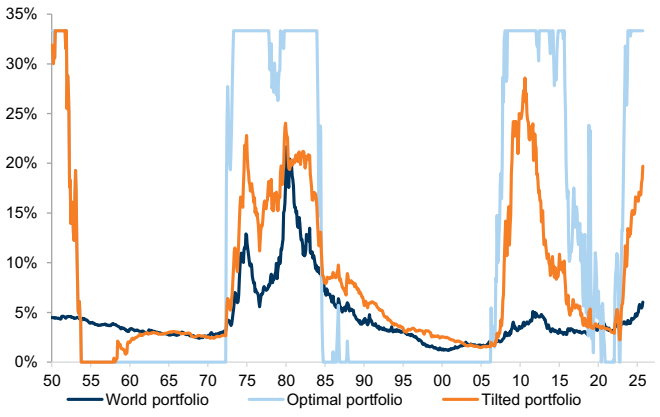
The bond weight mostly shifted inversely to the equity weight and has been below the World Portfolio weight recently (Exhibit 45). Since the COVID-19 crisis, bond allocations have been a significant drag on balanced portfolios – both the optimal portfolio and our strategic tilting strategy suggested a much lower weight than the benchmark. On the flipside large shifts in the Gold allocation reflect the potential value add to diversify inflationary shocks like during the 1970s and post the COVID-19 crisis but also FX debasement periods with a weaker Dollar, like around the GFC and more recently (Exhibit 46).

Exhibit 45: Recent optimal bond allocations were much lower than the benchmark weight
10-year rolling optimal bond weight



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 46: Gold allocations should have been much larger post the COVID-19 crisis
10-year rolling optimal gold weight

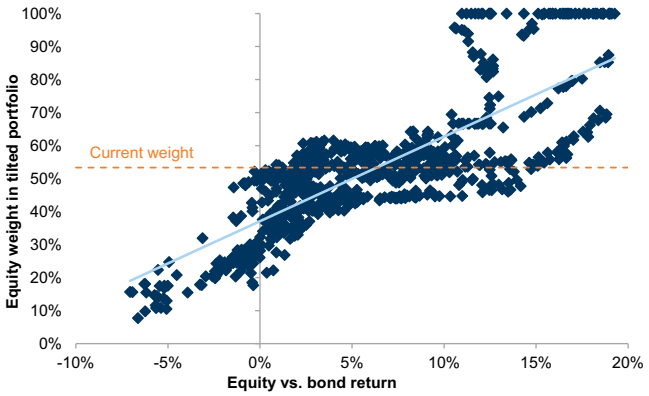


Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

The current weight of equities in the World Portfolio implies an equity risk premium of roughly 6% going forward based on our strategic tilting methodology (Exhibit 47). The current equity weight does not look unusually high or low – over longer time horizons equities generally outperformed bonds on average by close to 4-5% p.a. since 1900. On the flipside, the current weight of Gold in the wold portfolio benchmark is much lower than recent optimal weights, which would have been higher due to its strong

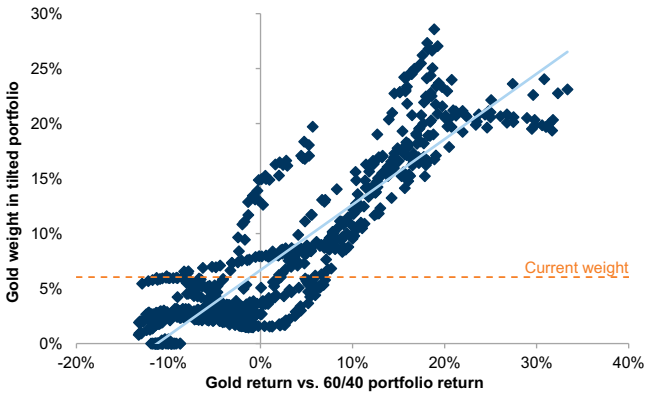
performance recently (Exhibit 48). This indicates the current World Portfolio is vulnerable to inflationary or FX debasement shocks, which often result in large 60/40 portfolio drawdowns with Gold outperforming. This points to a larger allocation to real assets and more targeted exposure within equities (see grey box below).

Exhibit 47: The current benchmark weight of 53% in the World Portfolio implies an equity risk premium of c. 6%



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 48: Current benchmark weights are much lower than recent Gold performance and fiscal dominance risks suggest

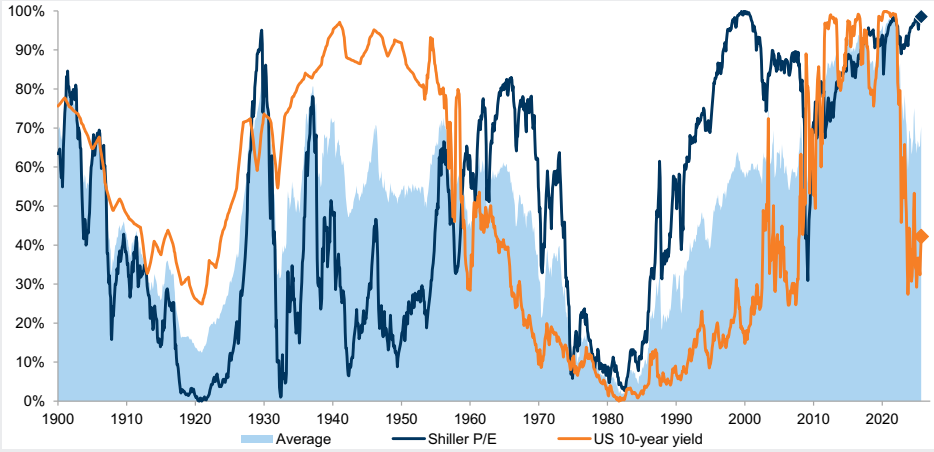


Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Balancing tailwinds from innovation with risks from inflation

The current valuation starting point for a US balanced portfolio is better than in 2021 but mostly due to higher bond yields (Exhibit 49). Equity valuations are elevated again with S&P 500 Shiller P/Es near their highs due to a combination of a better growth/inflation mix since the COVID-19 recovery and strong performance of mega cap Tech stocks, further boosted by AI optimism. Those elevated equity valuations might drag on long-term equity returns, also relative to bonds. But while US 10-year bond yields are closer to their long-term average, more positive equity/bond correlations due to higher inflation coupled with concerns on higher debt/GDP ratios and fiscal dominance argue against higher bond allocations.

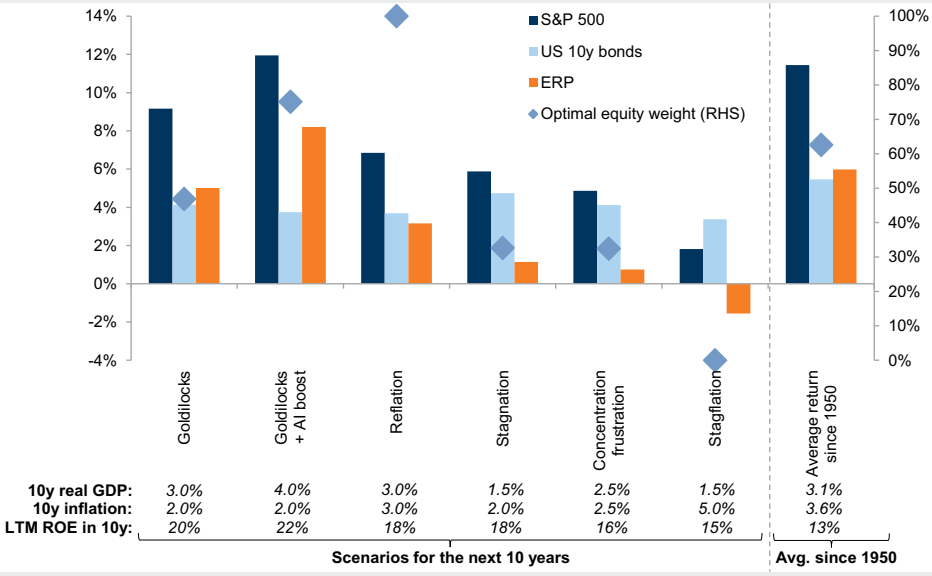
Exhibit 49: Equities expensive, bond yields near long-term average
Valuation percentile (since 1871)



Source: Robert Shiller, Haver Analytics, Goldman Sachs Global Investment Research

In our Strategic Balanced Bear research, we developed a framework for macro-based strategic tilting, combining valuations and structural macro conditions. Exhibit 50 updates our US long-term return forecast scenarios, including bullish scenarios based on innovation or bearish ones due to higher inflation or stagnation. A very bullish AI scenario, boosting equities or reflation suggests a higher equity allocations than the current World Portfolio weight. However, other scenarios such as stagnation, stagflation or an equity concentration unwind point to much lower equity allocations but also generally poor returns for both equities and bonds. To diversify structural regime risks, we believe investors need to capture tailwinds from innovation while balancing risk from inflation.

