CAPITAL MARKETS

REPORT

CFA Institute Research & Policy Center

The Performance of the 60/40 Portfolio: A Historical Perspective

Nga Pham, CFA, Bei Cui, and Ummul Ruthbah

Executive Summary

This report highlights the critical role of asset allocation in shaping long-term investment returns, with a particular focus on the traditional 60/40 equity/bond allocation model commonly used by pension funds. We analyse how the 60/40 model has performed over time and the challenges it may face in today's shifting economic landscape. The first of a two-part series, this report focuses on the historical performance of the 60/40 strategy. The second report will assess the effectiveness of this approach as a retirement investment strategy in the future.

We used the Dimson–Marsh–Staunton (DMS) Global Investment Returns database to study performance data. The dataset includes 122 years of nominal and real returns of stocks, Treasury bills, Treasury bonds, inflation rates, and exchange rates for 35 countries and five composite regions. This study focuses on Australia, Japan, the United Kingdom, and the United States, referencing the European region and the world index, when applicable, for benchmarking.

The research delves into the performance of stocks and bonds across different periods, revealing that the correlation between these asset classes is neither static nor consistently negative. This lack of consistent correlation has significantly influenced the dynamic performance of the 60/40 portfolio during the past 122 years.

Our research highlights the diverse fortunes experienced by different countries and by different generations within each country, with baby boomers around the world generally enjoying favourable market conditions and superior overall 60/40 portfolio performance compared with other generations, especially millennials. The generational differences are less pronounced in the Australian and US markets, thanks to more stable long-run investment returns.

February 2025

CONTENTS

Many investors were caught unprepared by the simultaneous decline in stocks and bonds in 2022, which challenged the classic 60/40 equity/bond portfolio's diversification effectiveness. Diversification benefits are still pronounced in the long term, however, with mitigated volatility and drawdowns. In the long run, the 60/40 portfolio produced positive returns in real terms in all markets examined, ranging from the lowest value of 2.95% per annum (p.a.) in Japan to 4.97% p.a. in Australia.

Japan was also the riskiest market among the four, with the highest volatility and maximum drawdowns of the 60/40 portfolios. The Japanese investment opportunity set was also the least efficient across different historical periods. In Japan, most allocation strategies would result in more risk for the same level of return, compared with the investment opportunity sets in other markets.

We also examine the benefit of international diversification in the context of the 60/40 portfolio. Our findings indicate that the efficacy of international diversification varies. International diversification has been quite beneficial in Japan and the United Kingdom but less so in Australia and the United States, where domestic investments have offered higher returns, including risk-adjusted returns.

Additionally, our research explores the integration of commodities, showing that adding them as an alternative asset class can enhance diversification benefits. Further expansion of 60/40 portfolios to include commodity, private equity, infrastructure, real estate, inflation-linked Treasury bonds, and high-yield credits improved portfolio return but also increased risk, thus reducing the Sharpe ratio. Adding various asset classes, especially alternatives, has substantially changed the investment opportunity sets. Especially when Bitcoin is considered in the portfolio, the opportunities for exceptionally high returns come at the cost of extremely high volatility. Because of limited data availability, we observe this dynamic only in the short term.

This report identifies some critical considerations for investors before they decide to use the 60/40 allocation strategy:

- Be cautious of overreliance on some periods of negative correlations between stocks and bonds. In the long run, because the correlation between these two major asset classes has not been consistently negative, consider diversifying beyond the traditional 60/40 allocation.
- Tailor investment strategies to the specific circumstances and goals of different generations. Market conditions and investment outcomes have varied significantly across generations. In some markets, baby boomers have generally enjoyed more favourable conditions than millennial investors.
- Evaluate market-specific strategies. Historically, the Japanese market has exhibited higher volatility and lower investment efficiency. Be mindful of these characteristics when considering Japanese assets, and seek alternative strategies or hedges to mitigate risks.
- Exercise caution when diversifying internationally. Although adding exposure to the world's broad market has benefited investors in some regions, such as Japan and the United Kingdom, it has had less impact in Australia and the United States.
- Evaluate alternative assets carefully. Although adding commodities and other alternative assets can enhance diversification and potentially boost returns, in some cases these additions can increase portfolio risk and may not produce a higher Sharpe ratio.
- Carefully consider both risk tolerance and investment horizon. When evaluating the role of high-risk alternative assets such as Bitcoin, remember that any higher return from adding exposure to Bitcoin to the portfolio comes with substantial risk.

Overall, investors should stay informed on both historical trends and future outlooks of the traditional 60/40 portfolio. Understanding long-term patterns and potential shifts in asset class performance will help investors adjust asset allocation more effectively to align with their long-term goals and risk tolerance.

Introduction

The traditional 60/40 portfolio has been the most popular benchmark for many investment strategies worldwide during the last century. The 60/40 strategy has historically been underpinned by the low correlation between equities and bonds. When stocks falter, bonds tend to yield positive returns, mitigating overall portfolio volatility.

Since 1900, the 60/40 portfolio has had impressive performance, posting an annualised return in real terms of almost 5% in the United States and Australia, more than 4% in the United Kingdom, around 3% for Japan and Europe, and on average 4% for the world.

Yet 2022 was a challenging year for the 60/40 portfolio because bonds failed to protect portfolio performance when stocks fell. For most significant markets, equities and bonds' real returns were in negative territory, causing investors to question the efficacy of the 60/40 portfolio in the current economic landscape. Some investors started to worry whether the advantages of the 60/40 portfolio have diminished as market dynamics have changed. Others, however, continue to believe in the long-term performance of the 60/40 portfolio as the valuation fell and asset prices stabilised. The evidence presented in this report supports the latter view.

This research study offers an in-depth historical analysis of the long-term performance of the 60/40 investment portfolio strategy across major global markets, specifically focusing on Australia, Japan, the United Kingdom, and the United States. It also delves into the evolving dynamics of risk and return trade-offs associated with various portfolio allocation strategies within these markets over time.

What Is the 60/40 Portfolio?

The traditional 60/40 portfolio has 60% invested in equity and 40% invested in fixed-income securities, such as government bonds. It combines the potentially high returns of equity investments and the stability of bond income. Although bonds offer more modest returns, adding bonds to the portfolio is expected to mitigate the overall risk of the portfolio and result in diversification benefits because of the typically low correlation between stocks and bonds.

The 60/40 split represents a balanced allocation between stocks and bonds for many institutional investors. A substantial allocation to bonds in a portfolio can limit its downside risk compared with an all-equity portfolio, improving resilience to significant stock market drawdowns. Instead of pure stocks and bonds, the 60/40 allocation can also be applied to the split between growth versus defensive assets in a portfolio. The 60/40 portfolio earns much of its popularity from its straightforward approach to portfolio construction and implementation, making it an appealing choice for investors seeking simplicity in their investment strategy.

The Current Debate

In the ongoing investment strategy debate joined by the world's largest asset managers, the performance of equity and bond markets in 2022 has taken the central stage. As examples, we present two different perspectives on the situation from two prominent investment management firms.

> "Far from being dead, the 60/40 portfolio is poised for another strong decade."
>
> Todd Schlanger, Senior Investment Strategist, Vanguard (2023)

Despite acknowledging that 2022 was a challenging year, Vanguard firmly supports the 60/40 portfolio strategy. The firm emphasises the importance of evaluating the 60/40 portfolio's long-term performance, particularly over the past decade. Vanguard (2023) predicted an improved long-term outlook for this investment strategy with higher expected returns and a more negligible probability of a significant loss in any given year. Overall, Vanguard saw the year 2022 as a correction time, bringing valuation to a more reasonable level.

> With the 60/40 portfolio becoming increasingly challenged, now may be the time to consider alternatives that can add diversification and target new sources of return.
>
> BlackRock (2023)

In sharp contrast to Vanguard's approach, BlackRock recommended a modified 60/40 portfolio strategy in response to changing market conditions. The firm highlighted the interconnection between fixed-income and equity performance, which makes bonds a less reliable diversifier than they once were. BlackRock suggests a need to reassess fixed-income allocations and is shifting its focus towards public and private investments, along with tactical holdings of bonds such as inflation-linked bonds and short-term debt. The firm is also adding other alternative investments for more return resilience. These moves signified a departure from traditional asset allocation strategies.

Inspired by the current industry debate, we conducted a comprehensive analysis of the performance of the traditional 60/40 portfolio during the last century. We also examined the performance of the modified 60/40 portfolio, which incorporates commodities, other types of bonds, and alternative investments.

This report is the first of a two-part series investigating the past performance of the 60/40 allocation strategy and its potential as a retirement investment strategy in the future. In Part I (this report), our in-depth study offers a historical perspective on the portfolio's resilience and effectiveness, dissecting its behaviour through various market conditions and economic cycles. This report provides valuable insights into whether the 60/40 investment strategy has stood the test of time. In the next report (Part II), we will examine the performance of the 60/40 strategy in a simulated environment to understand whether the strategy might hold in the future.

Data Description and Methodology

To examine the performance of the 60/40 portfolio over the last century, we used the Dimson–Marsh–Staunton (DMS) Global Investment Returns database.[1] The dataset includes 122 years of nominal and real annual returns of stocks, Treasury bills, Treasury bonds, inflation rates, and exchange rates

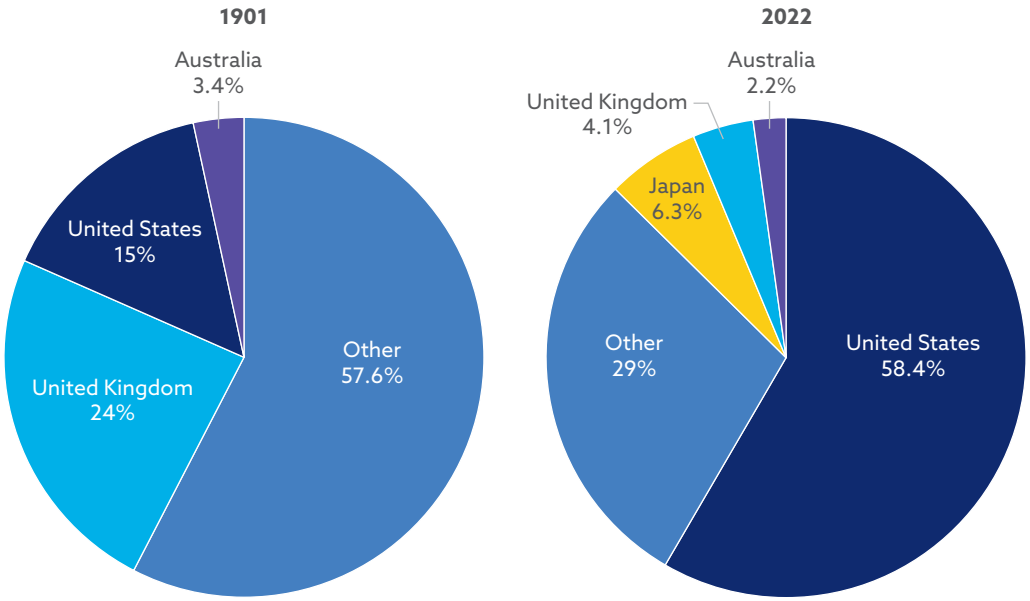
[1]The indices are described in Dimson, Marsh, and Staunton (2018).

for 35 countries and five composite regions[2] from 1901 to 2022. The returns data are available in both local currencies and USD. We based our analysis on the annual return in local currency terms, adjusted for inflation, unless noted otherwise.

The primary markets we explore in this analysis are Australia, Japan, the United Kingdom, and the United States, benchmarked to the European and world markets' average when practical. These countries constitute the world's major equity markets in terms of capitalisation, as illustrated in **Exhibit 1**.

The last 122 years witnessed phenomenal growth in the relative size of the US stock market and the shrinking of most other major markets. The United States grew from 15% of the world's market capitalisation to almost 60%, while the United Kingdom shrank from a quarter of the world market to slightly more than 4%.

Exhibit 1. Stock Market Capitalisation, Relative Market Sizes



Source: Data from Dimson, Marsh, and Staunton (2023).

[2]The composite regions in the DMS dataset are Developed markets, Emerging markets, Europe, World, and World ex-US. The world equity series comprises a 23-country index in US dollars. At the beginning of each period, the investor bought a portfolio of 23 positions in each country weighted by its market capitalisation for the entire period from 1900 to date. The 23-country world bond market index is constructed the same way. The bond index is GDP-weighted throughout.

For details on the countries included in the composites, see Dimson, Marsh, and Staunton (2023). The Europe equity series comprises a 16-country, common-currency (here taken as US dollars) world index. For each period, a market's local currency return is converted to US dollars. Europe is represented by Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Russia, Spain, Sweden, Switzerland, and the United Kingdom, weighted by country size.

In the early 20th century, Japan's equity market was notably modest in scale. During the Japanese asset price bubble, Japan experienced remarkable growth and reached its zenith in 1989. Representing 40% of the global market at that time, Japan stood as the world's largest stock market. Following the bursting of this bubble until the end of 2022, however, the Japanese equity market significantly contracted to only 6.3% of the world. Australia went from 3.4% to 2.2% of world capitalisation during the same period. Altogether, the four markets in this report covered 71% of the world's capitalisation at the end of the 122-year period studied.

Although the US equity market represents a sizeable portion of the global market, investors in other markets tend to have a substantial home bias and stay heavily invested in their local markets. Therefore, in this report, we first examine the performance of the domestic 60/40 portfolio in each local market. We then expand the analysis to investigate the performance of international 60/40 portfolios and globally diversified multi-asset portfolios.

Performance of the 60/40 Portfolio over the Last Century

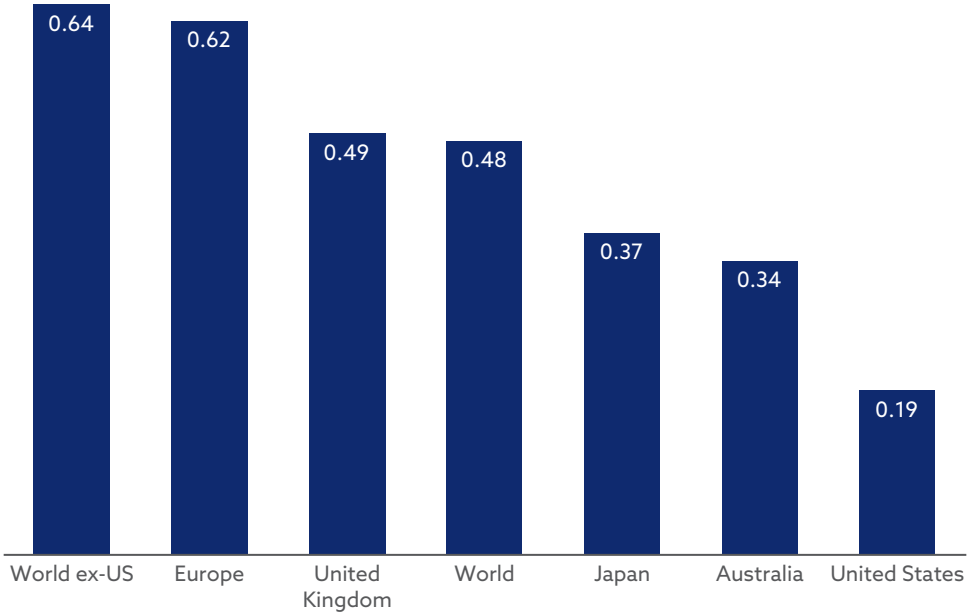
Stocks and bonds form the two core components of a 60/40 portfolio, and their correlation significantly influences the portfolio's overall volatility. Lower correlations between assets within a portfolio help reduce its volatility, enhancing its stability. A negative correlation is particularly desirable, as it maximises diversification benefits and mitigates risk.

The Equity–Bond Returns Relationship

Over the long term, stocks and bonds tend to have a low correlation; therefore, their combination in a portfolio provides essential diversification benefits for investment. The correlation, however, is not the same across all markets. Although investors in the United States and Australia have seen low correlations between stocks and bonds of only 0.19 and 0.34, respectively, the observed correlations were much higher in the United Kingdom (0.49) and Europe (0.62). **Exhibit 2** illustrates these differences. Note that these long-run correlations were not negative.

Highlight 1: The long-run correlation between stocks and bonds was positive and varied across different markets.

Exhibit 2. Long-Term Bond–Equity Correlation, 1901–2022



Source: Data from Dimson, Marsh, and Staunton (2023).

Performance of the Domestic 60/40 Portfolio Strategy

This section examines the 60/40 investment strategy in which, hypothetically, 60% is allocated to domestic equities and 40% to domestic bonds. The portfolio is rebalanced each year, and returns are measured gross of any rebalancing costs. We analysed the historical performance and implications of maintaining such a domestic investment approach, which reflects the common home bias[3,4] among investors and their commitment to leveraging the economic dynamics and opportunities within the local market.

The performance of the domestic 60/40 is evaluated based on its return, volatility, Sharpe ratio, and maximum drawdown. The portfolio's annual return is determined by a weighted average, where 60% is derived from the annual equity returns and 40% from bond returns. The Sharpe ratio is an indicator measuring the performance of an investment while adjusting for its risk. It calculates how much excess return over a risk-free investment is generated for the additional unit of risk taken. A higher Sharpe ratio indicates a more desirable risk-adjusted return and a better investment strategy. Maximum drawdown is a risk metric

[3]According to *The Home Bias Report* by Charles Schwab (2018), both US and UK investors exhibit home bias, a common phenomenon especially among retail investors, whereby investors have a strong tendency to invest in their domestic market rather than internationally. In the United Kingdom, 74% of surveyed investors were looking to invest the majority of their assets in their home market. Although US investors benefit greatly from investing in their home market, home bias does not work well for UK investors because the UK market provides fewer opportunities for sufficient diversification.

[4]In the Australian context, home bias has also been well documented by the annual *Australian Investor Study*. See Australian Securities Exchange (2023).

used to assess the most significant single drop from peak to trough in the value of a portfolio. Investors use maximum drawdown to gauge an investment's downside risk. **Exhibit 3** shows the results by country in the major markets.

From 1901 to 2022, the Australian 60/40 portfolio demonstrated the highest annualised mean return, the highest annualised median return, and the lowest risk, resulting in the highest Sharpe ratio of 0.33. The US portfolio had similar performance with the second-highest annualised mean and median returns of 4.89% and 6.40%, respectively, and a volatility of 13.46%. The US domestic 60/40 portfolio produced a long-term Sharpe ratio of 0.32.

The maximum drawdown represents the largest loss experienced by these domestic portfolios during the 1901–2022 period. The US portfolio had the smallest maximum drawdown of –44.88%, followed by Australia at –54.61%. The Australian and US portfolios outperformed the global benchmark (the World portfolio) on returns, Sharpe ratio, and maximum drawdown.

Over the last century, the Japanese market appeared to be the riskiest. Japan's long-term performance of the domestic 60/40 portfolio produced the lowest mean return but the highest volatility and maximum drawdown. Its maximum drawdown was almost –98%. Japan's moderate Sharpe ratio resulted from the risk-free rate used in the calculations. On average, Japan's real risk-free rate was –1.88% p.a., based on the geometric mean of Japan's T-bill returns.

The final two columns of Exhibit 3 present the percentage of years during the 1901–2022 period in which the 60/40 portfolio delivered returns greater than zero and returns that outperformed T-bills. In these markets, the 60/40 portfolios produced positive returns in more than 62% of the years, and in more than 57% of years, they generated returns higher than T-bill returns. Performance varied across markets—for example, in Australia, 60/40 investors experienced returns higher than T-bills in nearly 73% of the years analysed.

