

Vanguard research

Vanguard's approach to constructing Australia's Diversified Portfolios

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Summary

- Diversification is a fundamental investment concept. Together with a long-term investment plan, it serves as the bedrock for an investment portfolio.
- When building a diversified portfolio, there are several elements to consider including the investment objective, time horizon, risk tolerance, tax, cost, and investor behaviour. At Vanguard, we categorise these elements according to our four key investing principles: goals, balance, cost, and discipline (see Vanguard's Principles for Investing Success). In determining the asset allocation of our diversified portfolios, our focus is to design well balanced, disciplined funds, and deliver a professionally managed, diversified portfolio solution that gives investors the best chance of investment success.
- This paper explores Vanguard's framework for designing diversified portfolios in Australia. We explain the type of investors these funds are best suited to, the rationale for the asset allocation of the funds, and highlight the relevance of key implementation considerations such as the use of index versus active strategies and the importance of rebalancing.

Key portfolio construction considerations

Investors may feel they lack the necessary time, interest, or expertise to construct their portfolio. They may be overwhelmed by the number of investment options, asset classes, and implementation challenges, such as deciding between index and active management strategies. Additionally, investors may encounter behavioural risks in adhering to their investment plans over time – for example some investors may be tempted to chase performance or be prone to overreacting to market events.

Vanguard's Principles for Investing Success emphasise a central theme: Direct your attention towards aspects that are within your control (see **Figure 1**).

Focus on what you can control:

There are only a few key factors that can be readily controlled by investors: costs, asset allocation and investment contribution rates are some of the biggest. These can be driving factors in the final investment outcome of a portfolio. While this paper focuses on asset allocation, investors can improve outcomes by increasing their investment contributions and/or spending less on fees.

FIGURE 1:

Quantifying the value-add of best practices in wealth management



Notes: Base case (10% savings rate, 100 bps fees & 70/30 portfolio) Simulation assumes a 25-year-old investor investing to retirement at age 65, earning \$80,000 per annum growing at a real rate of 2%. Percentage values shown indicate the difference in median final values of the adjusted portfolios relative to the base case. Vanguard Capital Markets Model (VCMM) data used as of December 2023.

IMPORTANT: The projections or other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modelled asset class in AUD. Simulations are as of December 2023. Results from the model may vary with each use and over time.

Sources: Vanguard calculations, using the VCMM.

Despite the allure of responding to short-term market fluctuations, current economic updates, or emerging investment trends, these factors typically do not contribute to better decision making or improved long-term investment results.

Vanguard's diversified portfolios offer professionally managed solutions tailored to help medium to long-term investors achieve their objectives and navigate various challenges. Central to Vanguard's portfolio construction methodology are four fundamental principles: goals, balance, cost and discipline.

1. **Goals:** Investors should have a clearly stated and appropriate goal for their investments.
2. **Balance:** The asset allocation should be balanced in its exposures to various asset classes and be appropriate for the goal.
3. **Cost:** Minimising investment costs improves the chance of better long-term outcomes.
4. **Discipline:** Investors and investment strategies that stay with their approach across different environments have the best chance at investment success.

The diversified portfolios are tailored to the needs of investors aiming for long-term wealth accumulation, who prefer not to take on additional investment risk beyond the broader equity and bond markets. This approach is based on the principle that the rates of return, volatilities and correlations of key asset classes converge toward their historical long-term averages. Some investors with shorter-term financial goals or extremely low risk tolerances may find cash or other low-volatility vehicles a suitable investment. In reality, the majority of Australian investors need to accept some market risk to reach intermediate and long-term investment goals.

In constructing portfolios, we advocate for the use of broadly diversified, market capitalisation-weighted global index funds as a solid foundation. These funds offer an efficient means for the majority of investors to attain long-term optimal market returns in line with

their risk appetite. They are cost-effective, provide exposure to the broad market, and offer diversification and transparency. However, it's essential to note that there is no 'one-size-fits-all' portfolio or recommendation.

For investors whose risk preferences suggest they are open to managing other risks including active manager, sector and model risk, leveraging a variety of robust portfolio construction tools, which facilitate the creation of portfolios that incorporate a mix of active, passive, factor-based, and illiquid investment vehicles can be advantageous. Importantly, the tools can explicitly consider risk-return dynamics in alignment with an investor's risk tolerance and objectives. For a more detailed overview on investor risk preferences, see Aliaga-Díaz et al., 2022.