Exhibit 50: Structural regimes point to different long-term return forecasts
10-year return scenarios in function of different structural scenarios



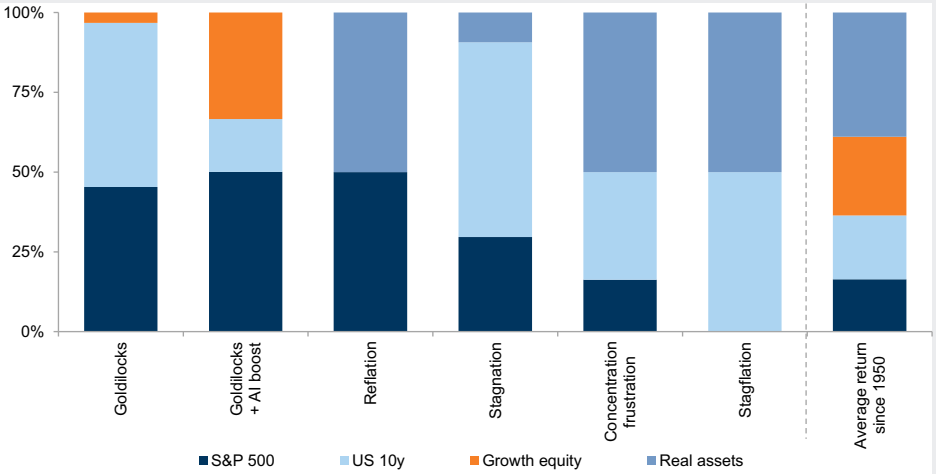
Source: Haver Analytics, Robert Shiller, Goldman Sachs Global Investment Research

Allocations to real assets, such as infrastructure stocks, TIPS or Gold, historically helped diversify structural inflation risks. The source of inflation matters for what works best – our commodities team recently reiterated the rising benefits of higher allocations to commodities, especially Gold, due to a combination of debasement risks and commodity supply concentration.

Allocations to growth stocks can provide more targeted exposure to higher productivity growth, which can also drive disruption for existing companies. Growth stocks have often outperformed during or ahead of periods with a material pick-up in productivity growth, especially in technology revolutions like the 1960s and 1990s, as well as more recently. This, of course, increases the risks of overshoots and bubbles, which points to more diversification across regions and companies linked to innovation.

Our strategic tilts based on the long-term return scenarios illustrate the benefits from allocations to growth stocks and real assets (Exhibit 51). Outside of an AI Goldilocks scenario, the average optimal allocation to equities is likely to be below the long-run average but in a lot of scenarios the long-run return outlook is not attractive for bonds, resulting in very different outcomes and large allocations to cash in different structural scenarios. However, if you include growth stocks and real assets in the opportunity set, the optimal asset mix across the different structural regimes is roughly 1/3 growth equity, 1/3 real assets and 1/3 bonds or safety assets.

Exhibit 51: A combination of real assets and growth stocks can protect from extreme structural cycle scenarios
Optimal allocations for the next 10 years

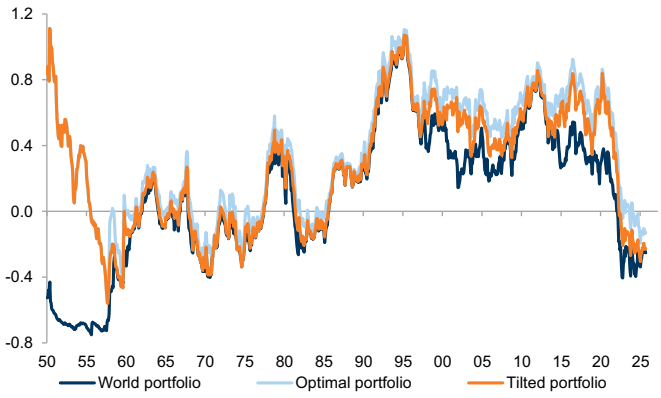


Source: Goldman Sachs Global Investment Research

(2) Strategic tilting of US assets and FX hedging

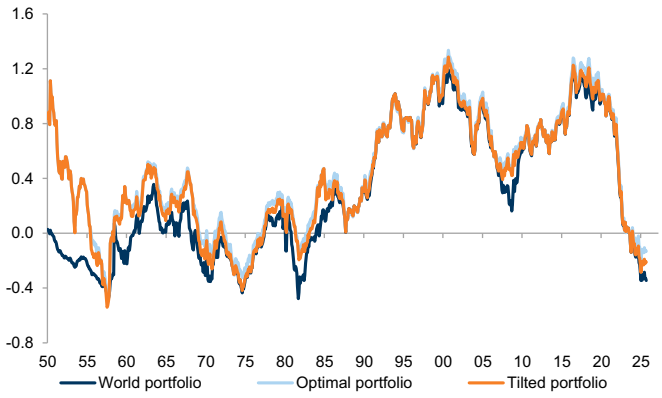
When it is better to stay home — more benefits from domestic bias in bonds
There were some benefits from strategic tilting of US vs. non-US bond allocations but less so when hedging FX (Exhibit 52). When fully hedging FX, as is common in fixed income, Sharpe ratios for the bond benchmark were higher at 0.30 vs. 0.10 unhedged and there was little benefit from strategic tilting (Exhibit 53). This indicates that most of the benefits from regional bond allocation in the medium term were due to FX rather than views on regional divergence in rates – and FX volatility is often higher than that of bonds, which weighs on Sharpe ratios.

Exhibit 52: There were some opportunities to tilt out of US bonds but mostly due to a weaker Dollar
10-year rolling Sharpe ratios of global bond portfolios



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 53: FX hedged bond allocations on average had higher Sharpe ratios but fewer tilting opportunities
10-year rolling Sharpe ratios of FX-hedged global bond portfolios

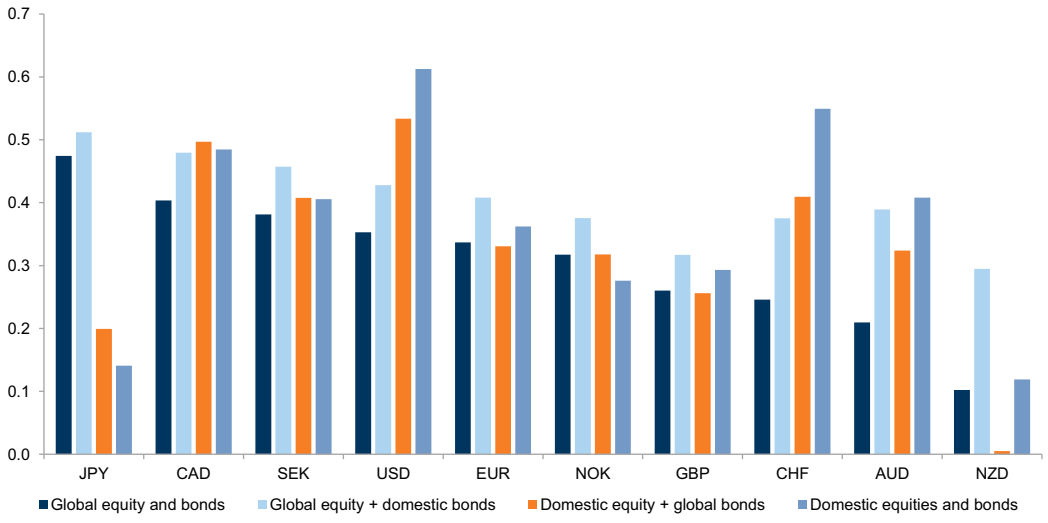


Note: Assuming that FX-hedged returns equal local currency returns.

Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

For most investors there is a case to favour domestic bonds given the costs and complexity of FX hedging. Since 1990, combining global equities with domestic bonds has generally offered the highest Sharpe ratios outside the US and Switzerland (Exhibit 54). In the US, strong domestic equity performance reduced the incentive to invest abroad, while Switzerland's robust Franc limited benefits from global assets. Japan saw the greatest advantage from global equities and domestic bonds.

Exhibit 54: Combining domestic bonds with global equities works for most investor domiciles
Sharpe ratios of different balanced portfolios by investor domicile since 1990

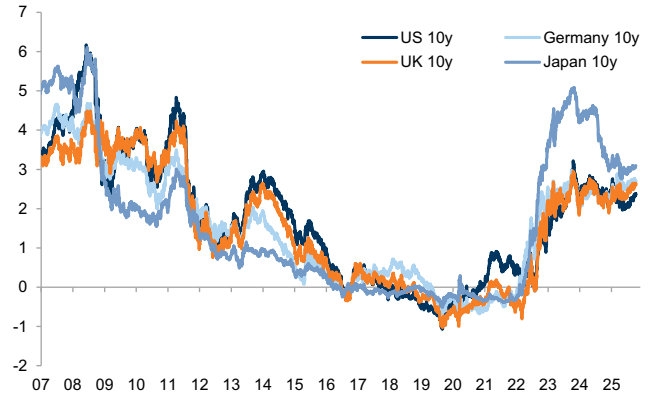


Source: Datastream, Goldman Sachs Global Investment Research

After the GFC, US investors had little reason to hold non-US bonds on a currency-hedged basis but FX-hedged US 10-year bonds regularly offered a yield pick-up for non-US investors (Exhibit 55) – this coupled with the size, liquidity and safe-haven status of treasuries supported higher allocations. But yield gaps have narrowed and concerns around US fiscal policy and Fed independence have increased – also Europe and Japan are less likely to face negative rates in the coming cycle due to fiscal spending, making US bonds less attractive for non-US investors.

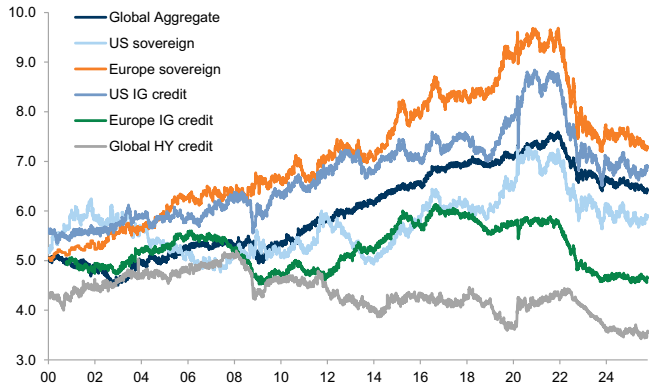
Investors also need to manage both regional and duration exposure in global bond benchmarks. With the potential for structurally steeper yield curves and more rates volatility due to fiscal risks, we would tilt towards shorter-duration bonds. Since the 2000s, duration in bond benchmark indices has generally increased as issuers were keen to lock in lower bond yields (Exhibit 56). Post the COVID-19 crisis, benchmark duration declined but remains higher for European sovereigns and US IG credit.

Exhibit 55: After the GFC, treasuries were regularly more attractive for EUR investors after hedging the currency
FX hedged 10-year bond yields for EUR investors



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 56: Bond duration increased up until the COVID-19 crisis
Effective duration for bond indices

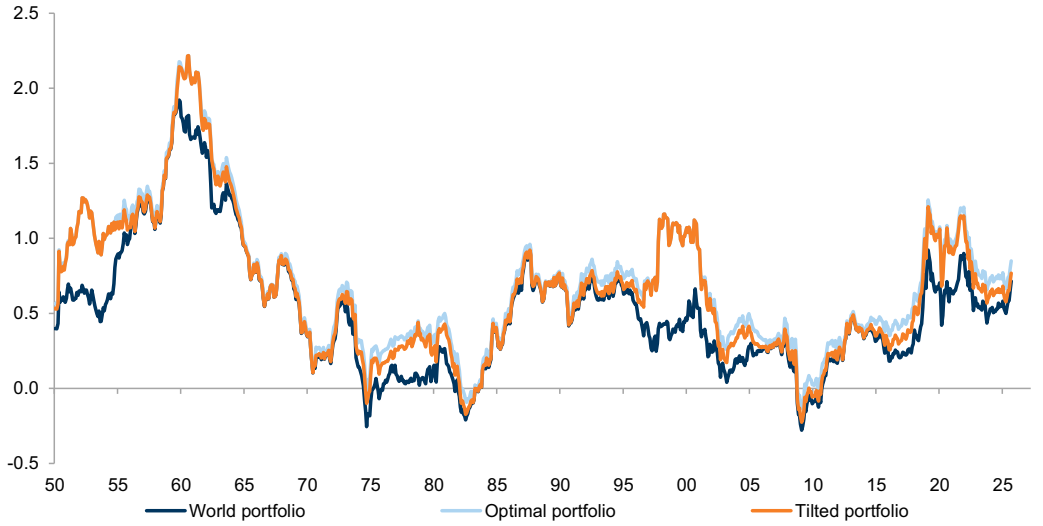


Source: Bloomberg, Goldman Sachs Global Investment Research

Diversification flirtation in equities — managing US dominance

Strategic tilting between US and non-US equities would have also materially improved risk-adjusted returns (Exhibit 57). The average 10-year rolling Sharpe ratio of the world equity benchmark since 1950 was 0.52 – the average of the optimal portfolio's Sharpe ratio would have been 0.71 and our strategic tilting methodology would have captured a large amount of that improvement with an average of 0.66.

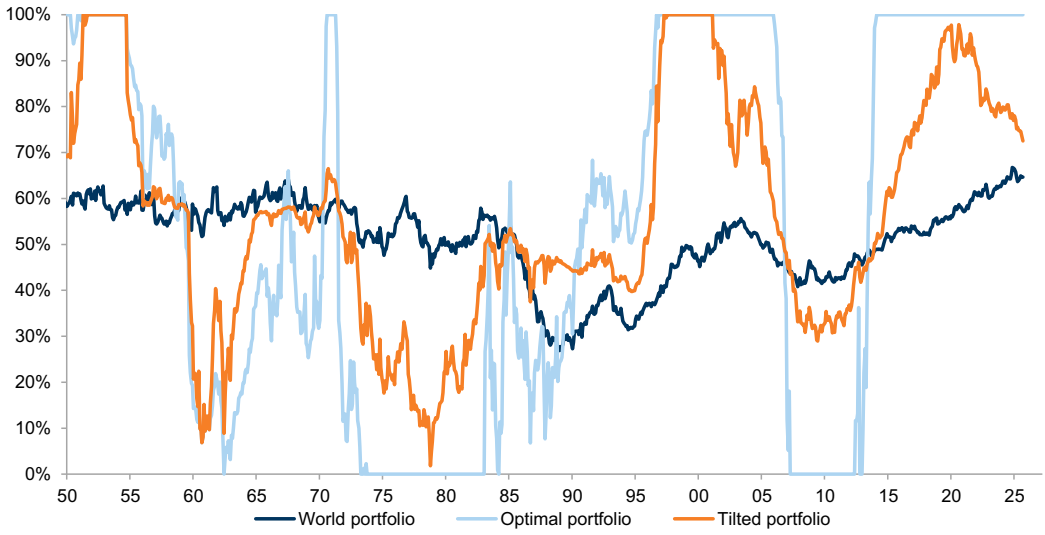
Exhibit 57: Material benefits from tilting vs. equity benchmarks since the 1990s
10-year rolling Sharpe ratios



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

But optimal US equity allocations were actually above the World Portfolio weights since the 1990s and during the Golden 1950s (Exhibit 58). On the flipside, during the 1970s and the financial bubble periods between the Tech Bubble burst and the GFC, lower allocations to US equities were better. The optimal strategic tilt was well above the benchmark weight post the GFC, but with the growing US equity weight and less risk-adjusted outperformance since the COVID-19 crisis, there is less of a gap now.