Exhibit 3. Long-Term Performance of Domestic 60/40 Portfolios in Real Terms, 1901–2022

	Mean Return	Median Return	Standard Deviation	Sharpe Ratio	Maximum Drawdown	Percentage > 0	Percentage > T-Bill Return
Australia	4.97%	7.06%	13.27%	0.3361	–54.61%	71.31%	72.95%
Japan	2.95%	6.13%	21.49%	0.2248	–97.74%	66.39%	62.29%
United Kingdom	4.11%	5.87%	15.27%	0.2121	–60.72%	63.93%	63.11%
United States	4.89%	6.40%	13.46%	0.3179	–44.88%	66.39%	67.21%
Europe	3.06%	2.51%	16.76%	0.1464	–79.44%	62.30%	57.38%
World	3.99%	5.98%	13.29%	0.2545	–64.00%	68.85%	65.57%

Source: Data from Dimson, Marsh, and Staunton (2023).

Regarding risk-adjusted returns and maximum drawdowns, Australia and the United States boasted the most robust performance, whereas Japan and Europe were relatively weak. The same performance metrics of equity, bond, and the 60/40 portfolio in other markets in the DMS database are provided in Appendix A, **Exhibits A1–A3**.

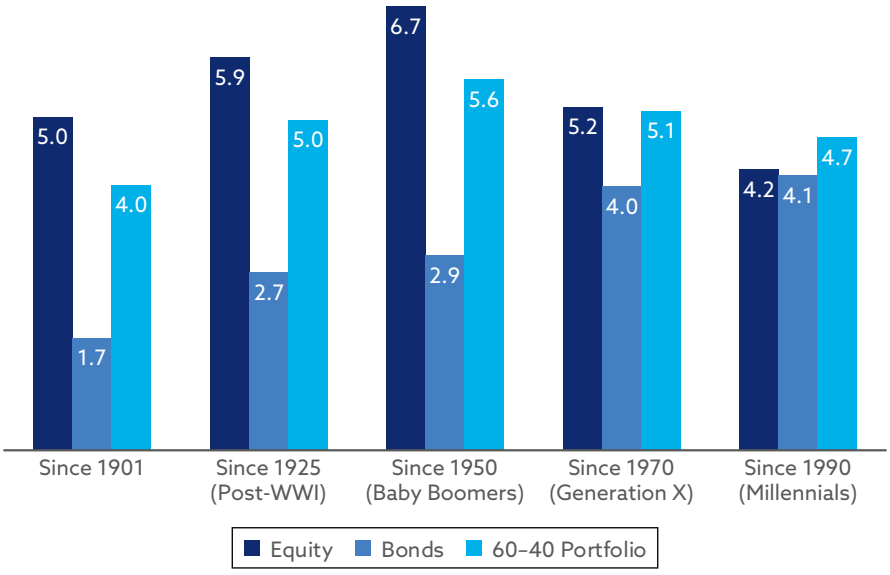
Highlight 2: Throughout the last century, among the markets covered in this study, the Australian and US domestic 60/40 portfolios had the best performance in terms of return, Sharpe ratio, and maximum drawdown. Japan's portfolio, on the contrary, produced the lowest mean return, the highest volatility, and the largest maximum drawdown, necessitating cautious investment strategies.

Generational Difference in Long-Term Investment Performance

The long-term investment performance of equities, bonds, and the 60/40 portfolio is not homogenous across different generations, as **Exhibit 4** shows. The 1900 era shows that equities had a significant advantage over bonds at the world market level, with annual real returns of 5.0% compared with 1.7% for bonds. The 60/40 portfolio produced a return of 4.0% p.a.

The period since 1925 (post–World War I) shows a similar pattern, with equities outperforming bonds (5.9% vs. 2.7%). The 60/40 portfolio produced a return of 5.0% p.a. since 1925. This return is higher than the full long-term performance

Exhibit 4. Long-Term Performance in Annualised Real Returns: World



Source: Data from Dimson, Marsh, and Staunton (2023).

of 4% since 1901 because it excludes the impact of the negative bond returns experienced in some European markets in the early 1920s.

The performance since the inception of the baby boomer generation saw much better returns from the 60/40 portfolios, driven by stronger equity and bond returns compared with earlier origination periods. From 1950 until now, on average, equity produced a return of 6.7% in real terms, while the 60/40 portfolio yielded 5.6% p.a. Baby boomers avoided the worst years of the stock markets during World War I, the Great Depression, and World War II. They also benefited from strong equity market growth during the post-WWII recovery years.

Long-term equity returns for Generation X and millennials were 5.2% and 4.2%, respectively—not as high as those experienced by baby boomers. Equity returns averaged down without the benefit of the high equity returns during the 1950s and 1960s, and they were more affected by the negative stock market performance during the oil crisis in the 1970s, the dot-com bubble, the Global Financial Crisis, and COVID-19 and the uneven post-COVID recovery periods. The decline of the 60/40 portfolios for Gen X and millennials compared with baby boomers was less than the decline in the comparable all-equity portfolio because of the improved bond returns over these generations.

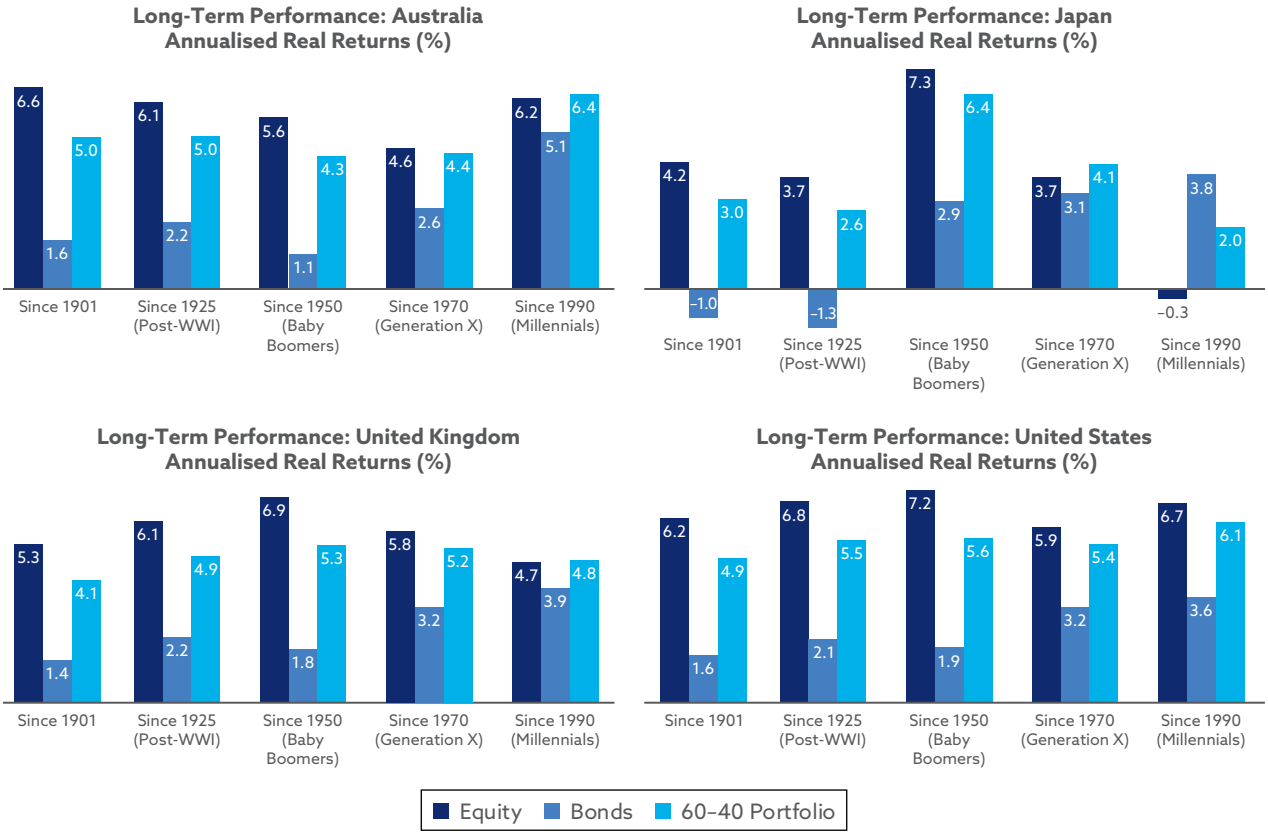
The generational differences of the specific markets, including Australia, Japan, the United Kingdom, and the United States, are presented in **Exhibit 5**. Although the United Kingdom shared the same general return patterns of the world in general, Japanese investors' experience differed substantially.

Japanese bonds experienced decades of negative real returns for the first half of the last century, resulting in 3.0% and 2.6% long-term returns of the 60/40 portfolios for 1901–2022 and 1925–2022, respectively. Japanese baby boomers enjoyed high equity and bond returns (7.3% and 2.9% p.a. on average, respectively) for the last almost three-quarters of a century. Following WWII, Japan achieved impressive economic development in the 1950s and 1960s, with an average annual growth rate of more than 10%, when the country pivoted towards producing high-quality and technologically advanced goods for both domestic and international markets.

After the boom in the mid-twentieth century, the Japanese equity market trajectory changed dramatically with the oil crisis (1973–74) and the asset price bubble burst in 1990. Since then, the Japanese market has never fully recovered. Japan's economy has drifted in and out of recessions, including the lost decade in the 1990s (see Callen and Ostry 2003), the Global Financial Crisis, and the COVID-19 pandemic. During 1990–2022, investors in Japanese equity experienced a negative real return of 0.3% p.a., while the 60/40 portfolio provided essential diversification protection with an annual real return of 2%.

The long-term return patterns in Australia and the United States were more stable across different generations. In these two markets, millennials enjoyed higher real returns in equity and bond investments. From 1990 to 2022,

Exhibit 5. Long-Term Returns by Subject Markets



Source: Data from Dimson, Marsh, and Staunton (2023).

on average, their 60/40 portfolios earned 6.4% and 6.1% per annum, respectively, in real terms.

The substantial investment returns experienced by Australian investors in the last few decades reflected the solid economic growth and rapid expansion of the Australian stock market. Several critical factors bolstered this growth, including the privatisation of major public companies, which brought quality companies to the capital market; the transformation of financial institutions through demutualisation; and a significant influx of capital into the share market, driven partly by the implementation of compulsory superannuation since 1992 (Mathews 2019).

In the United States, the baby boomer generation benefited from a robust average annual equity return of 7% in real terms, notably higher than the average during the millennial era. Baby boomers' returns from bonds were lower, however. As a result, their 60/40 portfolio yielded an average return of 5.6%, slightly lower than the 6.1% return millennials could achieve with their 60/40 portfolio.

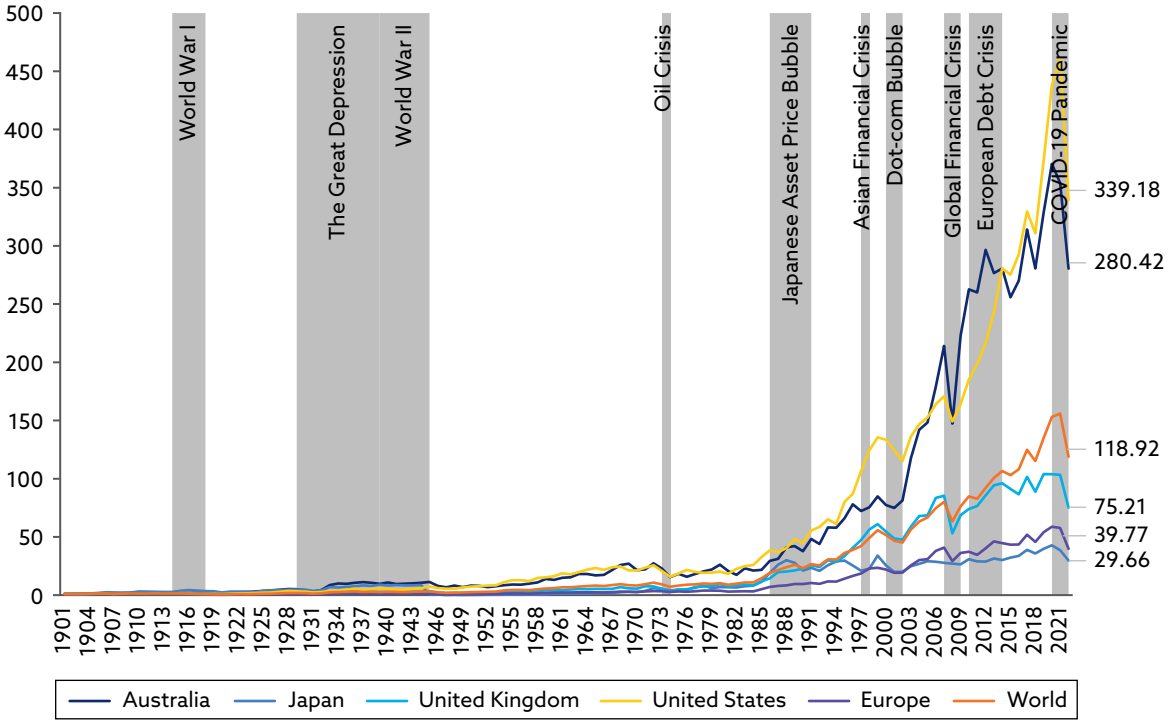
Despite significant market disruptions, however, such as the Wall Street crashes during the Great Depression, the oil shocks of the 1970s, the dot-com bubble, the Global Financial Crisis, and the recent COVID-19 pandemic, the long-term

stability of the 60/40 portfolio in the United States has been noteworthy, mainly because of the market's strong resilience and recovery after significant downturns. Nevertheless, it is essential to exercise caution when extrapolating US investors' experiences to different international markets.

Highlight 3: The long-term investment performance of equities, bonds, and the 60/40 portfolio were not homogenous across different generations and different markets. Baby boomers generally enjoyed better performance than Gen X and millennials. In Australia and the United States, however, generational differences were less pronounced because of more stable long-term investment returns of the 60/40 portfolio. For investors, this finding highlights the need to tailor investment strategies to the distinct market conditions experienced by different generations.

An alternative approach to assessing the long-term efficacy of 60/40 portfolios in these markets involves calculating their wealth index based on cumulative returns from 1901 to 2022. A wealth index measures the cumulative effect of real returns over time, typically based on a unit of the local currency invested. As **Exhibit 6** illustrates, Australia and the United States demonstrated the most robust growth, with Japan and Europe demonstrating the slowest.

Exhibit 6. Cumulative Wealth, 1901–2022 (in local currency)



Source: Data from Dimson, Marsh, and Staunton (2023).

An investment in a 60/40 portfolio in the United States at the beginning of 1901 would have grown 339 times by the end of 2022, whereas the same investment in Australia would have grown 280 times.

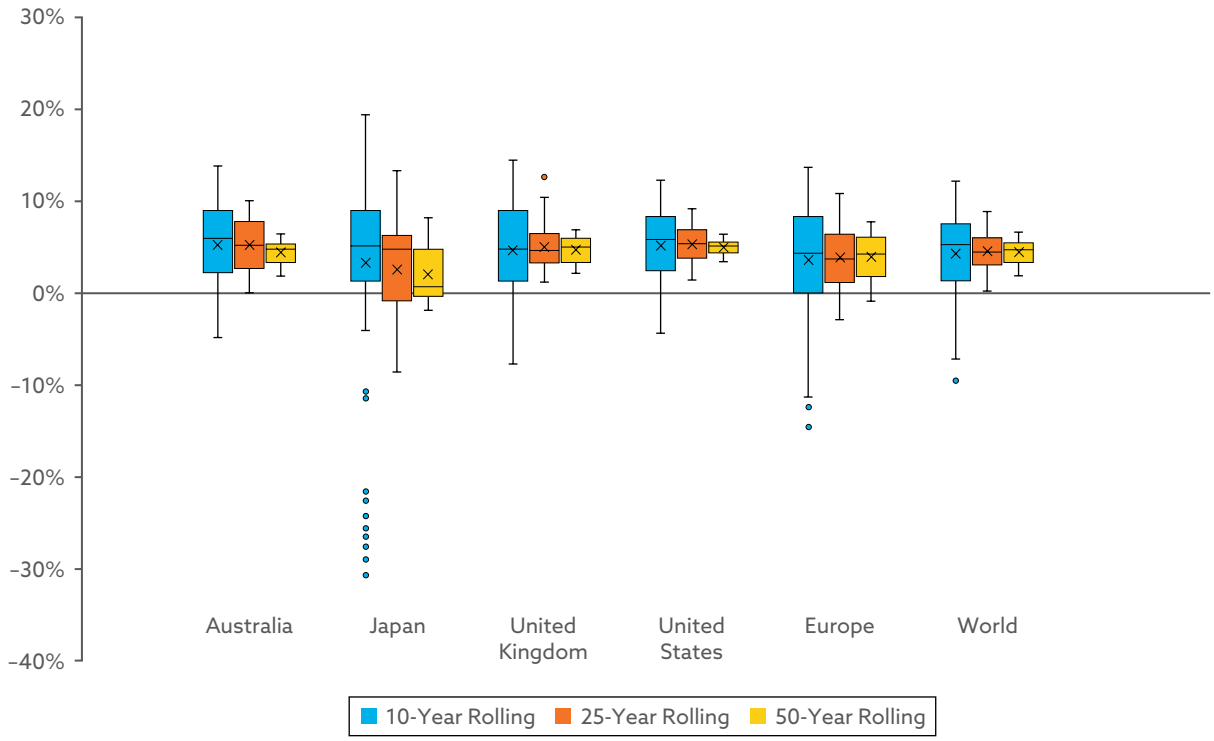
Long-Term Performance Under Different Rolling Windows

The box plots in **Exhibit 7** illustrate the mean, median, distribution, and dispersion of the long-term rolling real returns of the 60/40 portfolios in these markets, using three different rolling time windows: 10 years, 25 years, and 50 years. Returns are estimated as the geometric mean over a relevant period. **Exhibit 8** reports the mean and median return values.

We observed that longer-term returns of the 60/40 portfolios performed more consistently than short-term returns. Consistently in all markets, the 10-year rolling average annual returns (blue boxes) in Exhibit 7 show greater dispersion, with longer whiskers and outliers than the 25-year (orange) and 50-year returns (yellow), reflecting the increased volatility during shorter periods.

Some regions have outliers on the negative side, such as the 10-year rolling average annual returns in Japan, indicating periods of significant losses. Over the last 123 years, Japan's 60/40 portfolio's 10-year and 25-year mean (median) were 3.29% (5.13%) and 2.54% (4.76%), respectively. The presence of significant

Exhibit 7. Real Annualised Returns Under Various Rolling Windows



Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit 8. Long-Term Annualised Real Returns Under Different Rolling Windows

Market	10-Year Rolling Return	25-Year Rolling Return	50-Year Rolling Return
Australia			
Mean	5.23%	5.23%	4.41%
Median	5.94%	5.16%	4.77%
Japan			
Mean	3.29%	2.54%	2.04%
Median	5.13%	4.76%	0.69%
United Kingdom			
Mean	4.62%	5.00%	4.68%
Median	4.82%	4.57%	4.98%
United States			
Mean	5.16%	5.32%	5.02%
Median	5.81%	5.39%	5.08%
Europe			
Mean	3.60%	3.91%	3.93%
Median	4.32%	3.71%	4.21%
World			
Mean	4.31%	4.54%	4.43%
Median	5.28%	4.42%	4.68%

Source: Data from Dimson, Marsh, and Staunton (2023).

negative outliers in the 10-year and 25-year rolling returns resulted in the mean returns being dragged much lower than the median. These significant outliers were the periods immediately following WWII—specifically from 1945 to 1947, when Japan experienced severe triple-digit inflation,[5] the most extreme inflationary episodes in the country's modern economic history (see Hamada and Kasuya 1992). In real terms, Japan's 60/40 portfolio posted significant losses of –62%, –82%, and –53% in those three years. Investors experienced prolonged periods of underperformance in their portfolios resulting from significant losses, which required an extended duration to mitigate. Japan also had the lowest mean and median 50-year rolling annualised returns among all the markets examined.