As illustrated in **Figure 2**, the Australian diversified portfolios encompass a range of growth and defensive asset allocations, accommodating various goals, risk tolerances, and time horizons. The primary aim of these single-fund solutions is to enhance the likelihood of investment success by offering low-cost options that fulfill the core portfolio construction requirements of many investors.

FIGURE 2:
Asset allocations of Vanguard's diversified portfolios



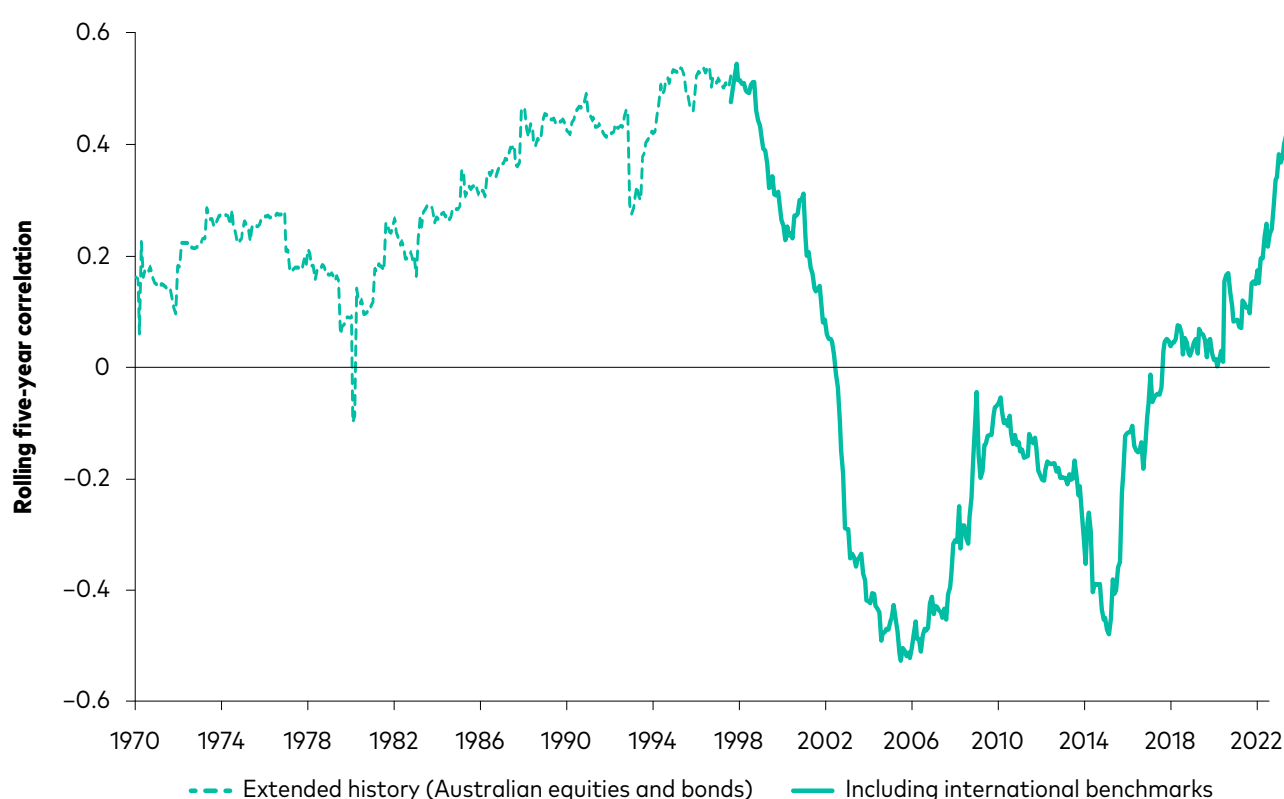
Source: Vanguard.

Broad asset-class allocation

The portfolio construction process of Vanguard's diversified portfolios follows a top-down hierarchy that starts by defining broad strategic allocations among the primary asset classes such as equities, fixed income, and cash (cash is a component of the Conservative option asset allocation only), and then the sub-asset allocation within classes such as domestic versus global equities or bonds.