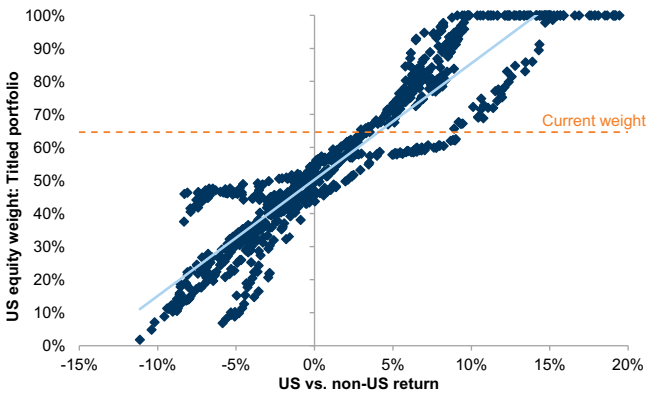
Exhibit 58: Since the 1990s, higher US equity allocations were better, but not before
10-year rolling optimal weight in US equities



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

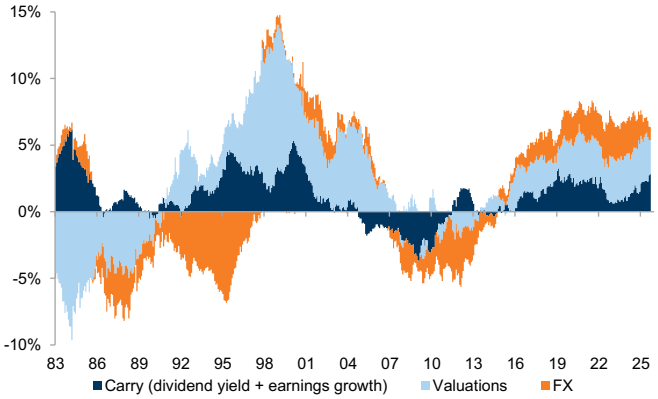
The current benchmark weight of US equities compared with historical strategic tilts implies a continued outperformance vs. non-US equities of roughly 4-5% in the next 10 years (Exhibit 59). This is broadly in line with the US vs. non-US equity return since the GFC, which was boosted by three tailwinds, which might fade in the coming years: (1) better carry to due stronger earnings growth and share buybacks, (2) rising relative valuations due to higher profitability and (3) a stronger Dollar trend (Exhibit 60).

Exhibit 59: The current equity benchmark weight is consistent with the US continuing to outperform non-US markets by 4-5% p.a.



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

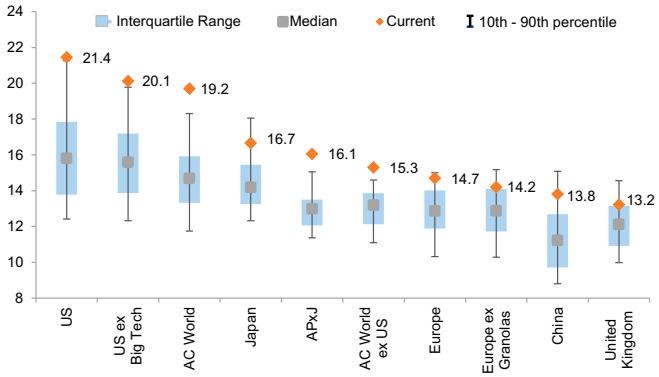
Exhibit 60: Multiple tailwinds for US equities since the GFC
Relative return decomposition of US vs. non-US equity performance (10-year rolling)



Source: Datastream, Goldman Sachs Global Investment Research

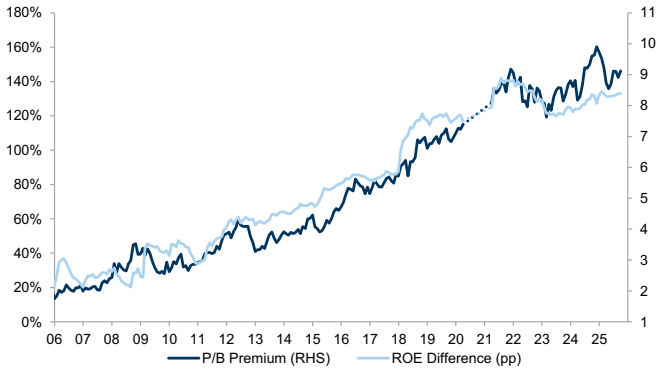
As our global strategy team highlighted, with higher US equity valuations and elevated stock concentration we expect more benefits from international diversification (Exhibit 61). Even excluding mega cap Tech stocks, US equity valuations are high on an absolute basis and relative to other markets. In large part, the higher US equity valuations can be explained by higher corporate profitability compared to most other markets (Exhibit 62). However, their relative ROE and growth advantage might be fading in the medium term, which would weigh on relative valuations. As a result it might be difficult for US equities to sustain their outperformance with less of a tailwind from valuations, earnings and the Dollar.

Exhibit 61: US equities are particularly expensive, even excluding large cap Tech stocks
12m fwd P/E multiple. MSCI Regions, STOXX 600 for Europe and S&P 500 for USA. Data since 2003



Source: Factset, Goldman Sachs Global Investment Research

Exhibit 62: US equities are more expensive due to better profitability (and growth)
US vs. non-US equities valuations vs. ROE



Source: Factset, Goldman Sachs Global Investment Research

FX hedge with edge — higher Dollar hedge ratios and allocations to EM

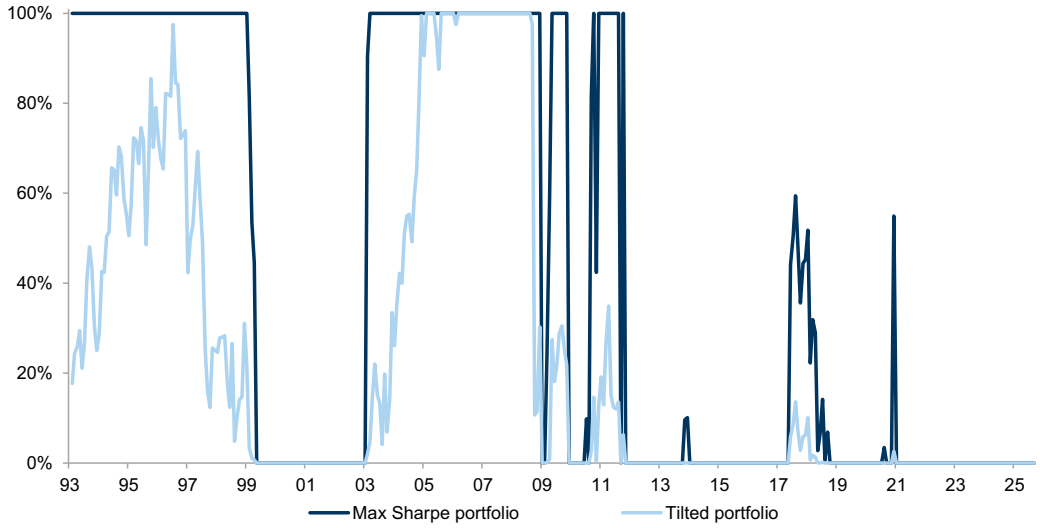
Higher FX risk poses a new challenge, especially for international equity investors. Fixed income investors, particularly those focused on low-risk bonds, tend to manage FX risk carefully already due to its high volatility relative to bonds. In contrast, international equity investors tend to hedge FX risk less as it has a smaller contribution to overall equity risk and FX tends to mean-revert in the medium term, reducing hedging benefits. Also, large cap companies are often already diversified in terms of revenue exposure.

The impact of FX and optimal hedge ratios varies by investor, depending on foreign asset exposure, home currency volatility, and 'risky asset' correlations. USD investors have been less affected as their portfolios are overweight domestic assets, and with the positive Dollar/equity correlation, foreign asset exposure has actually dampened risk recently. However, non-US investors are facing a larger drag on portfolio performance from a weaker Dollar. For example, for a EUR-investor, the optimal Dollar hedge ratio for US equities[8] was very low due mostly negative Dollar/equity correlations and the positive Dollar trend (Exhibit 63).

Optimal FX hedge ratios in the last 12 months have been much higher than in recent years for most non-US investors (Exhibit 64). This has been particularly true for European investors, for those in Japan and in Australasia. For more cyclical FX crosses the Dollar/equity correlations have turned less positive, pointing to higher but relatively less high Dollar hedge ratios. Based on available data from Australia, Canada, Denmark, Finland and Sweden, our FX team shows that a number of pension funds did hedge some of their Dollar exposure, but the shifts so far have been relatively limited.