Contrastingly, all rolling returns of the US 60/40 portfolio exhibited a smaller dispersion around the mean, especially for the 25-year and 50-year windows. Across all windows, mean and median returns hovered around 5%, indicating

[5]This turmoil was driven by the emergence of black markets in response to near-starvation food shortages and a failing rationing system in Japan's postwar economy.

consistent performance of the 60/40 portfolio over the years. This result aligns with the observation gained in Exhibit 5 that long-term investment returns for various US investor generations have been remarkably stable and uniform.

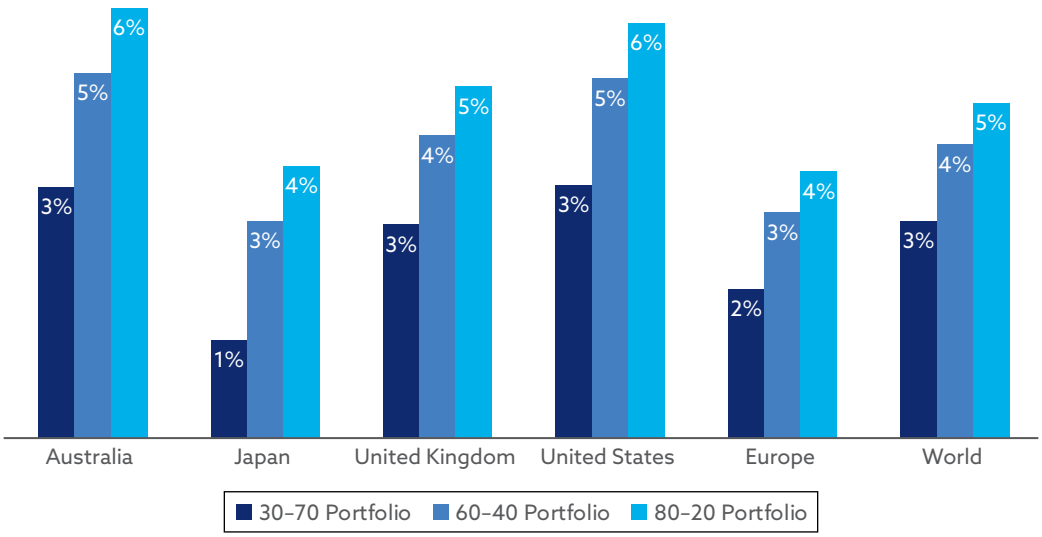
Highlight 4: Long-term 60/40 portfolio returns are more consistent than short-term returns. While Japan's 60/40 portfolio experienced significant volatility and negative outliers, particularly post WWII, the US 60/40 portfolio showed stable, consistent performance with minimal dispersion around the mean. This finding suggests investors prioritise long-term investment horizons to achieve more stable returns and be cautious of regional historical volatility, especially in markets such as Japan.

Was 60/40 the Optimal Portfolio?

Investors may wonder whether the 60/40 portfolio is the optimal strategy. A long-term historical perspective is crucial to answering that question.

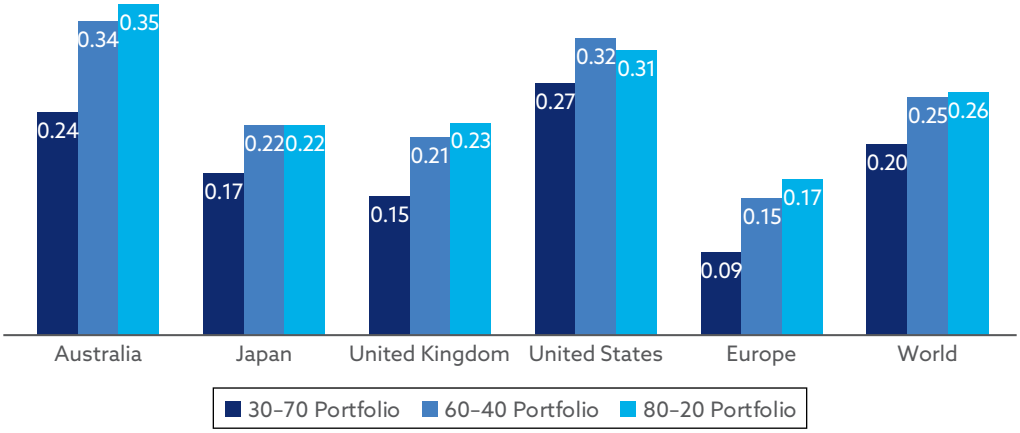
Our study juxtaposed the traditional 60/40 portfolio with the more conservative 30/70 portfolio, which limits equity exposure to 30% and allocates the remainder to bonds, and the more aggressive 80/20 portfolio, which amplifies equity exposure to 80%. As **Exhibit 9** illustrates, in most scenarios examined, returns of the 60/40 and 80/20 portfolios significantly outperformed those of the 30/70 portfolio, adhering to the principle of "higher risk, higher return."

Exhibit 9. Long-Term Returns of Various Strategic Asset Allocations, 1901–2022



Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit 10. Sharpe Ratios of Various Allocation Strategies



Source: Data from Dimson, Marsh, and Staunton (2023).

We note that the increment in risk-adjusted returns when shifting from a 30/70 allocation to a 60/40 allocation was considerably more pronounced than the transition from a 60/40 to an 80/20 allocation. This dynamic was evident in the substantial elevation in Sharpe ratios, reflecting an improvement in risk-adjusted returns when transitioning from a conservative to a more aggressive portfolio strategy, as illustrated in **Exhibit 10**.

However, the shift from a 60/40 to an 80/20 portfolio did not uniformly yield a substantial enhancement in risk-adjusted returns. Specifically, in Japan and the United States, the Sharpe ratios for the 80/20 portfolios were marginally lower or comparable to those of the 60/40 portfolios. We document this phenomenon in Exhibit 9, Exhibit 10, and **Exhibits A5–A8** in Appendix A.

Although an increased allocation to equities is generally expected to improve returns, this strategy does not necessarily translate into a superior risk-adjusted return for all markets. On average, investors in regions such as Australia, the United Kingdom, Europe, and the global market might find the shift towards a higher equity allocation advantageous. Conversely, Japanese investors and, to a certain extent, US investors might not experience the same benefits from a more aggressive investment stance than the 60/40 portfolio, based on long-term investment returns in the last 122 years. This finding underscores the importance of market-specific considerations when evaluating the potential advantages of varying portfolio allocations.

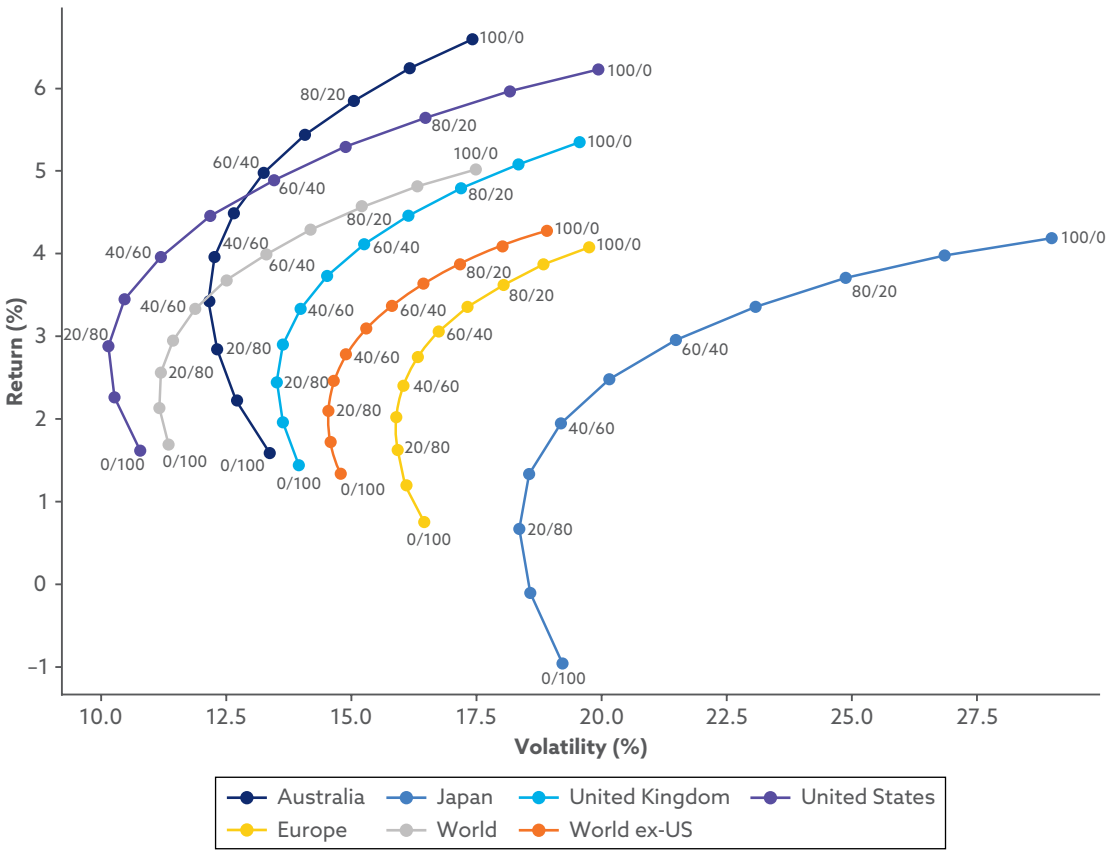
Highlight 5: Shifting from a 30/70 to a 60/40 portfolio significantly improves risk-adjusted returns, as shown by higher Sharpe ratios, whereas moving to an 80/20 allocation offers less marginal benefit. This advantage varies by market, benefiting investors in Australia, the United Kingdom, and Europe, but is less pronounced in Japan and the United States, highlighting the need for market-specific strategies.

We now examine how different allocation strategies have worked across these markets over the last 122 years. **Exhibit 11** presents the relationship between portfolio returns and volatility for different portfolio allocations from 1901 to 2022. Each line represents a market, and each point indicates a mix of equity/bond allocations, ranging from 0/100 (all bonds, no equity) to 100/0 (all equity, no bonds), constituting the investment opportunity set (IOS) of each market.

The 100/0 portfolios (all equity) for all regions appear at the top right, indicating the highest returns but also the highest volatility. Conversely, the 0/100 portfolios (all bonds) appear at the bottom left, indicating the lowest returns and volatility.

With its IOS positioned far to the left, the US market (shown in purple) is more efficient than other markets, except for a portion of the Australian IOS. Compared with Japan, the United Kingdom, Europe, and the world market, the US market typically shows higher returns at most levels of volatility. The United States represents an enhanced version of the world market's opportunity set because for the same risk, US investors can find a strategy that produces a high return and vice versa. In other words, at any given return level, US investors can enjoy a lower risk level.

Exhibit 11. Investment Opportunity Set of Various Markets, 1901–2022



Source: Data from Dimson, Marsh, and Staunton (2023).

The UK and Europe regions are both less efficient than the US and Australian markets because for any given level of returns, the UK and European portfolios would expose investors to substantially more risk. On the far right, Japan represents the least efficient market regarding risk and return trade-offs.

Notably, Japan is unique because it is the only market where a segment of the investment opportunity set dips below a 0% return. Additionally, the horizontal trajectory of Japan's curve indicates that when an investor aims to achieve higher returns by increasing equity allocation, any incremental increase in equity would necessitate assuming considerably more significant risk.

The 60/40 portfolios of Australia and the United States exhibit closely aligned performances, with their respective curves intersecting at a point. The comparison between these two markets offers intriguing insights. For the lower parts of the two IOSs when the equity allocation is less than approximately 50%, the US portfolios demonstrate greater efficiency because they offer lower volatility for the same level of return. When equity allocation exceeds 50%, however, the situation reverses, suggesting that the Australian IOS represents better investment options.

Additionally, the Australian IOS curve is steeper than that of the United States. This steepness indicates that Australian investors could potentially achieve additional returns by allocating a more significant portion to equities, with only a marginal increase in risk. This characteristic highlights the Australia IOS's efficiency, particularly at the higher end of equity allocation. This dynamic suggests that in the Australian market, a shift towards a higher equity composition in the portfolio could yield better returns for investors for a relatively small escalation in risk compared with the US market.

Highlight 6: The Australian and US markets are more efficient than other markets, offering higher returns at most volatility levels. These two markets, compared with Japan, the United Kingdom, Europe, and the world, typically show better risk–return trade-offs. The United Kingdom and Europe are less efficient, and Japan is the least efficient, with portions of its IOS below 0% real returns.

The IOS of a market is not static over the years. It reflects the dynamic trade-off between risk and returns as well as the correlation between equity and bond returns, all of which depend on the overall market conditions. The shape of the IOS depends much on the correlation[6] between equity and bond returns.

[6]In this report, because the dataset to be used is of yearly frequency, the resulting correlation could be higher than that based on a more frequent interval, such as weekly or monthly. These correlation values are computed for series that are all denominated in USD. These calculations differ from correlation values computed for series denominated in their local currencies. For instance, the correlation between the Australian equity and bond series in AUD is 0.3420, whereas the correlation between the same series in USD is 0.6162.

The following subsections explore how the IOS changed throughout major market cycles and economic crises. The analysis divides the past 122 years into approximately 25-year periods, each characterised by several major market crises and global events, as follows:

- Period 1 (1901–1922): includes WWI
- Period 2 (1923–1947): includes WWII, the Great Depression, and the 1929 stock market crash (the Great Crash)
- Period 3 (1948–1972): includes the post-WWII recovery
- Period 4 (1973–1997): includes the 1970s oil crisis, the Black Monday crash of 1987 in the United States, the asset price bubble in Japan, and the onset of the Asian Financial Crisis
- Period 5 (1998–2022): includes the dot-com bubble, the Global Financial Crisis, and the COVID-19 pandemic

Australia

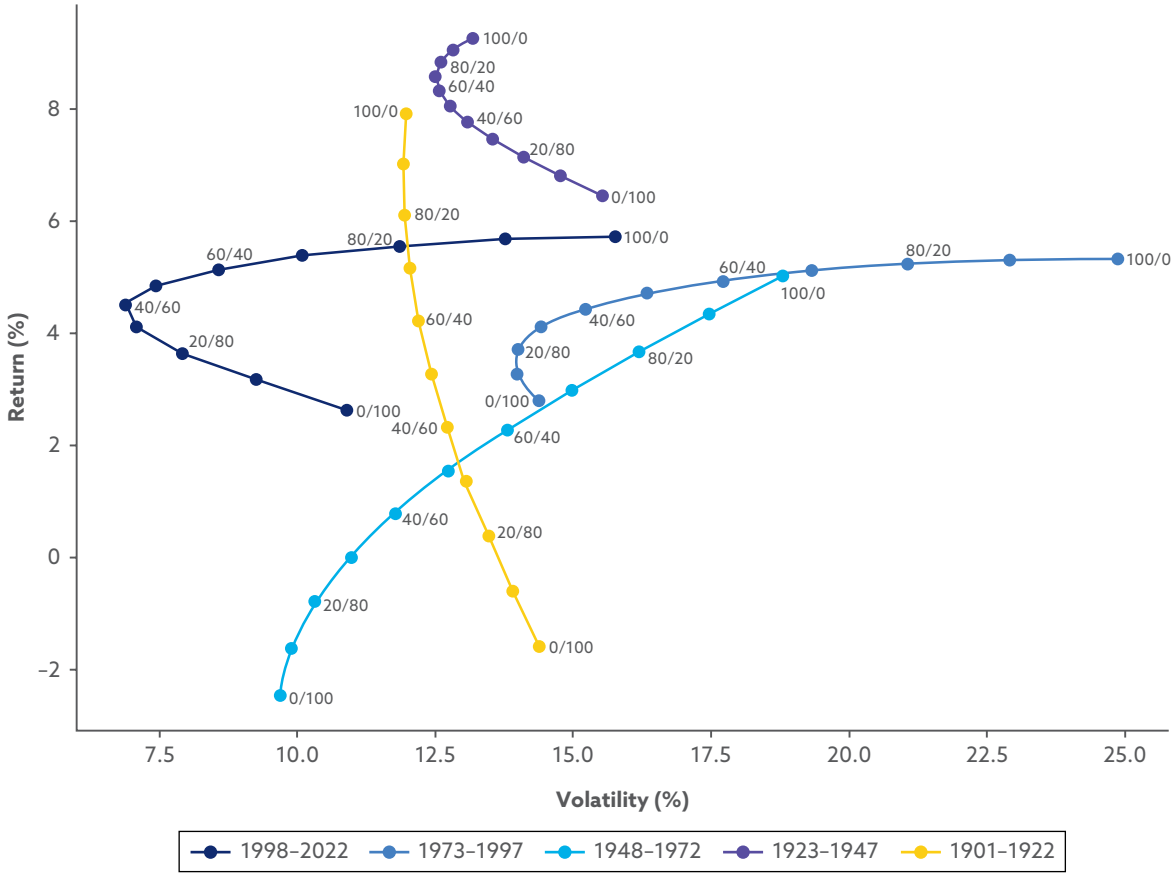
In Australia, as **Exhibit 12** illustrates, the IOS tilted towards the left in the first period, indicating that equity was a superior investment in both risk and return. During Period 1, there were more years in which the Australian treasury bonds provided a negative real return, making equity a more desirable asset class. This was partly caused by the Australian government's gross debt to GDP rocketing from a negligible amount during the first two decades of the 1900s to almost 55% of GDP by the end of 1920. At the beginning of the 1930s, the Australian government's gross debt was around 61% of GDP (O'Brien 2022, p. 57). Increasing allocations to equity in such a period would indeed improve the portfolio's return and, at the same time, reduce its risk.

Risk and return trade-offs were more normalised in later periods. In the second period, returns were elevated and all portfolio options yielded a return of above 6%, much higher than the previous period. Investors were better off increasing allocation to equity because they could earn higher returns and, at the same time, reduce their risk.

The steep curve in Period 3 tilted to the right, with the portfolio's returns ranging from below –2% to 5% at a much more extensive range of volatility. Periods 4 and 5 saw improved returns, and the shape of the investment opportunity set was more normalised, reflecting a normal correlation between equity and bond. Adding equity to an all-bond portfolio would improve its return and reduce its risk until it reaches the minimum variance portfolio on the set. Beyond that point on the efficient frontier, adding equity would enhance the portfolio's return at the cost of having more risk.

The efficient frontiers in both Periods 4 and 5 are relatively flat, suggesting that additional return earned by more allocation to equity comes at a lot more marginal risk. We also note that in the most recent period, Period 5, the IOS

Exhibit 12. Australia's IOSs: Portfolio Returns and Volatilities



Source: Data from Dimson, Marsh, and Staunton (2023).