As indicated in **Figure 3a**, the often low or negative correlation observed between equities and fixed income makes these asset classes excellent complements within a portfolio. While for much of the early part of the 21st century, the stock-bond correlation was negative, **Figure 3a** shows that this has not always been the case. For much of the 20th century, including the last 30 years shown in the graph, stocks and bonds exhibited positive correlation.

FIGURE 3a:
Low and sometimes negatively correlated assets provide diversification and reduce risk in a portfolio

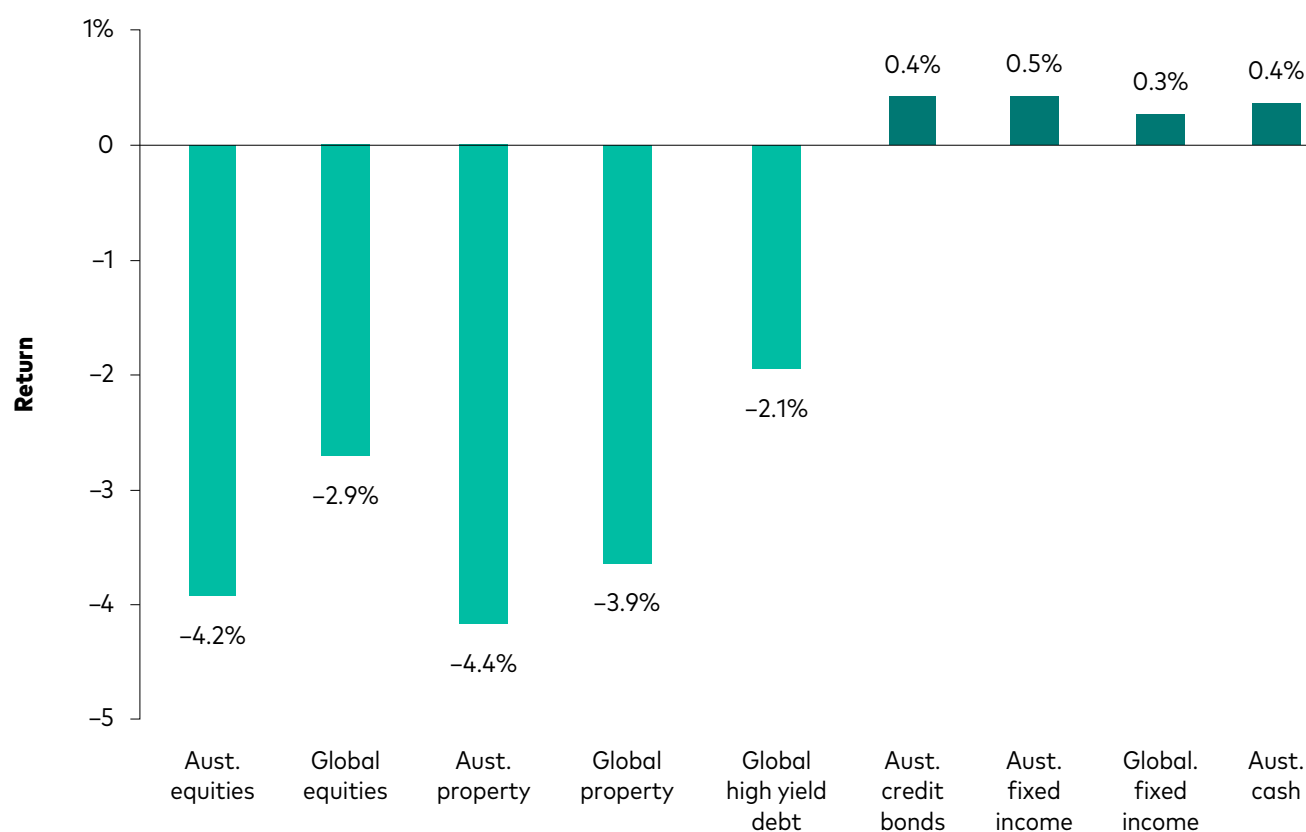


Notes: The chart shows the rolling five-year correlation for equities and bonds including monthly total return data inclusive of dividends reinvested before fees and taxes from 31 January 1970 to 31 December 2023. Prior to 30 June 1997, the equities index is represented by the ASX Accumulation Index and ASX All Ordinaries Index, and the fixed income index is represented by the Australian 10-year treasury bonds. From 1 July 1997 onwards, the equities index is composed of a 40% weighting to the S&P/ASX 300 Accumulation Index and a 60% weighting to the MSCI World ex Australia Index, and fixed income index is composed of a 30% weighting to the Bloomberg AusBond Composite 0+ Yr Index and a 70% to the Bloomberg Global Aggregate TR Index Hedged to AUD.