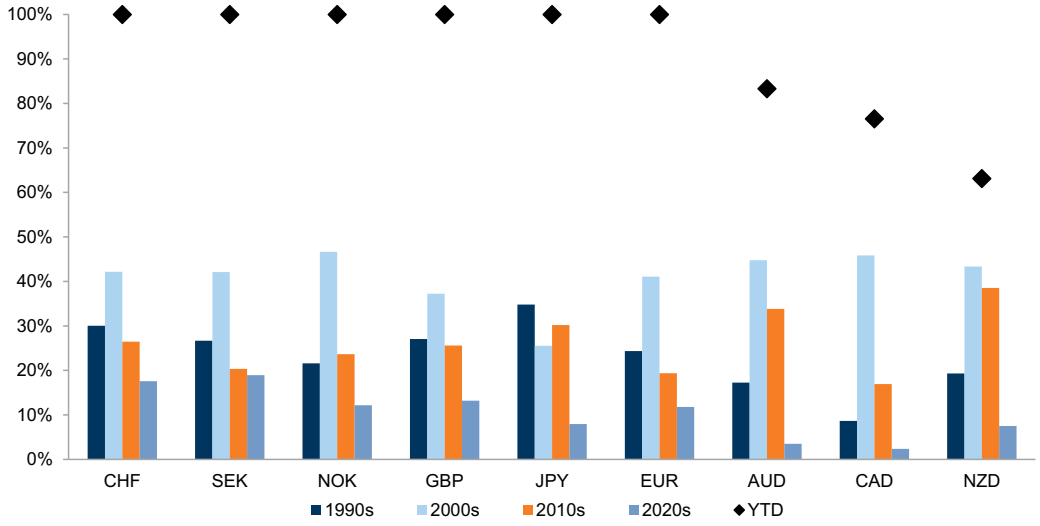
[8] We estimate the optimal FX hedge ratio based on the composition of the optimal portfolio made of unhedged and fully USD-hedged MSCI AC World equity. We FX-hedge only US equities within ACWI. For example if the portfolio with the highest Sharpe ratio is 80% USD-hedged equity and 20% unhedged, the optimal hedge ratio is 80%. We also use our strategic tilting methodology in order to avoid corner solutions and avoid large swings in hedge ratios.

Exhibit 63: Little benefit of hedging the Dollar post GFC
5-year rolling optimal USD equity hedge ratio for a EUR investor



Source: Datastream, Goldman Sachs Global Investment Research

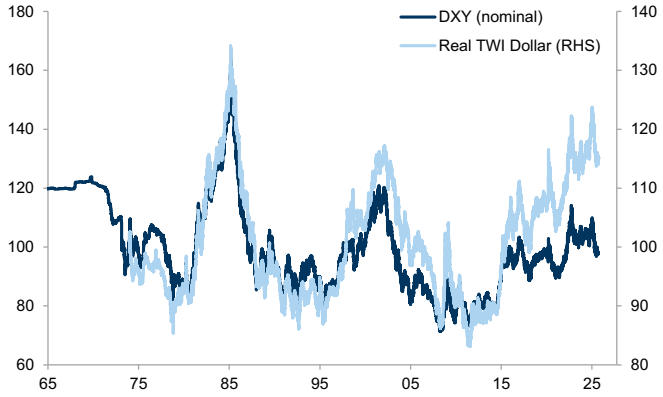
Exhibit 64: Optimal FX hedge ratios for global equity investors have picked up materially
Average 1-year rolling Dollar hedge ratio for for different investor domiciles



Source: Datastream, Goldman Sachs Global Investment Research

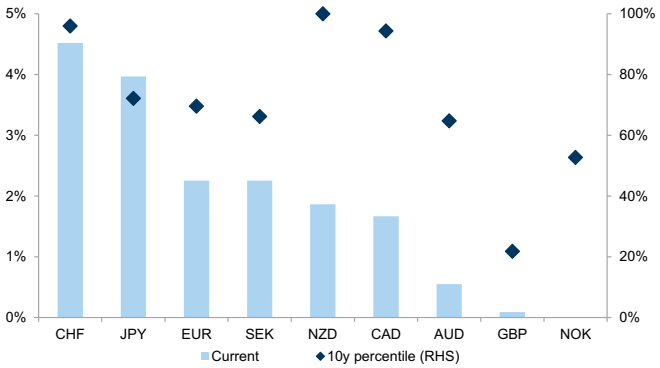
Even after the declines YTD, the real trade-weighted Dollar remains elevated (Exhibit 65). Our FX team expects the Dollar to depreciate further in coming months, because less exceptional economic and market performance no longer warrants its high valuation. Europe's growth-supportive fiscal shift and China's robust export sector argue for Euro and Yuan strength. This points to higher hedge ratios than in the post-GFC cycle, especially for equities. Hedging USD exposure can be costly, particularly for safer currencies like CHF, JPY, and EUR, but is less expensive for cyclical currencies with smaller rate differentials such as GBP (Exhibit 66).

Exhibit 65: Dollar is still expensive from a long run perspective



Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 66: Hedging the USD is currently still costly
Based on 1m forward, annualised



Source: Goldman Sachs FICC and Equities, Goldman Sachs Global Investment Research

While more Fed cuts would lower hedging costs, the drag from the cost of FX hedging can change the optimal allocation to US equities. As Exhibit 67 shows, for EUR investors the optimal allocation to US equities post GFC was lower for higher FX-hedged ratios due to hedging costs but also as the Dollar dampened risk of an unhedged holding. In fact, the recent optimal allocations to US equities for EUR investors have shifted below the US benchmark weight. Going forward, investors will have to incorporate FX risk and a hedge ratio assumption in their regional equity allocation decisions.

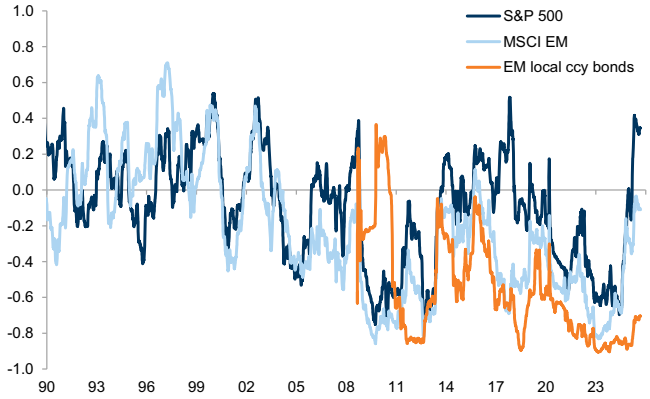
Exhibit 67: Higher hedge ratios can change optimal US equity allocations
5-year rolling optimal allocation to US equities in global equity benchmark for a EUR investor with different USD hedge ratios

Source: Datastream, Goldman Sachs Global Investment Research

Instead of FX hedging, allocations to EM assets and Gold or CHF can lower Dollar risk. EM assets, which are negatively correlated with the Dollar, can reduce the drag from weaker Dollar trends for US asset-heavy portfolios (Exhibit 68). Also, areas like China Tech might help diversify disruption risks for mega cap US Tech companies. Finally, as mentioned earlier, Gold tends to have a negative Dollar beta and can protect FX debasement risk. This year the Dollar/S&P 500 correlation has turned positive, while

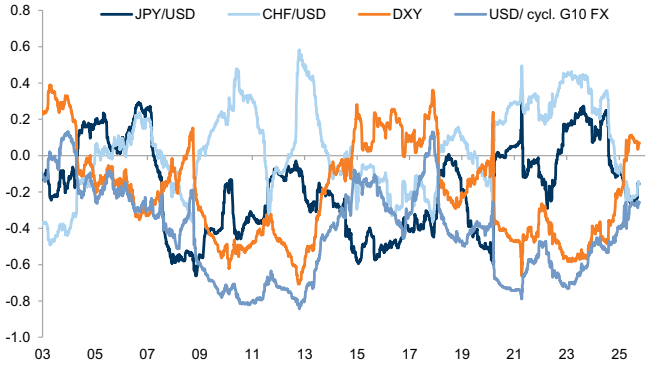
CHF and Yen have become more 'risk off', safe haven FX such as the CHF likely provide more diversification benefits as long as local real yields remain sticky (Exhibit 69).