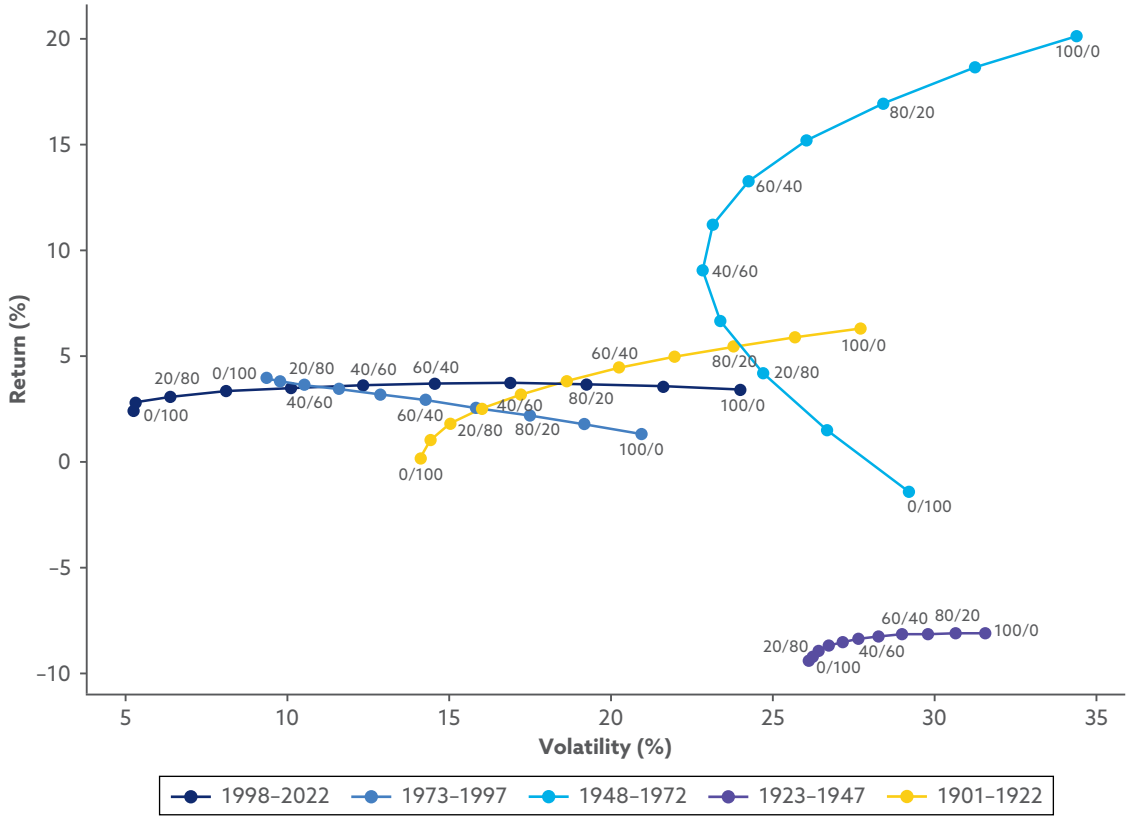
moved to the far left of Period 4's set, indicating that investors could formulate portfolios with much lower volatility at any given level of return.

Japan

At the start of the last century, during Period 1, Japan's IOS was standard, with portfolio returns ranging from below 0% to more than 20% p.a. at high levels of volatility. In Period 2, because of the Great Depression and WWII, the IOS collapsed to all-negative return territory in real terms while volatility remained high. Period 3 started with the post-WWII recovery. Increased allocation to equity during this period substantially improved the portfolio's return while reducing its risk up to the minimum variance portfolio near the 40/60 portfolio. Beyond this point, additional equity would bring more risk and more return.

The IOS was again compressed to almost a flat curve in the last two periods. In Period 4, which spans the Japanese asset bubble in the late 1980s, investors would earn less return and more risk if they allocated more to equity. In Period 5, covering Japan's so-called "Lost Decade," Japanese investors enjoyed slight

Exhibit 13. Japan's IOSs: Portfolio Returns and Volatilities



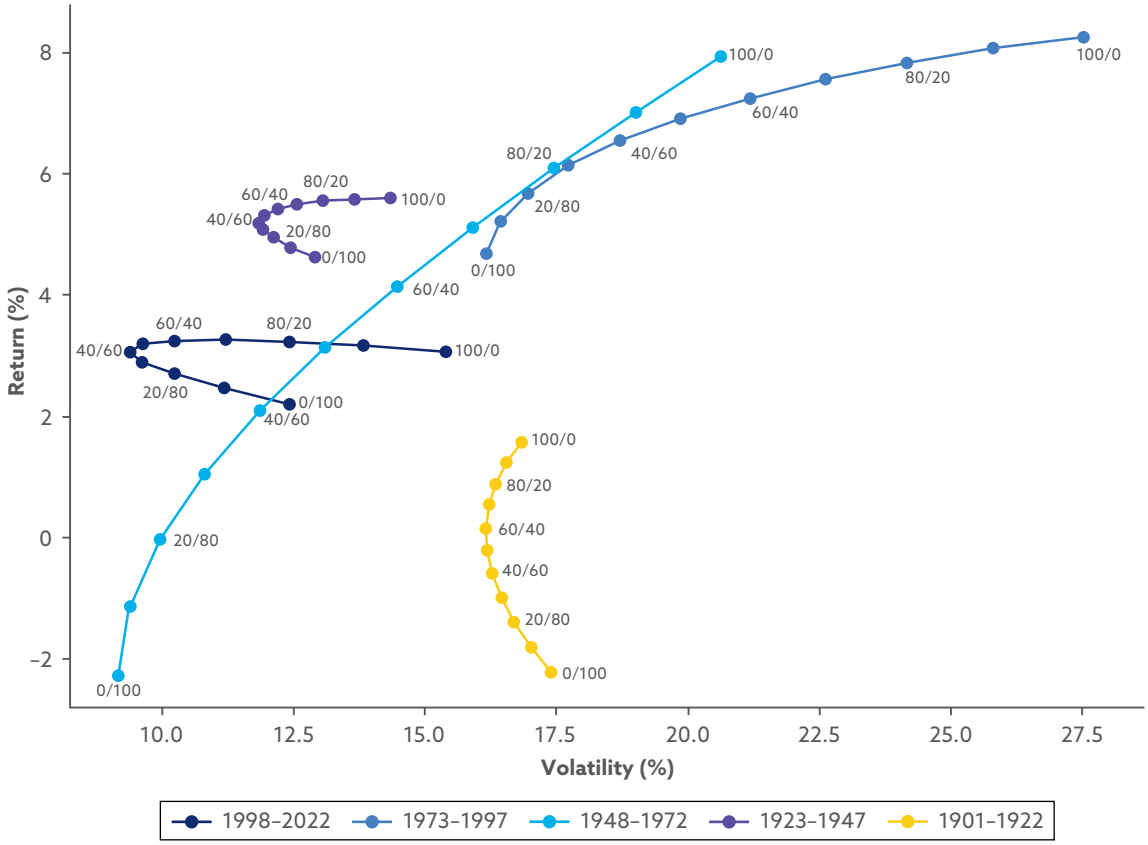
Source: Data from Dimson, Marsh, and Staunton (2023).

improvements in the equity market. The IOS no longer sloped downwards. When the proportion of equity increased, however, the volatility increased markedly, yet the return did not improve much. **Exhibit 13** illustrates these trends.

United Kingdom

The United Kingdom's IOS in Period 1 tilts towards the left around a range of low returns. The shape of the curve, illustrated in **Exhibit 14**, indicates the benefit of increasing returns without much additional risk when increasing allocation to equity. In the second period, following WWI, the IOS moved further towards the top left corner, with much higher returns and lower risk than the previous IOS. In Periods 3 and 4, the IOS changed shape substantially, with the opportunities spanned out across wide ranges of risk and returns. During these periods, investors could earn more returns by investing more in equity, but such returns would come at the expense of a high marginal increase in volatility. In the most recent period in the United Kingdom, investors saw the IOS curve flatten, indicating that increased allocation to equity brought more return and lowered the portfolio risk only up to the minimum variance portfolio, around the 40/60 portfolio, beyond which an increase in equity relative to the bond's weight yielded little additional return but much more additional risk.

Exhibit 14. United Kingdom's IOSs: Portfolio Returns and Volatilities



Source: Data from Dimson, Marsh, and Staunton (2023).

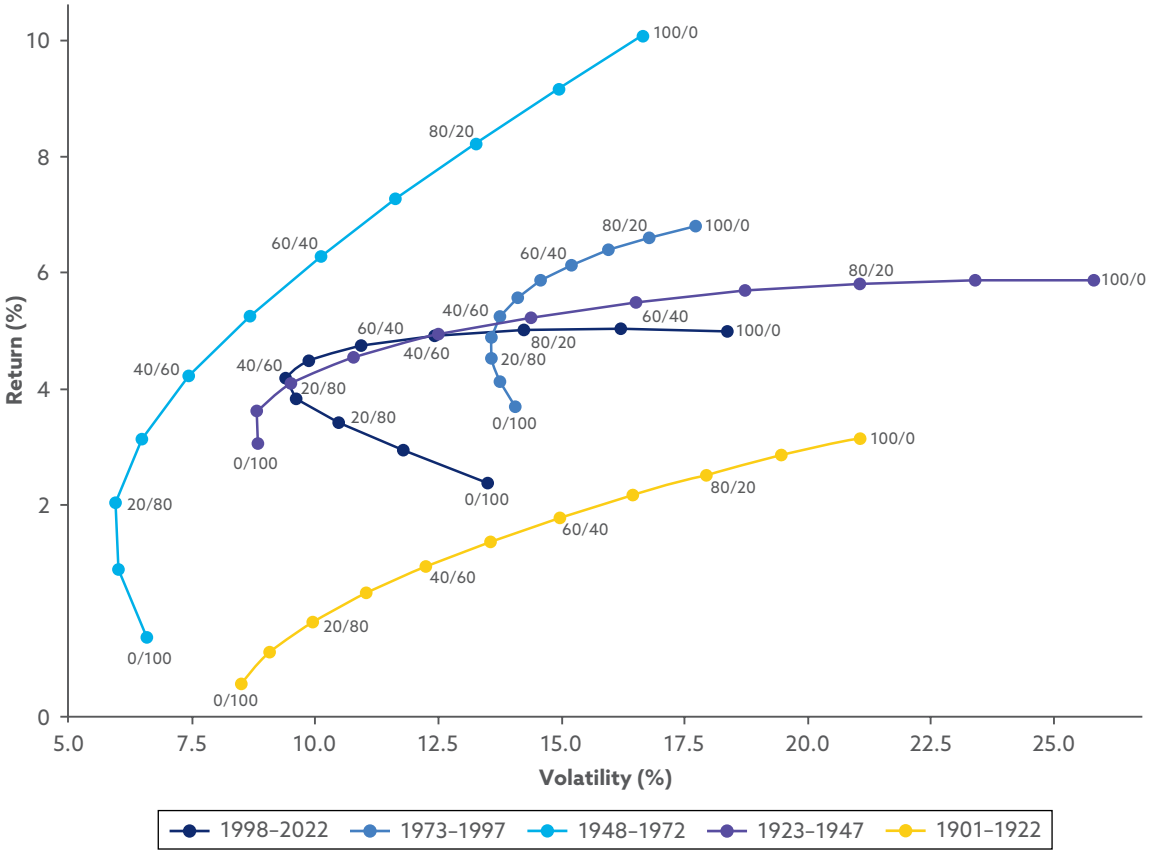
United States

During Periods 1 and 2, the IOSs in the United States show an upward slope (albeit not very steep), indicating a broad range of returns and risks. This pattern, shown in **Exhibit 15**, suggests that incorporating more equity in the portfolio could enhance returns but at the cost of substantially increasing risk. Notably, the IOS of Period 2 produced higher returns than that of Period 1.

In Period 3, the IOS shifts farther to the left, presenting investment options that offer higher returns for lower levels of risk. This shift represents an improvement in investment efficiency. In Periods 4 and 5, however, the IOS shrank, reflecting a smaller dispersion of risk and returns among different allocation strategies.

To examine the optimality of the 60/40 under various long-term windows, we calculated the Sharpe ratios for portfolios along the IOS of each market. For the United States, in all time windows, the 60/40 strategy produced the highest Sharpe ratios compared with the 30/70 and 80/20 strategies, as presented in Appendix A, **Exhibit A4**. Results are inconclusive for other markets, however, varying for different time frames. For Australia, the 60/40 Sharpe

Exhibit 15. United States' IOSs: Portfolio Returns and Volatilities



Source: Data from Dimson, Marsh, and Staunton (2023).

ratio was highest for all windows, except for the most extended time frame (1901–2022), in which the 80/20 portfolio was better. Japan and the United Kingdom exhibited mixed results.

Taken together, these observations suggest that investors should adjust their asset allocations over time to align with changing market conditions and correlations between equity and bond returns in order to optimise their risk–return profiles.

Highlight 7: The IOS of a market is not static over the years. Rather, it reflects the dynamic trade-off between risk and returns and the correlation between equity and bond returns, all of which depend on the overall market conditions. The 60/40 portfolios generally work well for the Australian and US markets, but results are mixed for the United Kingdom and Japan depending on the time frame analysed. Investors should adjust their asset allocations over time to align with changing market dynamics.

The International 60/40 Portfolios

This section examines the historical performance of 60/40 portfolios when the investment options are extended to international equities and bonds. Specifically, this portfolio has 60% invested equally in domestic and international equities and 40% invested equally in domestic and international bonds. We use the world market excluding the market in focus (abbreviated as "World ex") as a proxy for global investment. So, for the United States, for example, international investment refers to World ex-US and for Australia, World ex-Australia.

These international components' returns are in USD, so the USD versions of the domestic equity and bond series are also used to maintain consistency and eliminate the effect of currency fluctuations. The portfolio weighting calculation is as follows:

$$\begin{aligned} R_{P_i} &= 0.6\left(0.5R_{DE_i} + 0.5R_{IE_i}\right) + 0.4\left(0.5R_{DB_i} + 0.5R_{IB_i}\right) \\ &= 0.3R_{DE_i} + 0.3R_{IE_i} + 0.2R_{DB_i} + 0.2R_{IB_i} \end{aligned}$$

The DMS dataset contains the World equity and bond return series, which are ideal for the portfolio's international components. However, the DMS World market also includes the other focus markets of Australia, Japan, the United Kingdom, the United States, and Europe. Consequently, an equivalent World equity and bond return series must be used for each market but with that market excluded. The DMS dataset contains the World ex-US equity and bond return series, which was used for the US international portfolio. However, the international series for the remaining markets must be re-constructed following the DMS methodology.[7]

The bill return series used in the following analysis is the DMS World Real Bill USD return series, which is the same as the DMS US Real Bill (USD) return series. **Exhibit 16** shows the results for each market.

As illustrated in Exhibit 16, Australia's and Japan's international portfolios had the highest mean real annual returns. In terms of risk, Japan had the highest volatility and maximum drawdown. When we consider the Sharpe ratio, which represents risk-adjusted returns, Australia and the United States once again demonstrated better performance. However, the Sharpe ratios of all markets were not vastly different from each other, indicating consistent performance. In these markets, in about two-thirds of the years in the 1901–2022 period, the international 60/40 portfolios delivered positive returns and outperformed T-bills.

[7]Following the DMS methodology, the World ex-Australia/Japan/UK/Europe equity series are constructed using market capitalisation data from the Global Financial Dataset from 1901 to 2022. The weighted average of equity returns across the various markets is taken, with the weights for each market taken to be that market's capitalisation divided by the total market capitalisation of all markets.

The World ex-Australia/Japan/UK/Europe bond series are calculated similarly, except that they are GDP weighted. The GDP data from 1960 to 2022 is taken from the World Bank DataBank, and any missing data values are filled using backfilling and interpolation. Backfilling is performed based on the average GDP growth rate for each market (for Russia, Soviet Union GDP data are used). From 1901 to 1959, equal GDP weights are used because of the lack of available data.

Exhibit 16. International Portfolio Metrics, 1901–2022

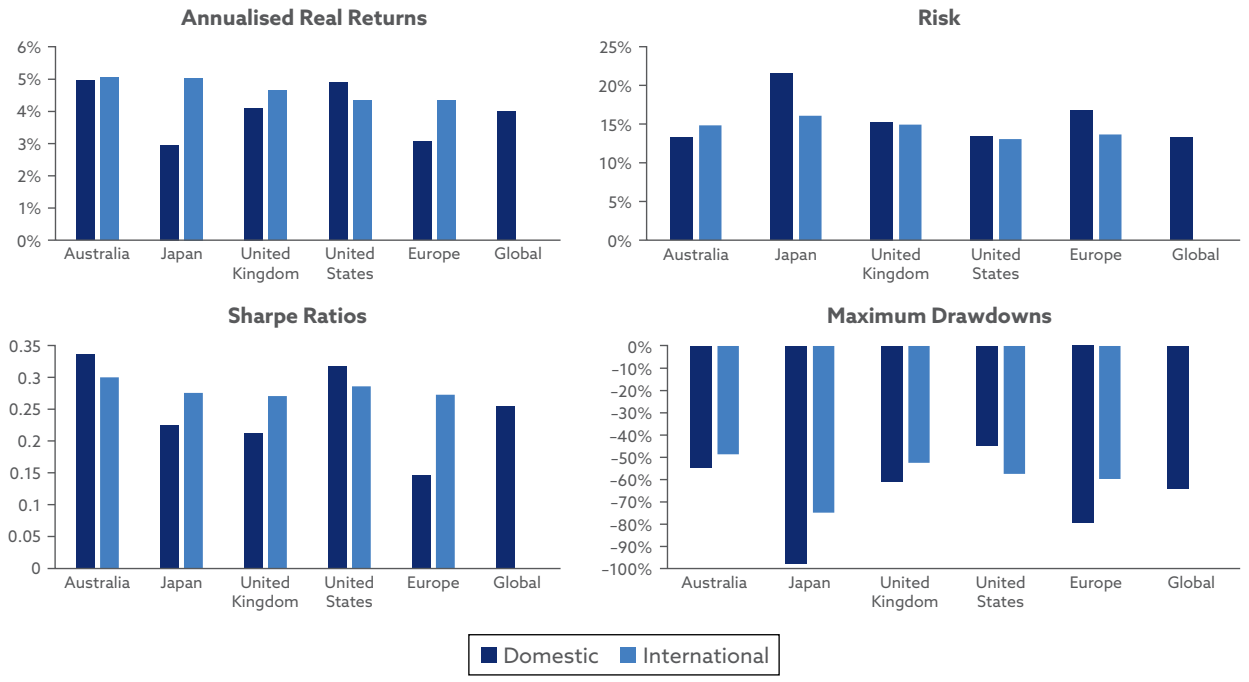
	Mean	Median	Standard Deviation	Sharpe Ratio	Maximum Drawdown	Percentage > 0	Percentage > Bill Return
Australia	5.06%	4.95%	14.83%	0.2999	–48.64%	67.21%	65.57%
Japan	5.04%	5.62%	16.07%	0.2755	–74.84%	67.21%	67.21%
United Kingdom	4.65%	6.64%	14.93%	0.2706	–52.45%	65.57%	63.93%
United States	4.34%	6.87%	13.05%	0.2857	–57.42%	68.03%	68.03%
Europe	4.33%	5.82%	13.65%	0.2727	–59.68%	67.21%	66.39%
World	3.99%	5.98%	13.29%	0.2545	–64.00%	68.85%	65.57%

Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit 17 compares the performance of the domestic 60/40 portfolio with the international 60/40 portfolio in each market, based on various portfolio metrics.