Sources: Vanguard calculations, using data from Global Financial Data and Bloomberg.

FIGURE 3b:

Diversification is particularly critical during periods of market stress



Notes: The chart shows median asset returns during the worst decile of Australian equity monthly returns from 1 May 1992 to 31 December 2023. Australian equities are represented by the S&P/ASX 300 Accumulation Index, global equities by the MSCI World ex Australia Index, Australian property by the S&P/ASX 300 A-REIT Index (since 2001), global property by the FTSE/NAREIT Developed Index in AUD (since 2005), global high yield debt by the Bloomberg Global High Yield USD Hedged Index (since 1999), Australian fixed income by the Bloomberg AusBond Composite 0+ Yr Index, global fixed income by the Bloomberg Barclays Global Aggregate TR Index Hedged to AUD, and Australian cash by the Bloomberg AusBond Bank Bill Index.

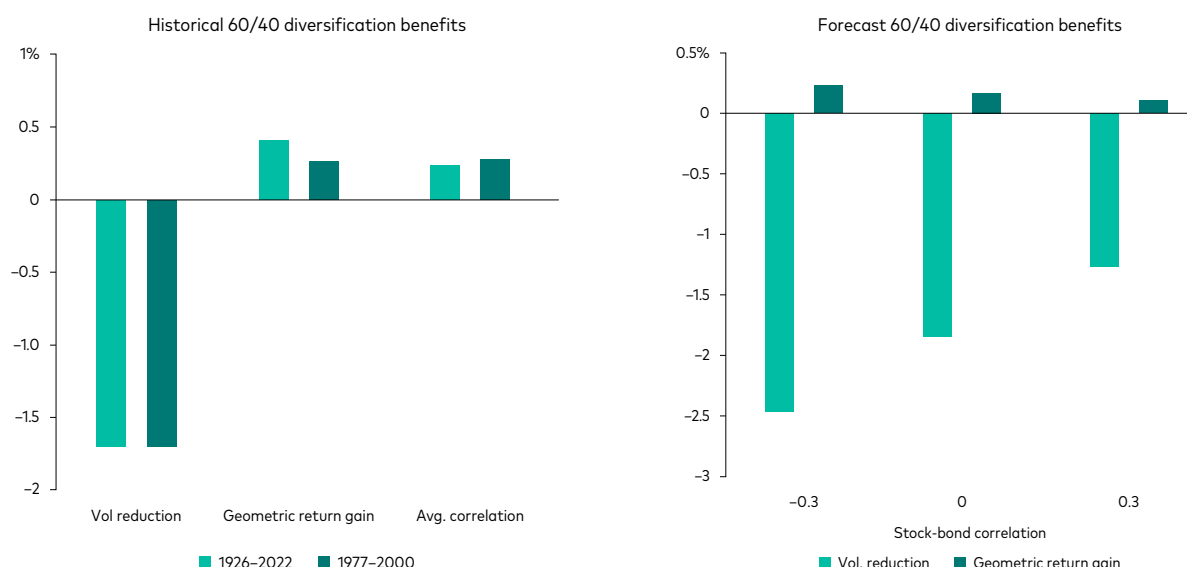
Sources: Vanguard calculations, using data from Bloomberg.

Even during these periods, the bond allocation can still dilute equity risk and improve risk adjusted return of a multi-asset portfolio.

Figure 4 illustrates this point with U.S. data which reliably stretches back to the 1920s. Even though the stock-bond correlation has (on average) been positive over the past 100 years, the presence of bonds in diversified portfolios has still reduced volatility and raised geometric returns.

Later, when discussing the risks of bond investing using Australian data, we find that periods of large, simultaneous drawdowns in stocks and bonds are rare (refer forward to **Figure 16**) and often accompanied by unanchored inflation expectations as was the case during 2021-2022. This shows that even without a negative correlation to equities, bonds can still act as a stabiliser within a portfolio.