Exhibit 68: EM assets can help diversify Dollar risk with negative correlations
12m rolling correlations with DXY (weekly changes)



Source: Bloomberg, Datastream, Goldman Sachs Global Investment Research

Exhibit 69: CHF and Yen have become more negatively correlated with the S&P 500 again
12m rolling correlation with S&P 500

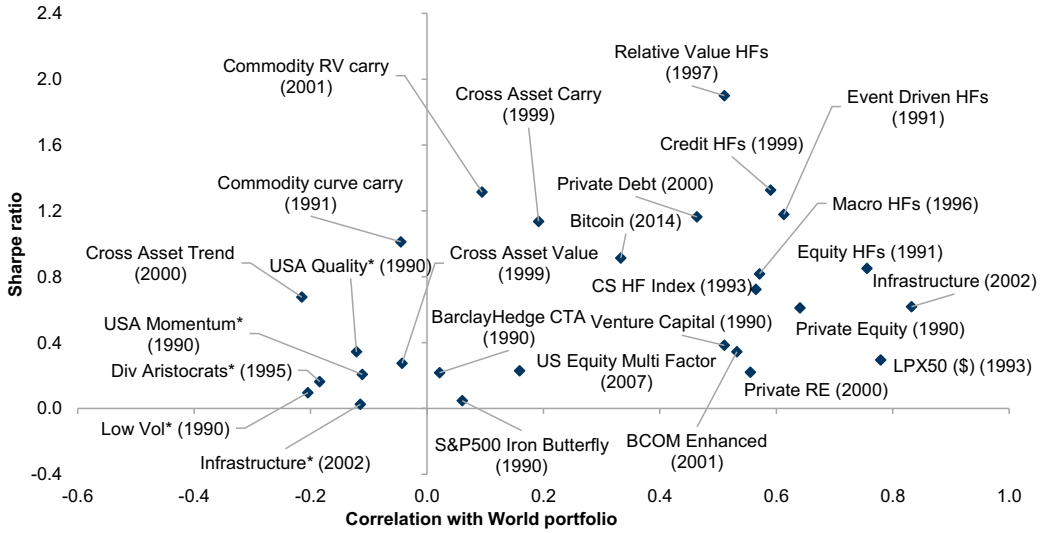


Source: Bloomberg, Goldman Sachs Global Investment Research

(3) Looking for alternatives — diversification outside of benchmarks

Larger allocations to smaller assets, including sectors and styles, cryptocurrencies and alternatives could historically improve risk-adjusted returns of the World Portfolio. This was particularly the case when return potential and diversification in traditional assets was more limited. Exhibit 70 shows several of the assets and strategies that might enhance the World Portfolio in the medium term due to high Sharpe ratios or diversification benefits (we discussed a lot of those in more details in Balanced Bear Despair Part 3 and Part 4).

Exhibit 70: Few assets have a low correlation to the World Portfolio but high Sharpe ratio
Data since 1990 (where available, start date shown in brackets)



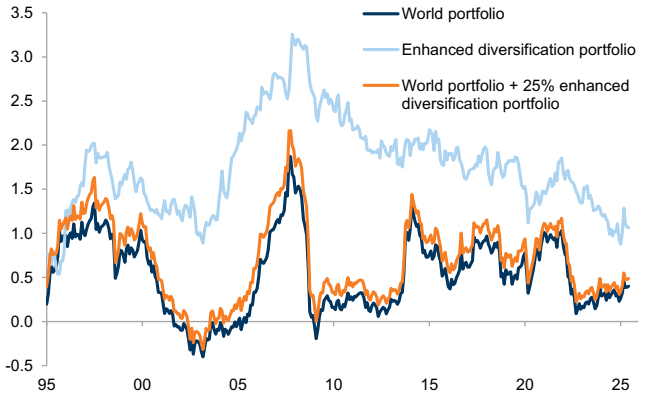
Note: *relative performance vs. the market, scaled by relative volatility, fully funded.

Source: Bloomberg, Datastream, Preqin, Goldman Sachs Global Investment Research

We build a risk parity portfolio combining smaller assets such as bitcoin, infrastructure stocks (vs. MSCI World), low volatility and dividend aristocrats stocks (vs. S&P 500

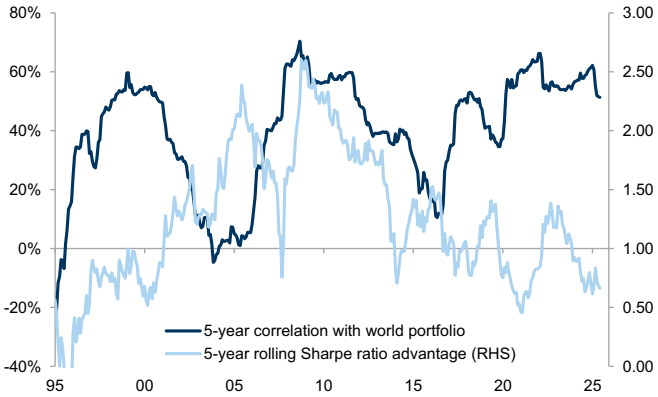
equal-weight), and alternatives such as commodity carry, cross-asset trend following, hedge funds and private markets.[9] Allocating 25% to that 'enhanced diversification portfolio' improved diversification of the World Portfolio since 1990 and increased risk-adjusted returns markedly –the average 5-year rolling Sharpe ratio of the World Portfolio since 1990 was 0.52, which increases to 0.71 (Exhibit 71). The benefits were larger in the run-up and post the GFC due to both a lower correlation with the World Portfolio and better risk-adjusted returns (Exhibit 72). **We think the benefits from allocations to smaller assets and alternatives are likely to increase in the medium term again, both from relative performance and lower correlations.**

Exhibit 71: Alternatives had a higher Sharpe ratio on average but the gap to the World Portfolio has narrowed
5-year rolling Sharpe ratios



Source: Bloomberg, Datastream, Preqin, Goldman Sachs Global Investment Research

Exhibit 72: Recently alternatives were more correlated and relative Sharpe ratios were lower
Data for 'Enhanced diversification' portfolio of smaller assets and alternatives



Source: Bloomberg, Datastream, Preqin, Goldman Sachs Global Investment Research

Private markets have grown materially, and are often seen as a potential way to enhance returns with less volatility via very active management of underlying assets. They allow investors to gain exposure to assets that are not accessible through public markets, for example AI-related technology or infrastructure and private credit, which can have different credit quality and covenants compared with public credit.

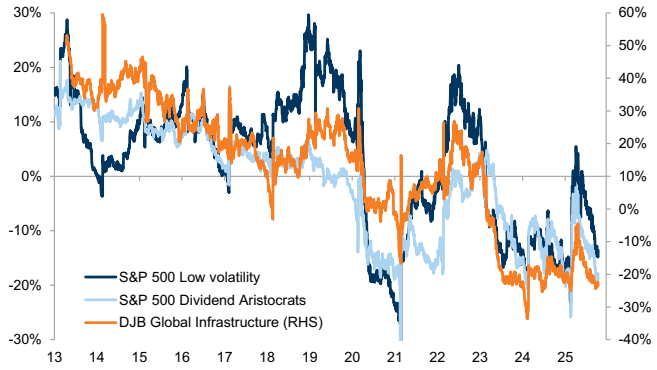
Investors can isolate areas within equities, e.g. styles and sectors, to improve the risk/reward of the World Portfolio. Selective defensive quality stocks can diversify US growth and Tech concentration risks – they tend to outperform in 'risk off' but tend to have similar risk-adjusted returns to equity benchmarks. Defensive indices such as the S&P 500 Low Volatility Index and the S&P 500 Dividend Aristocrats Index have materially de-rated in the last decade (Exhibit 73). The same has been true for the DJB Global Infrastructure Index, which should be a good stagflation hedge.

Hedge funds, CTAs and liquid alternatives tend to have low correlations with the World Portfolio and often better Sharpe ratios. Liquid alternatives also offer daily liquidity – those include alternative risk premia, which are long/short strategies across assets with documented risk/reward and diversification potential. In a lot of cases they are replicating or following strategies similar to hedge funds. Their correlations with the World Portfolio varied over time – cross-asset trend-following strategies and CTAs

[9] Assets are added when they become available. We then target a volatility of 8% to match the world portfolio risk. We assume leverage cost at the return of 3m tbills. For assets with quarterly data we again desmooth and upsample values to monthly frequency.