Investors in Japan, the United Kingdom, and Europe would have significantly benefited from adding international equities and bonds to the domestic 60/40 portfolio in terms of higher return and Sharpe ratio, lower volatility, and maximum drawdown. Japanese investors could have improved their return from 3% to 5.04% p.a., in real terms, while their Sharpe ratio would have improved

Exhibit 17. Comparing the Domestic and International 60/40 Portfolios, 1901–2022



Source: Data from Dimson, Marsh, and Staunton (2023).

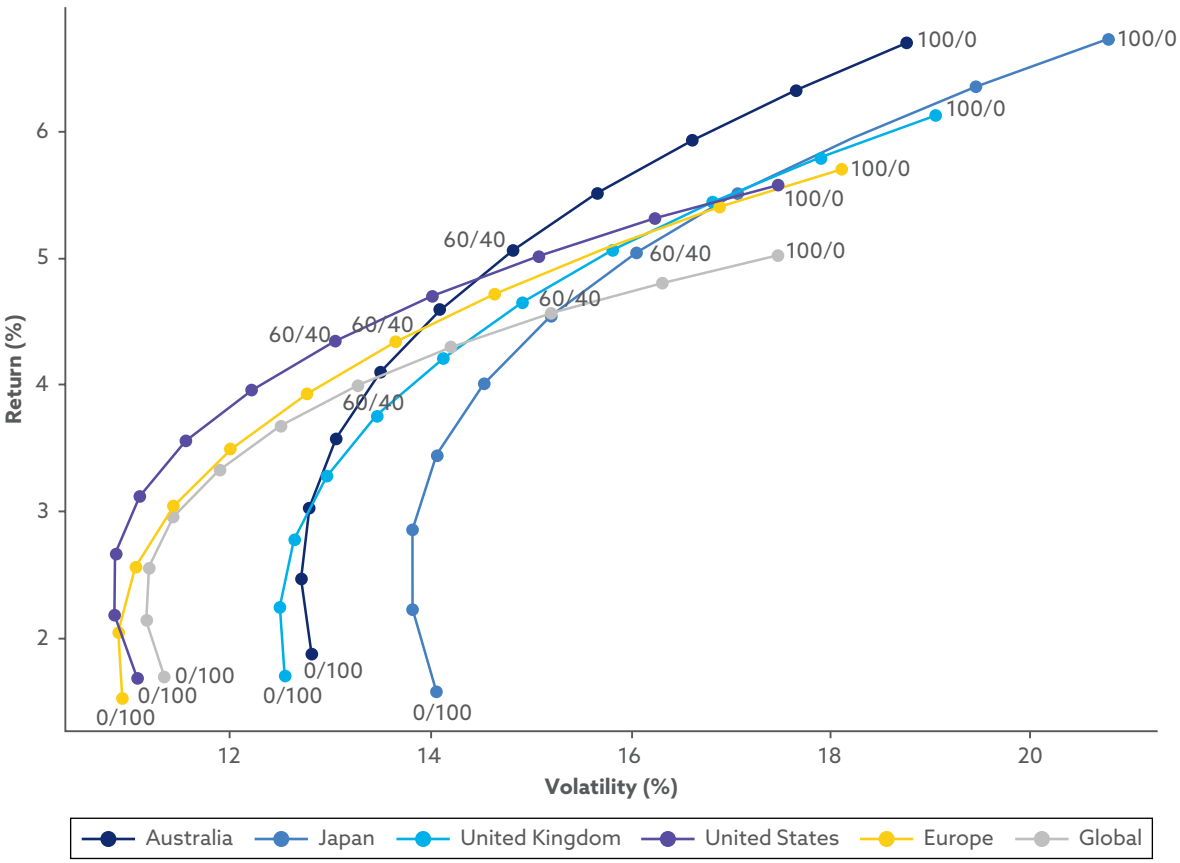
from 0.22 to 0.28, almost at par with the United States, the United Kingdom, and Europe. Having international bonds and equities in the 60/40 portfolio could also have helped Japanese investors reduce their risk from 21% to 16% and, at the same time, reduce their maximum drawdown.

For Japanese investors, the international 60/40 portfolio represents a much better investment strategy than the domestic one over this period. We observe a similar effect for investors in Europe, indicating benefits of international diversification. For UK investors, the international 60/40 portfolio also improved over the domestic one, though the improvement is less pronounced than in the Japanese case.

On the contrary, investors in Australia and the United States would not have benefited from having international components in their 60/40 portfolios. US investors would have had a lower return, a lower Sharpe ratio, and a more significant maximum drawdown. It appears that a robust domestic market made international diversification less beneficial for investors in these markets.

International diversification brought these markets' investment opportunity sets closer together, as shown in **Exhibit 18**. The IOSs are less dispersed than

Exhibit 18. International IOSs



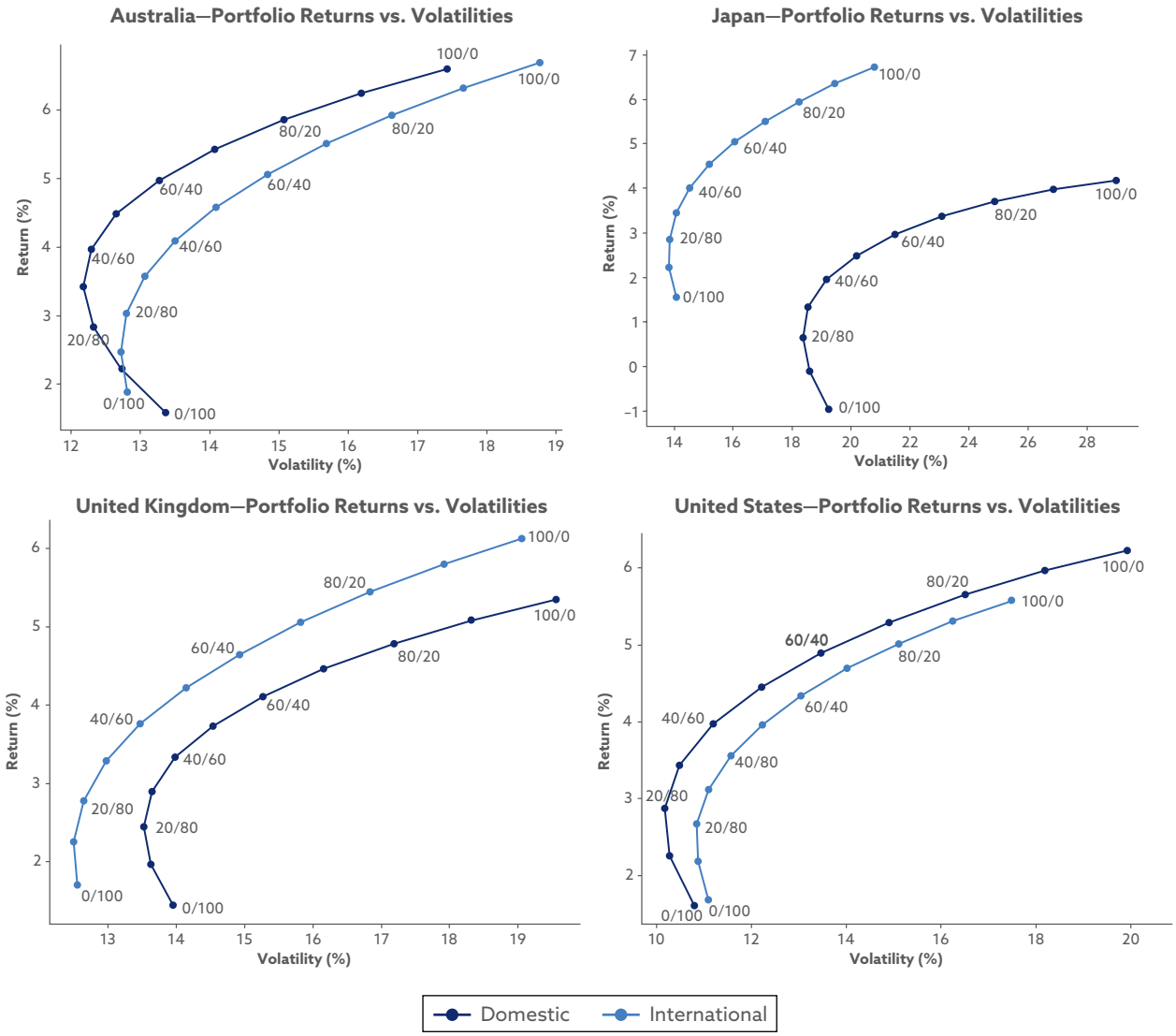
Source: Data from Dimson, Marsh, and Staunton (2023).

the domestic ones presented in Exhibit 11. Japan's opportunities still bear the highest risk, however, while parts of the US and Australian international IOSs represent the best international investment strategies.

With international diversification, based on the long-term historical analysis, while the investment opportunity set of Japan and the United Kingdom expanded substantially to the left (i.e., in the more efficient direction), the situation was reversed for Australia and the United States. **Exhibit 19** illustrates the trends.

These observations suggest that markets can potentially benefit from international diversification, especially those underperforming the world's

Exhibit 19. Domestic vs. International IOSs



Source: Data from Dimson, Marsh, and Staunton (2023).

benchmarks. Incorporating global returns into portfolios can reduce the spread of returns and mitigate the effects of tracking errors relative to global benchmarks, leading to more efficient investment opportunities.

Highlight 8: International diversification significantly improves the investment opportunity sets for Japanese and UK investors, with better returns and reduced risk, but does not benefit Australian or US investors because of their robust domestic markets.

The Extended 60/40 Portfolio with Other Asset Classes

Equity and bond returns had an interesting relationship throughout the last century. Although bonds offered investors essential diversification benefits, periods of relatively high correlation between bonds and stocks were not atypical.

Investors who set an expectation that stocks and bonds would always go opposite ways during their major drawdowns faced disappointment in 2022, when both stocks and bonds performed poorly. In real terms, almost all major markets, including Australia, the United Kingdom and the United States, experienced negative stock and bond returns in 2022. Despite what may have been their only prior experience up until 2022, investors should be reminded that this was not the first occasion when both asset classes simultaneously experienced downturns on a global scale.

Exhibit 20 shows the cumulative return of bonds in real terms when stocks experience a drawdown. A red zone represents a negative return, and a green zone represents a positive return. Positive bonds' return during a stock drawdown would benefit the 60/40 portfolio with valuable diversification.

Throughout history, major global events such as World War I, the Great Depression, World War II, the 1970s oil crisis, and the Global Financial Crisis have led to significant downturns in various equity markets. In these instances, when equity markets fell sharply—specifically, when cumulative real equity returns declined by more than 20%—it was not uncommon to observe that bond markets also posted negative cumulative returns. The bonds yielded positive cumulative returns, however, during significant equity drawdowns in the early 1990s, 2000s, and the 2008 Global Financial Crisis. This result serves as a reminder for all investors that a portfolio with only stocks and bonds, domestically or internationally diversified, may not always offer the protection when investors most need it.

Exhibit 20. Cumulative Bond Returns During Significant Equity Return Drawdowns

Australia

Drawdown Begin Year	Drawdown End Year	Drawdown Equity Return	Cumulative Bond Return
1929	1932	−30.23%	−7.52%
1951	1958	−41.18%	−45.93%
1970	1985	−65.94%	−33.75%
1990	1991	−22.81%	11.37%
2008	2016	−42.51%	23.00%
2022	N/A	−10.01%	−26.39%

Japan

Drawdown Begin Year	Drawdown End Year	Drawdown Equity Return	Cumulative Bond Return
1907	1910	−33.20%	−2.49%
1917	1932	−63.36%	−52.12%
1937	1969	−97.58%	−97.83%
1970	1971	−20.02%	−1.58%
1973	1984	−49.29%	−26.39%
1990	N/A	−70.07%	145.62%

United Kingdom

Drawdown Begin Year	Drawdown End Year	Drawdown Equity Return	Cumulative Bond Return
1914	1922	−45.85%	−68.44%
1929	1933	−30.58%	27.40%
1937	1946	−43.70%	−19.39%
1947	1954	−23.41%	−48.44%
1969	1972	−26.29%	−7.90%
1973	1982	−70.47%	−43.12%
2000	2006	−37.86%	15.84%
2008	2013	−33.11%	8.58%
2020	N/A	−10.55%	−39.96%

United States

Drawdown Begin Year	Drawdown End Year	Drawdown Equity Return	Cumulative Bond Return
1907	1908	−30.04%	−6.30%
1916	1924	−45.71%	−45.11%
1929	1936	−60.65%	20.04%
1937	1944	−36.26%	−2.55%
1946	1950	−25.53%	−24.04%
1969	1972	−20.31%	−5.08%
1973	1983	−52.19%	−15.49%
2000	2007	−41.91%	38.10%
2008	2012	−38.30%	25.76%
2022	N/A	−23.95%	−30.56%

Source: Data from Dimson, Marsh, and Staunton (2023).

When investors doubt the performance of the plain vanilla 60/40 portfolio from an asset allocation perspective, they often search for potential diversifiers among other asset classes. In such a scenario, investors look for asset classes that have low or negative correlations with equity and bonds and that offer protection against inflation.

In the following subsections, we explore the role that commodities and other asset classes can play in building a diversified investment portfolio. Our selection of asset classes to be added to the traditional 60/40 portfolio is guided by developments in the financial industry. BlackRock, for example, adds private assets, infrastructure, commodities, and inflation-linked bonds to its stock/bond core portfolio (Mackintosh 2023).

These new asset classes have a shorter performance data history, however. Therefore, our analysis here is dictated by the availability of historical data for the examined asset classes.

The extended 60/40 portfolio considers asset classes beyond equity and bonds. In this portfolio, 60% of the value is allocated to aggressive, riskier assets, and the remaining 40% is allocated to defensive, less risky investments. In each of these broad categories, we assume an equal distribution of assets. Because of the limited availability of indices, the extended portfolios considered in this analysis are global, not specific to one country. The indices in nominal terms are converted into real terms by using the DMS World Inflation series, using the following formula:

$$\text{Real value} = \frac{1 + \text{Nominal value}}{1 + \text{Inflation rate}} - 1$$

Additionally, the indices used are all in USD. The bill return series used is the DMS US Bill USD return series. The extended multi-asset-class 60/40 portfolio is built from the foundation of the Core Global Portfolio (CGP), which holds 60% of equity (using the DMS World Real Equity Total Returns) and 40% bonds (DMS World Real Bonds Total Returns).

To obtain an optimal historical perspective based on data availability, we examine the impact of multi-asset diversification by expanding the CGP in three steps:

(1) Equity, Bonds, and Commodities International Portfolio (EBCIP)

(2) Extended Globally Diversified Portfolio 1 (EGDP1)

(3) Extended Globally Diversified Portfolio 2 (EGDP2)

The analysis period for each of the three portfolios varied, because it is determined by the longest available data series for the relevant assets.

Equity, Bonds, and Commodities International Portfolio (EBCIP), 1961–2022

The first diversifier added to the CGP is commodities to form a hypothetical Equity, Bonds, and Commodities International Portfolio in which 60% is invested in world equity and commodities and 40% in world bonds. The performance of commodities is measured by the Bloomberg Commodity Total Returns Index.

The return of the portfolio is calculated as follows:

$$R_{P_i} = 0.6\left(\frac{1}{2}R_{\text{Equity}_i} + \frac{1}{2}R_{\text{Commodities}_i}\right) + 0.4R_{\text{Bonds}_i}$$

Based on the equal-weight assumption, the resulting portfolio (EBCIP 30%) has a 30% allocation to commodities, which could be considered an aggressive allocation to commodities.

We also examined a hypothetical portfolio with only a 10% allocation to commodities (EBCIP 10%).

Extended Globally Diversified Portfolio 1 (EGDP1), 2004–22

In the second step, we add private equity, infrastructure, real estate, conventional bonds, inflation-linked government bonds, and high-yield credits to the mix with their representative performance index. Traditional bonds are represented by the Bloomberg Global Aggregate Total Returns Index (hedged), which covers investment-grade government and corporate bonds. The allocation details are as follows:

- 60% invested equally in the following assets (with their returns represented by the relevant index provided in the brackets)
  - Listed equity (DMS World Real Equity Total Returns)
  - Private equity (S&P Listed Private Equity Total Returns)
  - Infrastructure (S&P Global Infrastructure Total Returns)
  - Real estate (MSCI World Real Estate Gross Total Returns)
- 40% invested equally in the following assets (with their returns represented by the relevant index provided in the brackets)
  - Conventional bonds (Bloomberg Global Aggregate Total Returns Hedged)
  - Inflation-linked government bonds (Bloomberg World Government Inflation-Linked Total Returns Hedged)
  - High-yield credits (Bloomberg Global High Yield Total Returns Hedged)

The return of the hypothetical portfolio is calculated as follows:

$$R_{P_i} = 0.6\left(\frac{1}{4}R_{\text{Public Equity}_i} + \frac{1}{4}R_{\text{Private Equity}_i} + \frac{1}{4}R_{\text{Infrastructure}_i} + \frac{1}{4}R_{\text{Real Estate}_i}\right) + 0.4\left(\frac{1}{3}R_{\text{Conventional Bonds}_i} + \frac{1}{3}R_{\text{Inflation–linked Bonds}_i} + \frac{1}{3}R_{\text{Credits}_i}\right)$$

Extended Globally Diversified Portfolio 2 (EGDP2), 2011–22

Commodities, hedge funds, and Bitcoin are added to the mix in the third step.

- 60% invested equally in the following assets (with their returns represented by the relevant index provided in the brackets)
  - Public equity (DMS World Real Equity Total Returns)
  - Private equity (S&P Listed Private Equity Total Returns)

- Infrastructure (S&P Global Infrastructure Total Returns)
- Real estate (MSCI World Real Estate Gross Total Returns)
- Commodities (Bloomberg Commodity Total Returns)
- Hedge funds (Eureka Hedge Fund)
- Bitcoin (Bloomberg Galaxy Bitcoin)

- 40% invested equally in the following assets (with their returns represented by the relevant index provided in the brackets)
  - Conventional bonds (Bloomberg Global Aggregate Total Returns Hedged)
  - Inflation-linked government bonds (Bloomberg World Government Inflation-Linked Total Returns Hedged)
  - High-yield credits (Bloomberg Global High Yield Total Returns Hedged)

The return of the hypothetical portfolio is calculated as follows:

$$R_{P_i} = 0.6\left(\frac{1}{7}R_{\text{Public Equity}_i} + \frac{1}{7}R_{\text{Private Equity}_i} + \frac{1}{7}R_{\text{Infrastructure}_i} + \frac{1}{7}R_{\text{Real Estate}_i} + \frac{1}{7}R_{\text{Commodities}_i} + \frac{1}{7}R_{\text{Hedge Funds}_i} + \frac{1}{7}R_{\text{Bitcoin}_i}\right) + 0.4\left(\frac{1}{3}R_{\text{Conventional Bonds}_i} + \frac{1}{3}R_{\text{Inflation-linked Bonds}_i} + \frac{1}{3}R_{\text{Credits}_i}\right)$$

Exhibit 21 shows large differences in the behaviour and performance of these new asset classes included in the globally diversified portfolios in the last decade. Bitcoin and private equity are the only two asset classes outperforming listed equity in terms of mean return. They both fail to outperform equity in terms of risk-adjusted return (i.e., Sharpe ratio), however, because of their high volatility. Bitcoin's standard deviation is 1,543.54%, reflecting the highly speculative nature of the asset. Indeed, it is still debatable whether Bitcoin should be considered an investment asset. Only infrastructure and high-yield credit produced a higher Sharpe ratio than equity during this period.