FIGURE 4:
Diversification still works with positive correlations



Notes: Historical U.S. equity series is based on the S&P 90 from 1926–1957, the S&P 500 from 3 April 1957 to 31 December 1974, the Wilshire 5000 Index from 1 January 1975 to 22 April 2005, the MSCI US Broad Market Index from 23 April 2005 to 2 June 2013, and the CRSP US Total Market Index thereafter. U.S. bonds series is based on the S&P High Grade Composite Index from 1926 to 1968, the Citigroup High Grade Index from 1969 to 1972, the Lehman Brothers US Long Credit AA Index from 1973 to 1975, the Bloomberg Barclays US Aggregate Index from 1976 to 31 July 2009, and spliced Bloomberg Barclays US Aggregate Float Adjusted Index thereafter. The 60/40 portfolio consists of 60% stocks and 40% bonds. Forecast scenarios use returns from the VCMM; 10-year projections as of December 2022 were used.

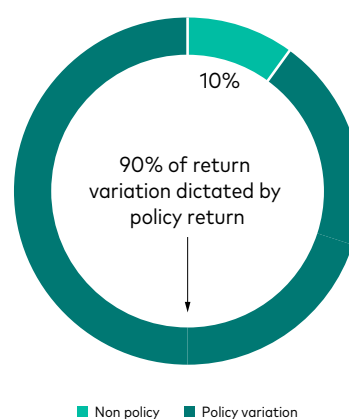
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Sources: Vanguard calculations, using data from Bloomberg.

Why strategic asset allocation?

Vanguard's research, encompassing Australia, the United States (U.S.), Canada, United Kingdom (U.K.), Japan, and Hong Kong markets, reveals that the strategic asset allocation (SAA) decision predominantly influences portfolio return movement, outweighing attempts at market timing or security selection. See Donaldson et al., (2021). Consequently, the broad allocations to defensive assets (fixed income) and growth assets (equities) serve as the primary determinants of the risk-return profiles of the diversified portfolios.

FIGURE 5:
The strategic asset allocation drives the investment experience



Notes: For each fund in our sample, a calculated adjusted R^2 represents the percentage of actual-return variation explained by policy-return variation. The percentage shown in the figure represents the median observation from the distribution of percentage of return variation explained by asset allocation for balanced funds. The Australian market sample covered 682 balanced funds from 1 January 1990 through to 30 September 2020. Calculations were based on monthly net returns, and policy allocations were derived from a fund's actual performance compared with a benchmark using returns-based style analysis (as developed by William F. Sharpe) on a 36-month rolling basis. Funds were selected from Morningstar's Multi-Sector Balanced category. Only funds with at least 48 months of return history were considered in the analysis. The policy portfolio was assumed to have an expense ratio of 2.0 basis points per month (24 bps annually, or 0.24%).

Sources: Vanguard calculations, using data from Morningstar, Inc

What does strategic asset allocation mean in practice?

It means constant evaluation, but only making changes that offer enduring value.

Any change is assessed with respect to its capacity to improve risk-adjusted returns. Given the already well diversified exposure, the bar for change is high. Any change is also considered in the context of associated costs. The long-term focus and the underlying principle that the rates of return, volatilities and correlations of key asset classes converge toward their historical long-term averages also means that asset allocation changes are infrequent and look through short-term market volatility. Shorter term one year annualised rolling returns exhibit much greater volatility, as shown by the larger range of outcomes, than longer term 10-year returns (**Figure 6**).

For multi-asset funds such as Vanguard Australia's diversified portfolios, Vanguard's Investment Strategy Group (ISG) conducts an annual review of the strategic asset allocation of the funds. The team considers new asset classes, currency exposure, home bias, regulatory and tax impact, investment costs, investor behaviours, and implementation factors among others. The ISG team presents these findings to the Strategic Asset Allocation Committee (SAAC).

The SAAC is made up of global investment leaders from across the firm who are responsible for the investment methodology and policy allocations behind our single-fund solutions, which include Vanguard's Diversified Strategies (available as exchange-traded funds (ETFs), managed funds and managed

accounts). The committee is chaired by Vanguard's Global Chief Economist and Head of Investment Strategy. Since the SAAC's founding in 2013, its primary responsibilities have been to establish and validate the investment methodology used in our single-fund solutions and the portfolio construction approaches adopted to meet the investment objectives in those funds.