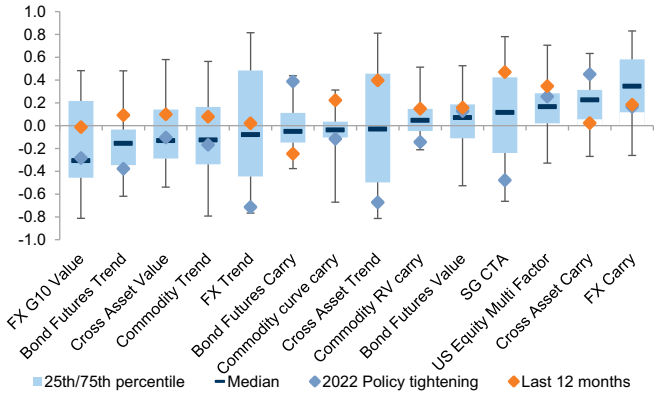
provided diversification in 2022 but performed poorly YTD. Commodity curve carry has a particularly low and stable correlation with the World Portfolio (Exhibit 74).

Exhibit 73: Defensive quality assets have de-rated and can diversify momentum stocks
12m forward P/E discount/ premium to MSCI World



Source: Bloomberg, Goldman Sachs Global Investment Research

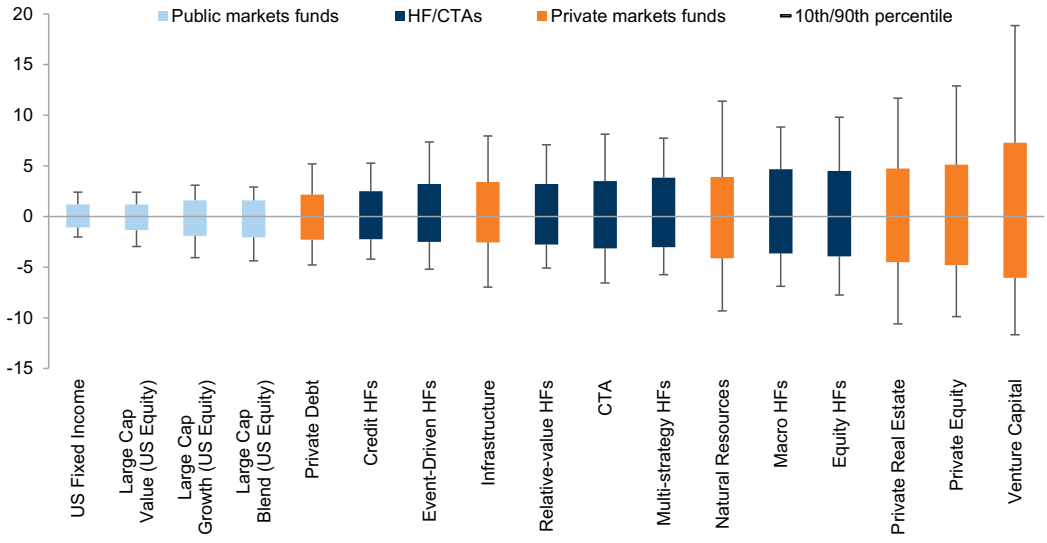
Exhibit 74: Correlations with the World Portfolio vary over time but few have negative 'risk off' correlation
12-month rolling correlation with World Portfolio (weekly returns, data since 1990)



Source: Bloomberg, Goldman Sachs Global Investment Research

Performance of alternatives tends to be highly dispersed and not comparable to public markets, especially for hedge fund strategies and private markets (Exhibit 75). Hedge funds can be opaque, illiquid, and often come with high costs. Selecting, analyzing, and allocating to hedge funds requires a different toolkit than traditional assets and more due diligence.[10] And private markets investments often carry more risk when considering illiquidity, less frequent performance reporting and embedded leverage. For hedge funds and private markets the dispersion of performance across managers also tends to be large, which means manager selection is also critical.

Exhibit 75: Within alternatives, manager selection is much more important
Excess return vs. median (5-year annualised return/ net IRR, in %, since 2015)



Source: Bloomberg, Morningstar, Preqin, Goldman Sachs Global Investment Research

[10] See Lhabitant (2025) for a recent discussion of the importance of hedge fund manager selection. A similar issue with alternative risk premia and strategies is data availability and comparability. Often, performance history is limited or backtested and design, implementation and costs vary with providers.

Appendix 1: Estimating the World Portfolio

Estimating the World Portfolio requires the combination of multiple data sources due to different history, data frequency and coverage. Ibbotson et.al. (1985) was one of the earliest attempts to estimate the global market portfolio based on annual data – more recent studies with higher data frequency or broader coverage include Doeswijk et.al. (2014, 2019), Jordà et.al. (2015) and Gadzinski et.al. (2018, 2021).

We create two versions of the World Portfolio: (1) a long-term proxy since 1950 using monthly data for a reconstructed, historical universe of global equities and bonds (mostly sovereign) and Gold, (2) an investable index since 1990 using mostly daily data for a broader universe comprising benchmark indices for global equities sovereign bonds, credit, real estate, private markets, cryptocurrencies and Gold. Recent data history is of higher quality and with better coverage – we extend this data with different data sources, using scale factors to make things comparable if applicable. For markets that do not have history available, we make estimates using a combination of performance and net issuance/ supply.

Since 1990 (daily returns)

For equities, we use the MSCI AC World index and respective market cap estimates, which are scaled up to adjust for a free-float adjusted market cap factor and, additionally, with a factor estimated based on the FTSE Allcap index to account for a broader coverage universe including small and micro caps. The MSCI Indices also allow for easy splits by sector and country since 2000.

For bonds, we use the Bloomberg Global Aggregate Index, which covers investment grade debt including treasury, government-related, corporate and securitized fixed-rate bonds from both developed and emerging markets issuers. We then add global high yield credit, global inflation-linked bonds and US municipal bonds. Where there is no history on market values or performance available, we backfill data based on broader indices and historical changes. We can also estimate subsets of the Bloomberg global aggregate based on Bloomberg indices – we estimate a global credit aggregate based on the Bloomberg Global Credit index with the Bloomberg Global High Yield index added. We scale market values up to adjust for free-float and include the Fed's SOMA holdings of US sovereign bonds.

For Gold, we use estimates of above-ground supply from the World Gold Council, with history since 2000. To capture only investable Gold we exclude Jewellery supply, which leaves the categories Central Banks, Private Investment, Bars & Coins and ETFs.

For private markets, we use Preqin data on both assets under management and performance, with data available since 2000. We use the Preqin private capital indices to calculate performance – they include private equity, credit, infrastructure, real estate, venture capital and natural resources. Before that we use the private equity index from Cambridge associates. To get more realistic volatility and correlation estimates, we de-smooth quarterly return series (see also Geltner (1993)). We use returns of listed proxies to mark to market the performance of private markets within the quarter, adjusting the quarterly proxy returns to match those of the de-smoothed private capital indices. We use the Russell 2000 as a proxy for private equity (Phalippou et al. (2018) showed that the average buyout fund return is similar to that of a typical small-cap

index), Nasdaq 100 as a proxy for venture capital, DJ Brookfield Global Infrastructure for private infrastructure, leveraged loans for private credit, and FTSE NAREIT for private real estate.

For crypto, we combine the 10 largest cryptocurrencies (Bitcoin, Ethereum, etc.) based on their current value in an index which serves as a proxy for the size of the overall market. Bitcoin remains the largest cryptocurrency and has recently become more dominant again. We also calculate value-weighted daily indices since 2014, to track performance of the universe.

Since 1950 (monthly returns)

We estimate a proxy for the World Portfolio based on global equities, bonds and Gold. For global equities and bonds we use monthly data estimates in the same way as since 1990 – before that we backfill data based on a variety of sources.

For equities, we use MSCI AC World going back to 1990. The market cap of MSCI AC World in 1990 (scaled up as discussed above) is then extended to 1940 based on y/y changes in World equity market cap from Global Financial Data. Bottom-up aggregates from Datastream are used to compute the equity total return and country weight within global equities back to 1980. S&P 500 economic sector indices are used to compute the sector weights within US equities since 2001. We use a combination of sources from historical national data, central bank statistics as well as Global Financial Data to backfill the history for total return indices and the country and sector weights back (see also Kuvshinov et.al. (2022)).