Exhibit 22 presents the correlation matrix of the indices representing the asset classes of these global multi-asset portfolios. The Bloomberg Commodity Index and Bloomberg Galaxy Bitcoin Index both have low or negative correlations with asset classes, suggesting the potential benefit of diversification. Although infrastructure, private equity, and real estate have high correlations with listed equity, they have lower correlations with bonds and other alternative assets, suggesting that we can expect to gain diversification benefits in the context of a broad multi-asset portfolio.

Exhibit 21. Performance of the Various Asset Classes, in Real Terms, 2011–22

	Mean	Median	Standard Deviation	Sharpe Ratio	Maximum Drawdown
S&P Listed Private Equity Total Return Index	6.61%	8.83%	24.36%	0.3506	–32.43%
MSCI World Real Estate Gross Total Return	2.97%	1.85%	16.04%	0.3053	–29.04%
S&P Global Infrastructure Total Return Index	3.70%	7.24%	12.01%	0.4686	–12.10%
Bloomberg Global-Aggregate Total Return Index Value Hedged	–0.22%	1.37%	6.48%	0.2630	–23.17%
Bloomberg World Govt Inflation-Linked All Maturities Total Return Hedged	0.39%	2.48%	8.78%	0.2643	–23.16%
Bloomberg Global High Yield Total Return Index Value Hedged	2.33%	3.06%	9.02%	0.4722	–19.96%
Bloomberg Commodity Index Total Return	–4.77%	–3.59%	13.05%	–0.2176	–49.27%
Eurekahedge Hedge Fund Index	–0.34%	–0.59%	9.83%	0.1613	–18.83%
Bloomberg Galaxy Bitcoin Index	144.60%	102.93%	1543.54%	0.0949	–74.77%
DMS World Real Equity Total Return	4.59%	8.35%	14.93%	0.4369	–21.77%
DMS World Real Bond Total Return	–0.30%	4.03%	11.31%	0.1438	–34.23%

Source: Data from Bloomberg and Dimson, Marsh, and Staunton (2023).

Exhibit 22. Correlation Matrix, 2011–22

	S&P Listed Private Equity Total Return Index	MSCI World Real Estate Gross Total Return	S&P Global Infrastructure Total Return Index	Bloomberg Global-Aggregate Total Return Index Value Hedged USD	Bloomberg World Govt Inflation-Linked All Maturities TR Hedged USD	Bloomberg Global High Yield Total Return Index Value Hedged USD	Bloomberg Commodity Index Total Return	Eurekahedge Hedge Fund Index	Bloomberg Galaxy Bitcoin Index	DMS World Real Equity TR USD	DMS World Real Bond TR USD
S&P Listed Private Equity Total Return Index	1.0000	0.8302	0.7574	0.3405	0.3103	0.6705	0.3539	0.7092	0.3033	0.9244	0.2270
MSCI World Real Estate Gross Total Return	0.8302	1.0000	0.6794	0.5351	0.5339	0.6893	0.1563	0.6010	−0.0442	0.7378	0.4752
S&P Global Infrastructure Total Return Index	0.7574	0.6794	1.0000	0.3554	0.2926	0.6216	0.3465	0.5594	0.2747	0.7449	0.2872
Bloomberg Global-Aggregate Total Return Index Value Hedged USD	0.3405	0.5351	0.3554	1.0000	0.8978	0.7624	−0.4567	0.5888	−0.0056	0.4932	0.9458
Bloomberg World Govt Inflation-Linked All Maturities TR Hedged USD	0.3103	0.5339	0.2926	0.8978	1.0000	0.7094	−0.2027	0.5688	−0.1664	0.4296	0.9469
Bloomberg Global High Yield Total Return Index Value Hedged USD	0.6705	0.6893	0.6216	0.7624	0.7094	1.0000	0.0104	0.7346	0.1324	0.7323	0.6870
Bloomberg Commodity Index Total Return	0.3539	0.1563	0.3465	−0.4567	−0.2027	0.0104	1.0000	0.1442	−0.2067	0.2165	−0.3607
Eurekahedge Hedge Fund Index	0.7092	0.6010	0.5594	0.5888	0.5688	0.7346	0.1442	1.0000	0.1944	0.9037	0.6054
Bloomberg Galaxy Bitcoin Index	0.3033	−0.0442	0.2747	−0.0056	−0.1664	0.1324	−0.2067	0.1944	1.0000	0.3662	−0.1164
DMS World Real Equity TR USD	0.9244	0.7378	0.7449	0.4932	0.4296	0.7323	0.2165	0.9037	0.3662	1.0000	0.4133
DMS World Real Bond TR USD	0.2270	0.4752	0.2872	0.9458	0.9469	0.6870	−0.3607	0.6054	−0.1164	0.4133	1.0000

Source: Data from Bloomberg and Dimson, Marsh, and Staunton (2023).

Portfolios' Performance Metrics

Exhibit 23 compares the performance of the extended portfolios with the Core Global Portfolio (CGP, highlighted in grey) for the corresponding periods. EGDP2 shows the highest (geometric) mean return by far but also exorbitantly high volatility. From 2011 to 2022, while the CGP earned only 2.86% p.a., the EGDP2 produced an annual return of 38%. This large difference can be attributed to the presence of Bitcoin, which is very high risk but high reward. In contrast, the other portfolios had lower returns than EGDP2 and much lower volatilities.

EGDP1, EBCIP 10%, and EBCIP 30% each could deliver a marginally higher return than their core benchmark portfolio, CGP.

Ultimately, the metric to consider here is the Sharpe ratio, which considers both returns and risk. CGP represents the traditional global 60/40 portfolio and produces a Sharpe ratio of 0.255 for the entire period.

Although EBCIP 30% and EBCIP 10% could offer only a modest improvement in return compared with CGP, they both produce lower volatility and substantially enhance the Sharpe ratio. EBCIP 30% indeed has the highest Sharpe ratio of 0.4878. The two EBCIP portfolios also have a smaller maximum drawdown than the core benchmark portfolio. This result suggests that merely including commodities in a traditional 60/40 portfolio could be sufficient to improve its performance.

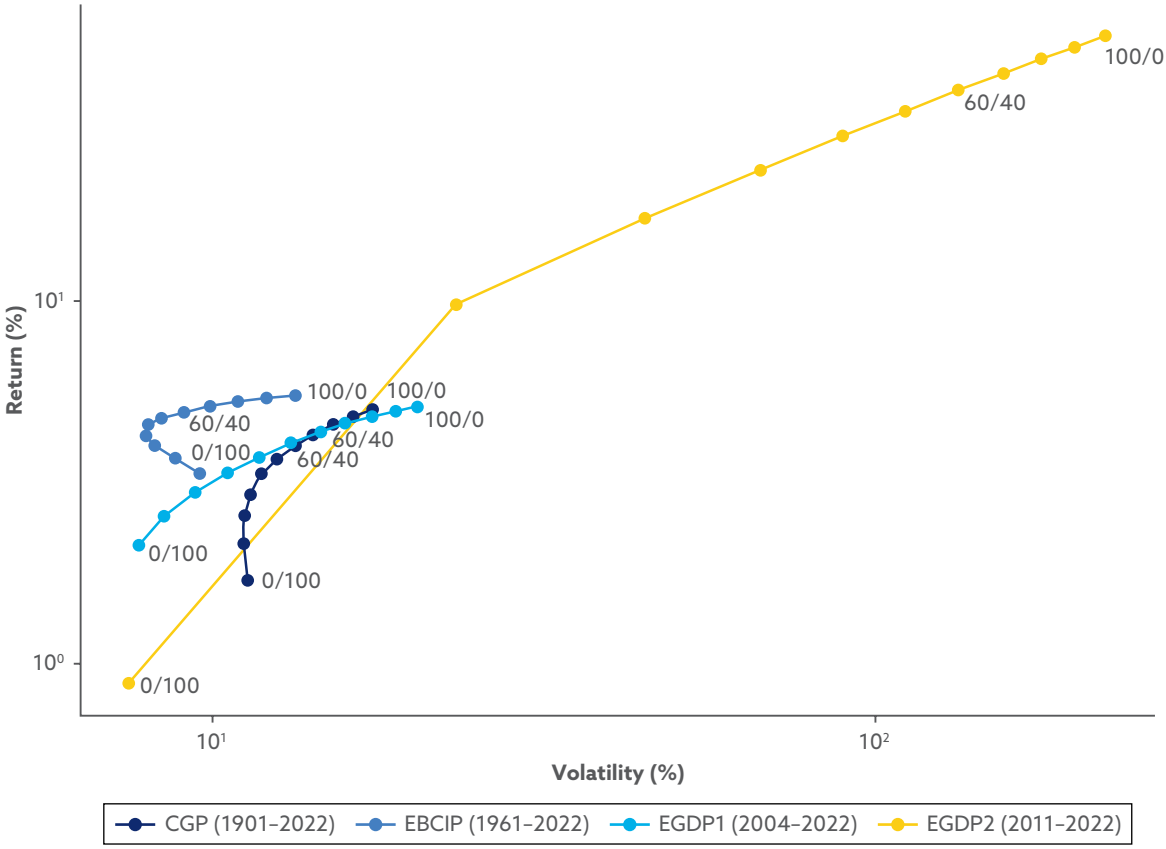
When we include other alternative asset classes to form EGPD1 and EGDP2, the Sharpe ratios of these hypothetical portfolios are both lower than those of CGP for the corresponding periods—albeit to varying degrees. This finding indicates that the increased returns generated by these portfolios are accompanied by significantly higher risks. Consequently, including these asset classes

Exhibit 23. Extended Portfolio Metrics

	Mean	Median	Standard Deviation	Skewness	Sharpe Ratio	Maximum Drawdown
CGP (1901–2022)	3.99%	5.98%	13.29%	0.2793	0.2545	–64.00%
CGP (1961–2022)	4.93%	8.08%	11.80%	–0.3876	0.3711	–33.23%
EBCIP 30% (1961–2022)	4.96%	6.23%	9.03%	–0.4571	0.4878	–18.75%
EBCIP 10% (1961–2022)	5.02%	7.17%	10.24%	–0.4045	0.4356	–20.69%
CGP (2004–2022)	4.00%	7.12%	11.89%	–1.2446	0.4487	–23.77%
EGDP1 (2004–2022)	4.34%	7.79%	14.52%	–1.0029	0.3905	–31.65%
CGP (2011–2022)	2.86%	5.35%	11.58%	–1.1509	0.4132	–23.77%
EGDP2 (2011–2022)	38.02%	18.97%	133.78%	2.7793	0.2986	–21.41%

Source: Data from Bloomberg and Dimson, Marsh, and Staunton (2023).

Exhibit 24. IOSs of Globally Diversified Multi-Asset Portfolios



Source: Data from Bloomberg and Dimson, Marsh, and Staunton (2023).

undermines the anticipated advantages of diversification in terms of risk-adjusted returns.

EBCIP 30%'s IOS (the medium blue curve in **Exhibit 24**) demonstrates its outperformance compared with the other portfolios. In contrast, EGDP2's plot (yellow) exemplifies its incredibly high-risk, high-return nature, exponentially expanding both the range of returns and the range of volatility in the IOSs. Opportunities for exceptionally high returns may avail with extremely high volatility, and investors should understand such risks thoroughly before embarking on this investment strategy.

Highlight 9: During the examined periods, including commodities in a traditional 60/40 portfolio could improve its performance. The inclusion of other asset classes increased returns generated by these portfolios but significantly elevated their risks, undermining the anticipated advantages of diversification in terms of risk-adjusted returns.

Conclusion

This study, focusing primarily on Australia, Japan, the United Kingdom, and the United States, examines the performance of the traditional 60/40 investment strategy over time. We also examine the potential inclusion of other asset classes to enhance the 60/40 portfolios.

Our research notes generational and regional differences in market conditions and investment returns, with baby boomers generally faring better than millennials. In Australia and the United States, however, generational differences were less pronounced because of more stable long-term investment returns of the 60/40 portfolio. For investors, this finding highlights the need to tailor investment strategies to the distinct market conditions that different generations experience.

The research emphasises the importance of diversification. The historical analysis of the stock–bond relationship over the past 122 years reminds us that simultaneous declines in stocks and bonds, as we witnessed in 2022, were not uncommon. Although the 60/40 portfolio did not sufficiently protect investors in those years when both asset classes experienced a drawdown, in the long run, the 60/40 portfolio stood the test of market volatility.

International diversification may bring benefits, but it is not always guaranteed. Although beneficial in Japan and the United Kingdom, it was less effective in Australia and the United States, where domestic investment performance was more robust. During the examined period, the integration of commodities into the core 60/40 portfolio, either at an aggressive or moderate level, enhanced portfolio diversification, improved the Sharpe ratio, and reduced volatility and drawdowns.

Adding other alternative assets to the mix, however—such as private equity, infrastructure, real estate, inflation-linked bonds, and high-yield credits—did not result in the anticipated benefits of diversification. Including assets such as Bitcoin demonstrated potential for high returns, albeit with substantial increased volatility, exponentially expanding the investment opportunity sets. Because this strategy involves extreme volatility, however, it should not be considered a standard component of the modified 60/40 portfolio.

Based on the key findings, we offer investors some tailored recommendations:

- Stay informed on both historical trends and future outlooks to effectively manage the performance of the traditional 60/40 portfolio relative to potential shifts in asset performance.
- Recognise that market conditions and investment outcomes have varied significantly across generations and regions. Tailor investment strategies to the specific circumstances and goals of different generations as well as to incorporate market-specific performance characteristics.

- Diversify internationally with caution. Although international diversification has been beneficial in some regions, such as Japan and the United Kingdom, it has been less impactful in Australia and the United States. Focus on regions and markets that offer the best risk-adjusted returns for the portfolio.
- Consider adding exposure to commodities, which may provide diversification benefits.
- Consider adding exposure to other asset classes. Alternative assets such as private equity, infrastructure, real estate, and inflation-linked bonds can potentially boost returns but not necessarily increase the Sharpe ratio.
- Consider adding exposure to Bitcoin. High-volatility assets such as Bitcoin can offer opportunities for high returns but come with much more substantial risk. In such a decision, investment managers must consider the investor's risk tolerance and investment horizon.

References

Australian Securities Exchange. 2023. "Australian Investor Study 2023." www.asx.com.au/investors/investment-tools-and-resources/australian-investor-study.

BlackRock. 2023. "Rebuilding Resilience in 60/40 Portfolios." www.blackrock.com/us/individual/insights/60-40-portfolios-and-alternatives.

Callen, T., and J. D. Ostry. 2003. *Japan's Lost Decade: Policies for Economic Revival*. Washington, DC: The International Monetary Fund.

Charles Schwab. 2018. "The Home Bias Report." https://content.schwab.com/web/retail/public/international/The-UK-Home-Bias-Report/CSUK-Home-Bias-Full-Report-(0718-86L0)-Final.pdf.

Dimson, E., P. R. Marsh, and M. Staunton. 2018. *Credit Suisse Global Investment Returns Yearbook 2018*. Credit Suisse Research Institute.

Dimson, E., P. R. Marsh, and M. Staunton. 2023. *Credit Suisse Global Investment Returns Yearbook 2023*. Credit Suisse Research Institute.

Hamada, K., and M. Kasuya. 1992. "The Reconstruction and Stabilization of the Postwar Japanese Economy: Possible Lessons for Eastern Europe?" Center Discussion Paper No. 672, Yale University Economic Growth Center. www.econstor.eu/bitstream/10419/160594/1/cdp672.pdf.

Mackintosh, J. 2023. "BlackRock vs. Goldman in the Fight over 60/40." *The Wall Street Journal* (15 January). www.wsj.com/articles/blackrock-vs-goldman-in-the-fight-over-60-40-11673728658.

Mathews, T. 2019. "A History of Australian Equities." Research Discussion Paper 2019–04, Reserve Bank of Australia. www.rba.gov.au/publications/rdp/2019/2019-04/australian-equity-market-facts-1917-2019.html.

O'Brien, G. 2022. "Australian Government Debt in Historical and International Perspective." In *Briefing Book: Key Issues for the 47th Parliament*, 55–61. Commonwealth of Australia (June). https://www.aph.gov.au/-/media/05_About_Parliament/54_Parliamentary_Depts/544_Parliamentary_Library/Research_Papers/2023-24/Briefing_Book_key_issues_for_the_47th_Parliament.pdf.

Vanguard. 2023. "The Improved Outlook for the 60/40 Portfolio" (March). www.vanguard.com.au/personal/learn/smart-investing/portfolio-building/improved-outlook-for-the-60-40-portfolio.

Appendix A. Long-Term Performance of Stocks, Bonds, and the 60/40 Portfolios in Markets around the World

As the primary analysis only covers the subject markets of Australia, Japan, the United Kingdom, and the United States, Exhibits A1–A3 provide the long-term performance of stocks, bonds, and the domestic 60/40 portfolio, respectively, of other markets available in the DMS dataset for reference.

Exhibit A1. Equity Returns, 1901–2022

	Geometric Mean	Arithmetic Mean	Median	Standard Deviation	Skewness	Sharpe Ratio	Maximum Drawdown	% > 0
Argentina	0.0309	0.2128	0.0425	0.9304	3.7606	0.0784	−0.8461	52.3810
Australia	0.0659	0.0808	0.0975	0.1742	−0.2171	0.3492	−0.6594	71.3115
Austria	0.0092	0.0511	0.0114	0.3052	1.2360	0.2878	−0.9569	52.4590
Belgium	0.0289	0.0548	0.0344	0.2344	0.5224	0.1415	−0.8042	58.1967
Brazil	0.0624	0.1610	0.0172	0.5327	1.7509	0.1471	−0.8275	54.1667
Canada	0.0570	0.0705	0.0719	0.1684	−0.0013	0.2613	−0.5532	68.8525
Chile	0.1180	0.1859	0.1054	0.4761	2.9478	0.3246	−0.6173	60.3175
China	0.0329	0.0836	0.0445	0.3421	0.7692	0.0746	−0.5767	53.3333
DMs	0.0512	0.0665	0.0932	0.1764	−0.0831	0.2557	−0.5979	71.3115
Denmark	0.0573	0.0759	0.0519	0.2074	1.2738	0.1897	−0.4917	63.9344
EMs	0.0355	0.0615	0.0711	0.2274	0.2651	0.1292	−0.8559	60.6557
Europe	0.0407	0.0592	0.0528	0.1976	0.4315	0.1753	−0.7359	63.1148
Finland	0.0546	0.0922	0.0904	0.2938	1.2089	0.2069	−0.8608	66.3934
France	0.0339	0.0585	0.0561	0.2286	0.3166	0.2419	−0.8753	57.3770
Germany	0.0322	0.0795	0.0639	0.3116	1.4525	0.1807	−0.9537	61.4754
Greece	0.0462	0.1307	0.0430	0.4872	1.8937	0.0813	−0.9459	56.5217
HK SAR	0.0852	0.1499	0.0931	0.3836	0.6269	0.2428	−0.8342	60.0000
India	0.0664	0.0969	0.0720	0.2597	0.6548	0.2448	−0.6076	64.2857
Ireland	0.0421	0.0678	0.0333	0.2283	0.2328	0.1614	−0.7506	60.6557
Italy	0.0202	0.0586	0.0495	0.2819	0.7157	0.1981	−0.8574	59.8361
Japan	0.0419	0.0858	0.0695	0.2898	0.5129	0.2092	−0.9758	62.2951
Malaysia	0.0635	0.1204	0.0547	0.3831	1.5392	0.1468	−0.7101	58.4906
Mexico	0.0849	0.1392	0.0538	0.3672	1.0245	0.1823	−0.7793	61.1111
Netherlands	0.0498	0.0701	0.0759	0.2115	0.8087	0.2201	−0.5541	65.5738
New Zealand	0.0603	0.0770	0.0849	0.1922	1.1523	0.2361	−0.7297	69.6721
Norway	0.0447	0.0726	0.0534	0.2628	2.1357	0.1359	−0.7368	63.1148
Portugal	0.0365	0.0838	0.0488	0.3366	1.6521	0.1446	−0.9378	58.1967
Russia	−0.1166	0.1496	0.0968	0.5573	1.5485	0.1101	−0.9998	68.1818
Singapore	0.0540	0.0959	0.0852	0.3054	0.6825	0.1628	−0.7466	57.8947
South Africa	0.0702	0.0910	0.0650	0.2178	0.9130	0.2773	−0.5223	61.4754
South Korea	0.0853	0.1373	0.0928	0.3499	0.7949	0.1867	−0.7234	71.6667
Spain	0.0323	0.0532	0.0233	0.2140	0.7571	0.1448	−0.8437	59.0164
Sweden	0.0589	0.0806	0.0852	0.2127	0.0557	0.2057	−0.7091	67.2131
Switzerland	0.0457	0.0634	0.0539	0.1942	0.3070	0.2036	−0.7252	66.3934
TWN (CHN TPE)	0.0950	0.1618	0.1413	0.3929	0.6904	0.2237	−0.6799	69.6429
Thailand	0.0704	0.1370	0.1273	0.4039	0.9515	0.1307	−0.8617	59.5745
United Kingdom	0.0535	0.0714	0.0695	0.1956	0.6523	0.2287	−0.7047	66.3934
United States	0.0623	0.0818	0.1034	0.1993	−0.2186	0.2818	−0.6065	65.5738
World	0.0502	0.0652	0.0918	0.1749	−0.0591	0.2520	−0.6080	70.4918
World ex-US	0.0427	0.0596	0.0578	0.1892	0.3950	0.1933	−0.6738	65.5738

Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit A2. Bond Returns, 1901–2022

	Geometric Mean	Arithmetic Mean	Median	Standard Deviation	Skewness	Sharpe Ratio	Maximum Drawdown	% > 0
Argentina	−0.0295	0.0201	0.0603	0.3267	1.2500	0.0385	−0.8314	61.2903
Australia	0.0158	0.0244	0.0242	0.1336	0.5610	0.0803	−0.7900	59.0164
Austria	−0.0402	0.0428	0.0204	0.5316	6.3967	0.0722	−0.9997	62.2951
Belgium	0.0024	0.0146	0.0210	0.1532	−0.0255	0.0435	−0.9138	57.3770
Brazil	0.0781	0.1031	0.0835	0.2404	0.5845	0.3912	−0.4005	71.4286
Canada	0.0189	0.0244	0.0186	0.1066	0.3361	0.0559	−0.6311	59.0164
Chile	0.0099	0.0128	0.0208	0.0738	−1.5698	0.6300	−0.2520	70.0000
China	0.0246	0.0294	0.0159	0.1002	−0.0222	0.1722	−0.1683	63.3333
DMs	0.0147	0.0209	0.0143	0.1126	0.1704	0.0760	−0.6994	55.7377
Denmark	0.0186	0.0274	0.0158	0.1387	1.0145	0.0041	−0.6892	55.7377
EMs	−0.0039	0.0169	0.0278	0.1879	0.0706	−0.0531	−0.9809	59.0164
Europe	0.0075	0.0214	0.0108	0.1645	0.2368	0.0085	−0.8714	61.4754
Finland	−0.0024	0.0107	0.0290	0.1403	−1.9688	0.0271	−0.9299	63.9344
France	−0.0006	0.0091	0.0180	0.1339	−0.6768	0.1551	−0.9666	57.3770
Germany	−0.0152	0.0108	0.0287	0.1578	−2.0004	0.0565	−0.9908	61.4754
Greece	0.0755	0.1115	0.0888	0.2806	0.7224	0.2457	−0.7472	70.0000
HK SAR	0.0203	0.0276	0.0263	0.1251	0.3062	0.2255	−0.3121	62.0690
India	0.0027	0.0098	−0.0098	0.1238	1.0246	−0.0003	−0.7894	45.7143
Ireland	0.0128	0.0238	0.0134	0.1527	0.6699	0.0495	−0.7995	53.2787
Italy	−0.0117	0.0030	0.0205	0.1556	−1.0897	0.1538	−0.9830	59.8361
Japan	−0.0095	0.0151	0.0319	0.1923	−0.8886	0.0480	−0.9951	61.4754
Malaysia	0.0424	0.0468	0.0348	0.0971	0.3954	0.3618	−0.2646	69.8113
Mexico	0.0632	0.0677	0.0777	0.0995	−0.1259	0.4547	−0.2164	78.5714
Netherlands	0.0137	0.0192	0.0147	0.1044	0.1006	0.1006	−0.6950	58.1967
New Zealand	0.0219	0.0261	0.0174	0.0922	0.3245	0.0762	−0.6001	68.0328
Norway	0.0163	0.0232	0.0189	0.1188	0.6224	0.0612	−0.7660	61.4754
Portugal	−0.0185	−0.0020	0.0100	0.1823	0.8431	−0.0348	−0.9909	55.7377
Russia	−0.1512	0.0475	0.0127	0.3713	1.1680	0.0720	−0.9999	54.5455
Singapore	0.0237	0.0262	0.0322	0.0719	−0.3302	0.2695	−0.2530	71.4286
South Africa	0.0179	0.0230	0.0219	0.1023	0.2254	0.0790	−0.6297	59.8361
South Korea	0.0794	0.0885	0.0572	0.1456	0.8557	0.4079	−0.3121	70.0000
Spain	0.0158	0.0240	0.0248	0.1300	0.3930	0.1113	−0.7540	60.6557
Sweden	0.0241	0.0318	0.0196	0.1300	1.1298	0.0687	−0.6755	61.4754
Switzerland	0.0201	0.0243	0.0196	0.0963	1.6194	0.1443	−0.5939	63.9344
TWN (CHN TPE)	0.0359	0.0379	0.0374	0.0666	−0.1291	0.4324	−0.1638	75.0000
Thailand	0.0617	0.0703	0.0580	0.1408	0.9686	0.3130	−0.2587	69.7674
United Kingdom	0.0144	0.0236	0.0087	0.1396	0.7653	0.0407	−0.7356	55.7377
United States	0.0161	0.0217	0.0148	0.1078	0.4075	0.0928	−0.6268	59.8361
World	0.0170	0.0231	0.0138	0.1135	0.5594	0.0957	−0.6995	60.6557
World ex-US	0.0134	0.0239	0.0158	0.1480	0.8635	0.0492	−0.8069	62.2951

Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit A3. 60/40 Portfolio Returns, 1901–2022

	Geometric Mean	Arithmetic Mean	Median	Standard Deviation	Skewness	Sharpe Ratio	Maximum Drawdown	% > 0
Argentina	0.0330	0.0838	0.0667	0.3321	0.5700	0.2262	−0.6843	61.2903
Australia	0.0497	0.0582	0.0706	0.1327	−0.0696	0.3361	−0.5461	71.3115
Austria	0.0151	0.0478	0.0190	0.2881	3.1560	0.3251	−0.9674	61.4754
Belgium	0.0234	0.0387	0.0348	0.1798	0.6191	0.1538	−0.8214	57.3770
Brazil	0.0914	0.1187	0.0741	0.2703	1.6958	0.3971	−0.3339	67.8571
Canada	0.0457	0.0521	0.0544	0.1157	−0.0299	0.2826	−0.4510	69.6721
Chile	0.0394	0.0482	0.0120	0.1402	0.5231	0.5416	−0.2779	53.3333
China	0.0450	0.0619	0.0295	0.1970	0.7406	0.1907	−0.4089	63.3333
DMs	0.0400	0.0482	0.0666	0.1313	0.1059	0.2578	−0.6324	66.3934
Denmark	0.0461	0.0565	0.0446	0.1553	1.5712	0.1812	−0.4658	63.9344
EMs	0.0259	0.0437	0.0398	0.1865	0.2543	0.1063	−0.9101	66.3934
Europe	0.0306	0.0441	0.0251	0.1676	0.4961	0.1464	−0.7944	62.2951
Finland	0.0396	0.0596	0.0594	0.2001	0.3883	0.2289	−0.8437	64.7541
France	0.0255	0.0387	0.0357	0.1645	0.0584	0.2851	−0.8744	61.4754
Germany	0.0207	0.0520	0.0565	0.2206	0.5726	0.2032	−0.9635	62.2951
Greece	0.0346	0.0800	0.0993	0.3035	−0.0138	0.0925	−0.8230	63.3333
Hong Kong	0.0410	0.0544	0.0392	0.1696	0.1880	0.2885	−0.2503	55.1724
India	0.0493	0.0621	0.0623	0.1687	0.7293	0.2758	−0.3810	62.8571
Ireland	0.0355	0.0502	0.0270	0.1756	0.3052	0.1725	−0.6572	62.2951
Italy	0.0147	0.0364	0.0396	0.2020	−0.0383	0.2493	−0.8635	59.8361
Japan	0.0295	0.0575	0.0613	0.2149	−0.3871	0.2248	−0.9774	66.3934
Malaysia	0.0669	0.0910	0.0550	0.2424	1.3382	0.2460	−0.5555	62.2642
Mexico	0.0581	0.0696	0.0344	0.1607	0.2736	0.2500	−0.1948	64.2857
Netherlands	0.0409	0.0497	0.0481	0.1372	0.5162	0.2748	−0.3901	68.0328
New Zealand	0.0488	0.0566	0.0567	0.1326	1.2525	0.2556	−0.4124	72.1311
Norway	0.0397	0.0529	0.0438	0.1720	1.3613	0.1788	−0.7020	63.9344
Portugal	0.0240	0.0495	0.0393	0.2414	1.4571	0.1495	−0.8883	58.1967
Russia	−0.1206	0.1087	0.0548	0.4653	1.5888	0.1231	−0.9999	68.1818
Singapore	0.0441	0.0557	0.0532	0.1617	0.7190	0.2464	−0.2972	57.1429
South Africa	0.0533	0.0638	0.0425	0.1522	0.8589	0.2855	−0.4887	62.2951
South Korea	0.0954	0.1178	0.1086	0.2308	0.8453	0.3268	−0.4151	70.0000
Spain	0.0305	0.0415	0.0214	0.1546	0.6652	0.1886	−0.7397	56.5574
Sweden	0.0506	0.0611	0.0659	0.1475	−0.0998	0.2400	−0.6191	68.0328
Switzerland	0.0391	0.0478	0.0504	0.1360	0.4862	0.2422	−0.6662	68.0328
Taiwan	0.0514	0.0621	0.0724	0.1538	0.3603	0.2883	−0.2177	67.8571
Thailand	0.0823	0.1030	0.0888	0.2220	0.8108	0.2914	−0.5363	62.7907
United Kingdom	0.0411	0.0523	0.0587	0.1527	0.3314	0.2121	−0.6072	63.9344
United States	0.0489	0.0577	0.0640	0.1346	−0.2305	0.3179	−0.4488	66.3934
World	0.0399	0.0484	0.0598	0.1329	0.2793	0.2545	−0.6400	68.8525
World ex-US	0.0337	0.0453	0.0374	0.1581	0.7472	0.1745	−0.7265	64.7541

Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibits A4–A8 illustrate the performance of the 60/40 against other allocation strategies in the subject markets, compared to Europe and the World.

Exhibit A9 presents the correlation among return series in USD of various markets.

Exhibit A4. The Performance of 60/40 Against 30/70 and 80/20

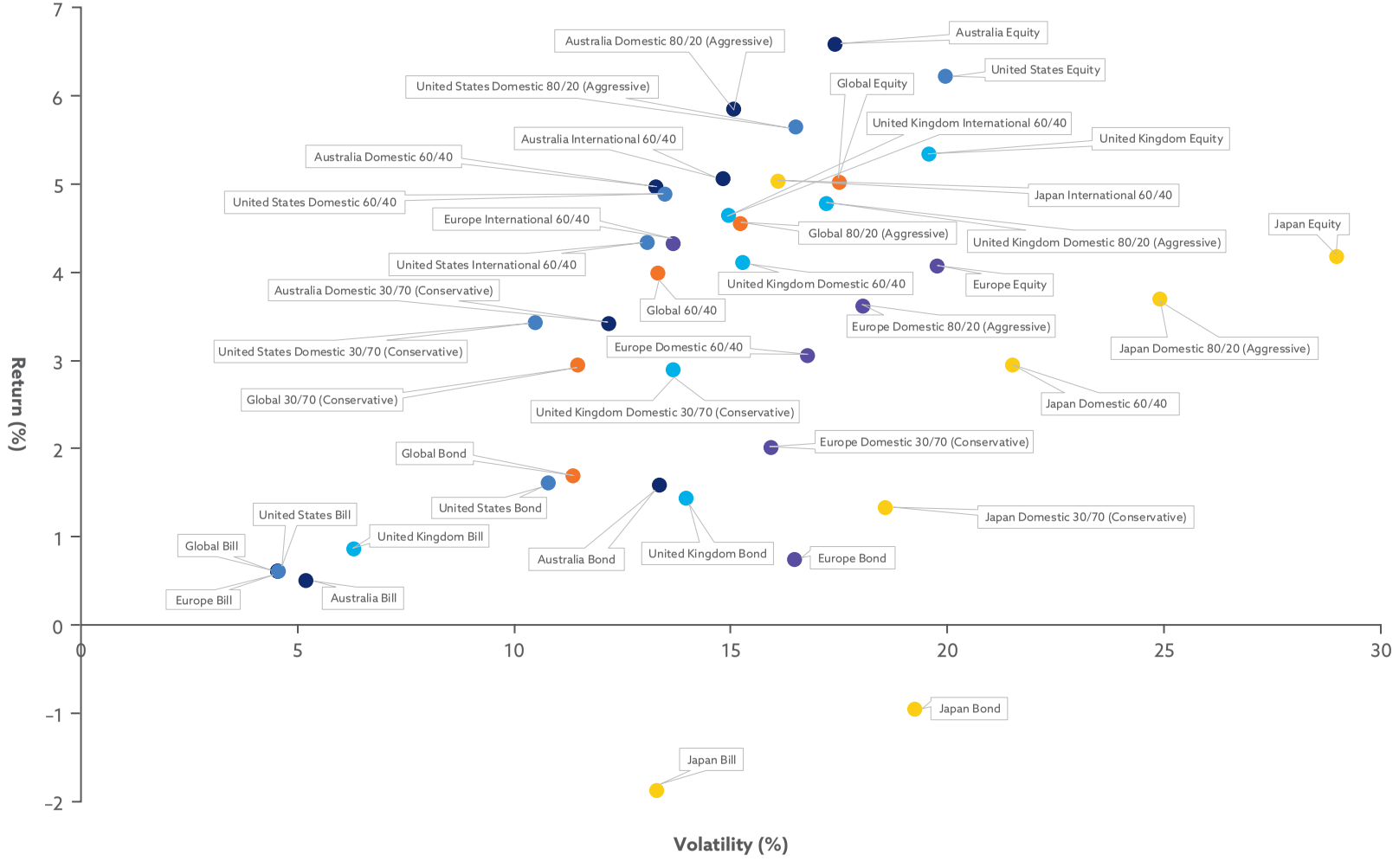
Country	Asset	Metric	1998–2022	1973–2022	1948–2022	1923–2022	1901–2022
Australia	Equity	Mean Return	0.06	0.06	0.05	0.06	0.07
		Standard Deviation	0.16	0.21	0.20	0.18	0.17
		Sharpe Ratio	0.31	0.18	0.24	0.29	0.35
	Bond	Mean Return	0.03	0.03	0.01	0.02	0.02
		Standard Deviation	0.11	0.13	0.12	0.13	0.13
		Sharpe Ratio	0.16	0.07	0.04	0.11	0.08
	30–70 Portfolio	Mean Return	0.04	0.04	0.03	0.04	0.03
		Standard Deviation	0.07	0.11	0.11	0.12	0.12
		Sharpe Ratio	0.45	0.20	0.19	0.25	0.24
	60–40 Portfolio	Mean Return	0.05	0.05	0.04	0.05	0.05
		Standard Deviation	0.09	0.14	0.14	0.14	0.13
		Sharpe Ratio	0.50	0.23	0.26	0.32	0.34
	80–20 Portfolio	Mean Return	0.06	0.05	0.05	0.06	0.06
		Standard Deviation	0.12	0.17	0.17	0.16	0.15
		Sharpe Ratio	0.39	0.21	0.26	0.31	0.35
Japan	Equity	Mean Return	0.03	0.02	0.08	0.04	0.04
		Standard Deviation	0.24	0.22	0.28	0.29	0.29
		Sharpe Ratio	0.15	0.10	0.28	0.22	0.21
	Bond	Mean Return	0.02	0.03	0.02	−0.01	−0.01
		Standard Deviation	0.05	0.08	0.18	0.20	0.19
		Sharpe Ratio	0.50	0.41	0.10	0.08	0.05
	30–70 Portfolio	Mean Return	0.03	0.03	0.05	0.01	0.01
		Standard Deviation	0.08	0.09	0.16	0.19	0.19
		Sharpe Ratio	0.43	0.36	0.29	0.21	0.17
	60–40 Portfolio	Mean Return	0.04	0.03	0.07	0.03	0.03
		Standard Deviation	0.15	0.14	0.19	0.22	0.21
		Sharpe Ratio	0.26	0.22	0.35	0.25	0.22
	80–20 Portfolio	Mean Return	0.04	0.03	0.07	0.03	0.04
		Standard Deviation	0.19	0.18	0.23	0.25	0.25
		Sharpe Ratio	0.20	0.15	0.32	0.24	0.22
United Kingdom	Equity	Mean Return	0.03	0.06	0.06	0.06	0.05
		Standard Deviation	0.15	0.22	0.22	0.20	0.20
		Sharpe Ratio	0.19	0.19	0.25	0.26	0.23
	Bond	Mean Return	0.02	0.03	0.01	0.02	0.01
		Standard Deviation	0.12	0.14	0.13	0.13	0.14
		Sharpe Ratio	0.17	0.14	0.05	0.10	0.04
	30–70 Portfolio	Mean Return	0.03	0.05	0.03	0.04	0.03
		Standard Deviation	0.10	0.14	0.13	0.13	0.14
		Sharpe Ratio	0.29	0.21	0.19	0.22	0.15
	60–40 Portfolio	Mean Return	0.03	0.05	0.05	0.05	0.04
		Standard Deviation	0.10	0.17	0.16	0.15	0.15
		Sharpe Ratio	0.31	0.22	0.25	0.27	0.21
	80–20 Portfolio	Mean Return	0.03	0.06	0.06	0.06	0.05
		Standard Deviation	0.12	0.19	0.19	0.17	0.17
		Sharpe Ratio	0.25	0.21	0.26	0.27	0.23

Exhibit A4. The Performance of 60/40 Against 30/70 and 80/20 (*continued*)