For bonds, we use a proxy based on G10 sovereign bonds. The weight of each country is based on the market cap of Bloomberg Global Aggregate Treasury indices (extended using the y/y change in market cap of ICE BofA Government bond indices) since 1991 for all countries but the US, for which we use the ICE BofA US Treasury index to include the SOMA holdings. The country weights before 1991 are based on the Central Government Debt data from the IMF (we scale down the debt outstanding for Italy and Sweden to match the lower amount of marketable bonds outstanding in 1990 and exclude Greece before 2000). Y/y changes in General Government Debt are used to extend the Central Government Debt amounts. A proxy of the market value of G10 bonds is computed by dividing the market value of US marketable debt from the Federal Reserve Bank of Dallas (adjusted by the % of outstanding debt with maturity < 1-year) by the weight of US bonds within G10. Monthly changes in the market cap proxy for G10 are used to extend the market value of bonds before 1990. The total return of bonds is based on Bloomberg Global Aggregate Treasury indices extended with ICE BofA Government bond indices. An historical proxy of the total return for US, Japan, UK, Germany, France, Italy and Spain bonds is obtained by combining the total return of 10y bonds and 3m bills of these countries to match the duration of US Treasuries. The average return of Germany, France, Italy and Spain is used as a proxy for the other Euro area countries, and the average return of G4 bonds is used as a proxy for the other G10.

For Gold, we use again estimates of above-ground supply from the World Gold Council, with history since 2000. To capture only investable Gold we exclude Jewellery supply, which leaves the categories of Central Banks, Private Investment, Bars & Coins and ETFs. For supply estimates before 2000 we backfill based on historical supply growth. Monthly Gold prices are from Bloomberg.

Appendix 2: Estimating Global Asset Allocations

The analysis covers three investor categories: *households/non-profits*, *insurance/pension funds*, and *non-money market investment funds*. All data is expressed/converted into billions of US dollars and aggregated into cash (including money market instruments, where available), equity, and debt. We do a look-through approach based on aggregate national data on asset allocations for insurance and pensions to estimate indirect equity/bond exposure. We do the same also for investment fund holdings by households, which we break down into the asset classes based on the aggregate national data on their asset allocations.

Quarterly OECD non-consolidated financial accounts are used for most countries: Denmark (from 1999), Canada (1990), Euro area aggregate (1999), Norway (1995), Sweden (1994), and the US (1952). Annual OECD data is used to extend time series for Denmark and Sweden (from 1994) and Switzerland (from 1995). For countries with incomplete OECD coverage, additional sources are used. Euro area data before 1999 is reconstructed from national accounts of member countries (18/20), excluding Cyprus and Malta. UK and Switzerland (from 1999) data is sourced from national financial balance sheets. Japan and Australia required category-level calculations from national accounts and were complemented with external datasets. Finally, New Zealand data is sourced from RBNZ and NZ SuperFund data.

To ensure homogeneity across datasets, adjustments were made for Japan, Switzerland, Australia, and New Zealand.

For Japan, the *households/NPISH* is computed as the sum of the two components. *Insurance/pension funds* include both private and public (GPIF) pension assets. *Non-money market investment funds* refer to securities investment trust management companies. *Investment fund shares or units* are calculated as the sum of investment trust beneficiary certificates and outward investment in securities. In Switzerland, investment fund shares or units refer to collective investment scheme units (vested benefits/pillar 3A), excluding insurance and pension schemes. In Australia, *insurance/pension funds* include pension funds and both life and non-life insurance, as well as other superannuation assets. For New Zealand, *insurance/pension funds* include life insurance, KiwiSaver, and other superannuation assets (including NZ SuperFund), which is split historically as 75%/5% in foreign/domestic equities and 18%/2% in foreign/domestic debt. *Non-money market investment funds* include retail and wholesale unit trusts.

Data on foreign holdings of US equities and bonds, as well as US holdings of foreign securities, is sourced from Treasury International Capital (TIC) data from US Treasury data. This includes US corporate stocks and debt (treasury, agency, corporate, and other bonds) held by foreign investors and, conversely, Rest of the World (RoW) equities and debt held by the US. Where a domestic/foreign breakdown is not directly available, the *total* equities held by domestic investors are estimated to be: *A)* the total domestic equity issued, minus *B)* domestic equities owned by foreign investors, plus *C)* foreign equities held by domestic investors. Domestic equities held by domestic investors is the difference between the first two (i.e A-B).

Appendix 3: Strategic Tilting around a Multi-Asset Benchmark

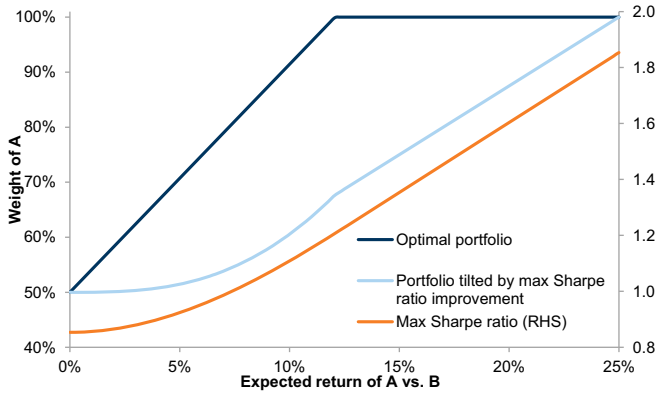
The original idea of strategic tilting was based on the potential for long-run mean reversion in valuations, especially from extremes. Based on long-term return estimates, an asset allocation is adjusted relative to a benchmark with the aim of adding risk-adjusted performance vs. a static benchmark. Compared with most tactical or dynamic asset allocation approaches, the focus is on a longer investment horizon, e.g., 5-10 years. Also, the frequency of adjusting the portfolio should be much lower.

Mean-variance optimisation allows you to find the optimal asset mix that achieves the highest Sharpe ratio, i.e., the optimal portfolio. That said, one of the main drawbacks of the optimal max Sharpe portfolio is its high sensitivity on the inputs, in particular expected returns. As a result weights of the optimal portfolio can swing widely for small changes in expected returns. This is unrealistic in practice, in particular for investors with a benchmark allocation: the optimal portfolio can suggest large tilts away from the benchmark which deliver small gains in risk-adjusted terms.

For more realistic tilts, we first find the optimal portfolio and compute the difference between its Sharpe ratio and that of the benchmark portfolio, i.e., the max Sharpe ratio improvement. Then, we set the allocation to the optimal portfolio to be proportional to that improvement – the rest is allocated to the benchmark. The final allocation will be close to the benchmark if the optimal portfolio offers only a small improvement, but near the optimal portfolio if the improvement is large (we set a 100% allocation when the improvement is above its 90th historical percentile, but this can be adjusted for more aggressive or conservative tilts).

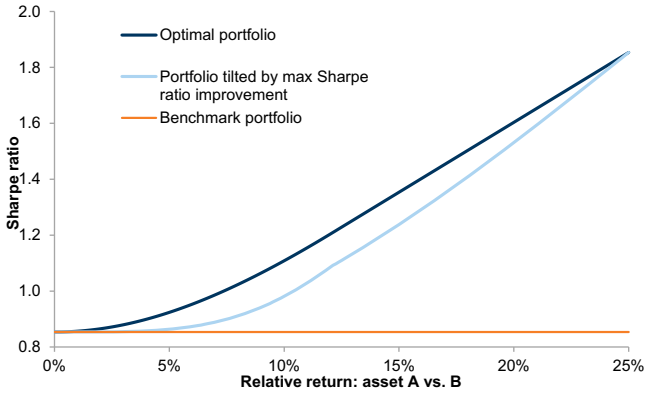
The stylized example below shows the benefits of this approach. Let's consider a 50%/50% benchmark portfolio of 2 assets, A and B. The combined expected return of the benchmark is fixed (to 6%) but the relative return of A vs. B can range from 0% to 25%. Exhibit 76 shows the sensitivity of the optimal portfolio to the inputs: even for small differences between the expected returns of the two assets, the allocation changes quickly despite the max Sharpe ratio achievable improving slowly. On the other hand, scaling the tilt based on the max Sharpe ratio improvement would increase the tilt more slowly for small relative returns. Exhibit 77 shows the resulting Sharpe ratio of both portfolios and the benchmark.

Exhibit 76: Strategic tilting based on expected Sharpe ratio improvements



Source: Goldman Sachs Global Investment Research

Exhibit 77: Improvement in Sharpe ratio for strategic tilting relative to Markowitz optimal portfolios



Source: Goldman Sachs Global Investment Research

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Disclosure Appendix

Reg AC

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