Country	Asset	Metric	1998–2022	1973–2022	1948–2022	1923–2022	1901–2022	
United States	Equity	Mean Return	0.05	0.06	0.07	0.07	0.06	
		Standard Deviation	0.18	0.18	0.17	0.20	0.20	
		Sharpe Ratio	0.31	0.31	0.39	0.33	0.28	
	Bond	Mean Return	0.02	0.03	0.02	0.02	0.02	
		Standard Deviation	0.13	0.14	0.12	0.11	0.11	
		Sharpe Ratio	0.23	0.19	0.13	0.17	0.09	
	30–70 Portfolio	Mean Return	0.04	0.04	0.04	0.04	0.03	
		Standard Deviation	0.10	0.12	0.10	0.10	0.10	
		Sharpe Ratio	0.47	0.34	0.34	0.36	0.27	
	60–40 Portfolio	Mean Return	0.05	0.05	0.06	0.06	0.05	
		Standard Deviation	0.11	0.13	0.12	0.13	0.13	
		Sharpe Ratio	0.50	0.38	0.44	0.40	0.32	
	80–20 Portfolio	Mean Return	0.05	0.06	0.07	0.06	0.06	
		Standard Deviation	0.14	0.15	0.14	0.16	0.16	
		Sharpe Ratio	0.40	0.35	0.42	0.37	0.31	
Europe	Equity	Mean Return	0.03	0.05	0.07	0.05	0.04	
		Standard Deviation	0.21	0.21	0.20	0.20	0.20	
		Sharpe Ratio	0.16	0.22	0.31	0.25	0.18	
	Bond	Mean Return	0.02	0.04	0.04	0.02	0.01	
		Standard Deviation	0.15	0.14	0.13	0.16	0.16	
		Sharpe Ratio	0.17	0.23	0.26	0.13	0.01	
	30–70 Portfolio	Mean Return	0.03	0.04	0.05	0.04	0.02	
		Standard Deviation	0.14	0.14	0.12	0.16	0.16	
		Sharpe Ratio	0.24	0.29	0.36	0.21	0.09	
	60–40 Portfolio	Mean Return	0.03	0.05	0.06	0.05	0.03	
		Standard Deviation	0.16	0.16	0.15	0.17	0.17	
		Sharpe Ratio	0.24	0.28	0.37	0.25	0.15	
	80–20 Portfolio	Mean Return	0.03	0.05	0.06	0.05	0.04	
		Standard Deviation	0.18	0.18	0.17	0.18	0.18	
		Sharpe Ratio	0.20	0.25	0.35	0.26	0.17	
World	Equity	Mean Return	0.04	0.05	0.07	0.06	0.05	
		Standard Deviation	0.19	0.18	0.17	0.18	0.17	
		Sharpe Ratio	0.24	0.25	0.37	0.31	0.25	
	Bond	Mean Return	0.03	0.04	0.03	0.03	0.02	
		Standard Deviation	0.10	0.10	0.09	0.11	0.11	
		Sharpe Ratio	0.38	0.33	0.27	0.21	0.10	
	30–70 Portfolio	Mean Return	0.04	0.05	0.04	0.04	0.03	
		Standard Deviation	0.09	0.10	0.09	0.11	0.11	
		Sharpe Ratio	0.51	0.41	0.44	0.33	0.20	
	60–40 Portfolio	Mean Return	0.04	0.05	0.06	0.05	0.04	
		Standard Deviation	0.12	0.13	0.12	0.13	0.13	
		Sharpe Ratio	0.40	0.36	0.44	0.36	0.25	
	80–20 Portfolio	Mean Return	0.04	0.05	0.06	0.06	0.05	
		Standard Deviation	0.16	0.15	0.14	0.15	0.15	
		Sharpe Ratio	0.32	0.31	0.41	0.34	0.26	

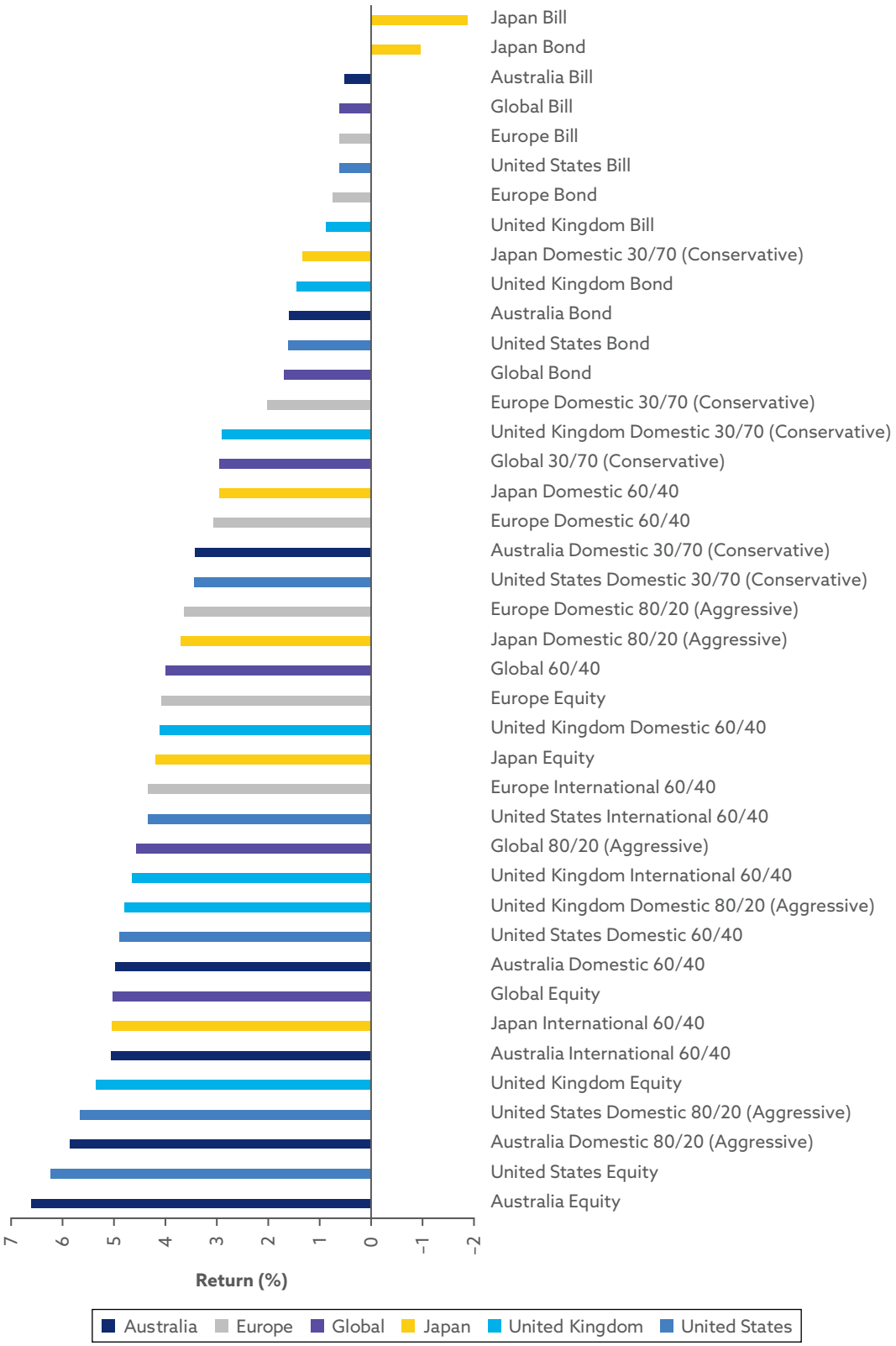
Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit A5. Risk and Return of Various Investment Options, 1901–2022



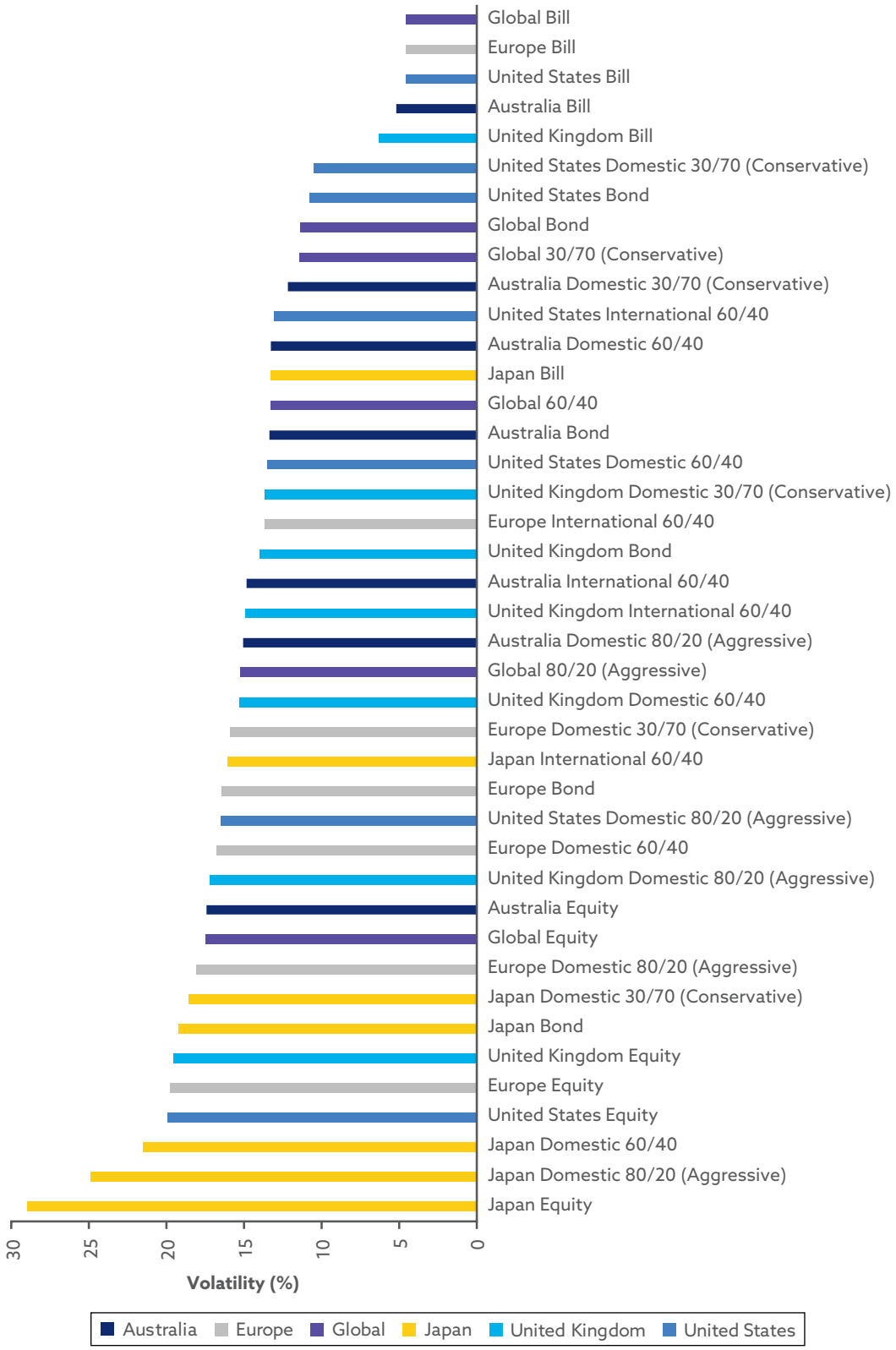
Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit A6. Returns Comparison Among Different Allocation Strategies: Domestic Portfolios



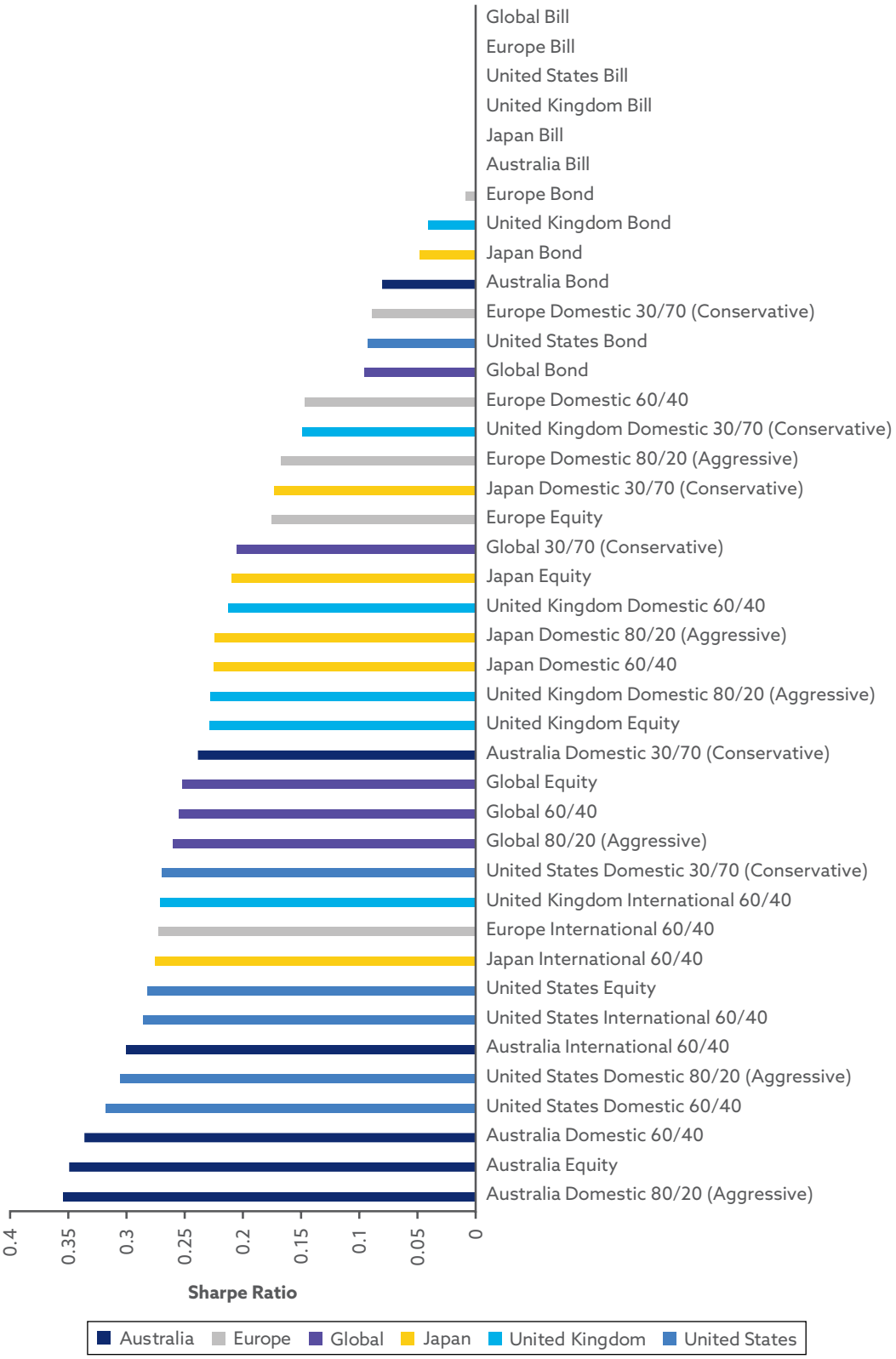
Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit A7. Volatility Comparison Among Different Allocation Strategies: Domestic Portfolios



Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit A8. Sharpe Ratio Comparison Among Different Allocations: Domestic Portfolios



Source: Data from Dimson, Marsh, and Staunton (2023).

Exhibit A9. International Correlation Analysis, 1901–2022

	Australia Equity	Australia Bond	World ex-Australia Equity	World ex-Australia Bond
Australia Equity	1	0.6162	0.7524	0.3461
Australia Bond	0.6162	1	0.4989	0.7210
World ex-Australia Equity	0.7524	0.4989	1	0.4726
World ex-Australia Bond	0.3461	0.7210	0.4726	1

	Japan Equity	Japan Bond	World ex-Japan Equity	World ex-Japan Bond
Japan Equity	1	0.4563	0.3762	0.2513
Japan Bond	0.4563	1	0.2672	0.4080
World ex-Japan Equity	0.3762	0.2672	1	0.4608
World ex-Japan Bond	0.2513	0.4080	0.4608	1

	United Kingdom Equity	United Kingdom Bond	World ex-United Kingdom Equity	World ex-United Kingdom Bond
United Kingdom Equity	1	0.6604	0.6953	0.4008
United Kingdom Bond	0.6604	1	0.4046	0.7145
World ex-United Kingdom Equity	0.6953	0.4046	1	0.4341
World ex-United Kingdom Bond	0.4008	0.7145	0.4341	1

	United States Equity	United States Bond	World ex-United States Equity	World ex-United States Bond
United States Equity	1	0.1909	0.6208	0.3270
United States Bond	0.1909	1	0.1039	0.4892
World ex-United States Equity	0.6208	0.1039	1	0.6410
World ex-United States Bond	0.3270	0.4892	0.6410	1

	Europe Equity	Europe Bond	World ex-Europe Equity	World ex-Europe Bond
Europe Equity	1	0.6226	0.7033	0.3583
Europe Bond	0.6226	1	0.3715	0.6432
World ex-Europe Equity	0.7033	0.3715	1	0.2568
World ex-Europe Bond	0.3583	0.6432	0.2568	1

Source: Data from Dimson, Marsh, and Staunton (2023).

Appendix B. Formulas

Appendix B presents all formulas used in this publication.

To calculate the returns, risk, Sharpe ratio, and maximum drawdown from our dataset, we used the following formulas.

Portfolio Return

$$R = \sum_{k=1}^{N} \omega_k R_k ,$$

where ω is the weight of asset k and R is the rate of return of asset k.

Geometric Mean Return

$$Mean(R) = \sqrt[N]{\prod_{i=1}^{N} R_i},$$

where R_i is the return of the portfolio in year i.

Risk

$$STD(R) = \sqrt{\sum_{k=1}^{N} \omega_k^2 STD^2(R_k) + \sum_{k=1}^{N} \sum_{j=1, j \neq k}^{N} \omega_k \omega_j Cov(R_k, R_j)},$$

where STD stands for the standard deviation of the return series and $Cov(R_k, R_j)$ is the covariance between the two return series k and j.

Sharpe Ratio

$$SR = \frac{Mean(R) - R_f}{STD(R)},$$

where R_f is the risk-free rate.

Cumulative Return

$$CR_t = \prod_{i=1}^{t} (1 + R_i),$$

where $t = 1, \ldots, N$ is the length of the relevant time period.

Maximum Drawdown

$$MDD = \min\left(\frac{CR_t}{\max_{i=1}^{t} CR_i} - 1 \right),$$

where $t = 1, \ldots, N$ is the length of the relevant period.

Authors

Nga Pham, CFA
Monash Centre for Financial Studies, Monash University, Australia

Bei Cui
Monash Centre for Financial Studies, Monash University, Australia

Ummul Ruthbah
Monash Centre for Financial Studies, Monash University, Australia

ABOUT THE RESEARCH AND POLICY CENTER

CFA Institute Research and Policy Center brings together CFA Institute expertise along with a diverse, cross-disciplinary community of subject matter experts working collaboratively to address complex problems. It is informed by the perspective of practitioners and the convening power, impartiality, and credibility of CFA Institute, whose mission is to lead the investment profession globally by promoting the highest standards of ethics, education, and professional excellence for the ultimate benefit of society. For more information, visit https://rpc.cfainstitute.org/en/.

First page photo credit: Getty Images/Arctic-Images

CFA Institute

PROFESSIONAL LEARNING QUALIFIED ACTIVITY

This publication qualifies for 1.5 PL credits under the guidelines of the CFA Institute Professional Learning Program.