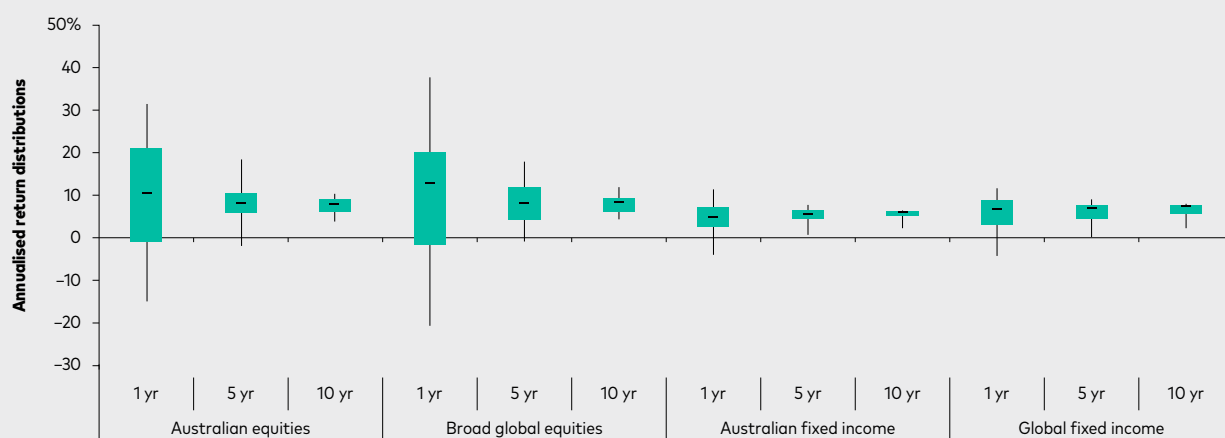
To do this the SAAC relies on a systematic, empirical approach to portfolio construction that is rooted in the proprietary 'V-family' of models, which include the Vanguard Capital Markets Model®, the Vanguard Life-Cycle Investing Model, and the Vanguard Asset Allocation Model. These models have been developed by ISG and underpin an important foundation for reviewing the diversified portfolios, though they are not the sole determinant of the final asset mix.

The SAAC meets regularly to review its investment methodology, debate investment strategies, and submit any changes it recommends for review and approval to Vanguard's Global Investment Committee. The Global Investment Committee has oversight responsibilities for all in-house equity and fixed income management functions as well as for the external investment advisory firms Vanguard employs.

In addition to its oversight responsibilities for Vanguard's single-fund solutions, the SAAC also coordinates with the Advice Policy Committee to ensure that Vanguard's best thinking is consistent across its multi-asset portfolio and advice offers. Ultimately, the SAAC aims to achieve the best possible outcomes for all our clients.

FIGURE 6:

Returns exhibit higher volatility over shorter time horizons



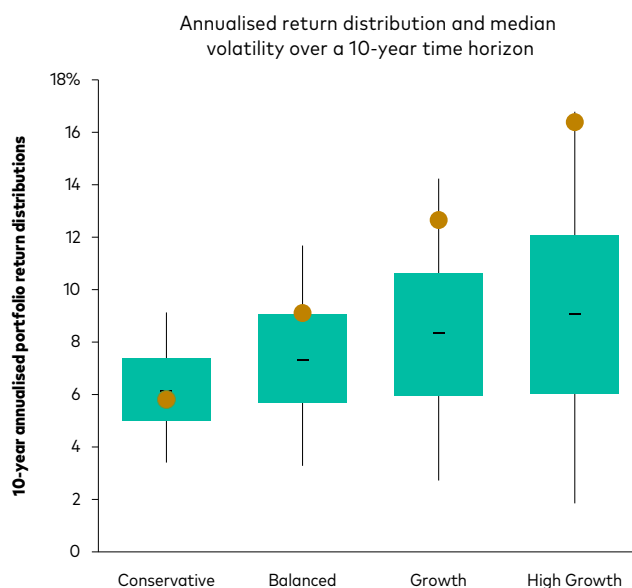
Notes: Box-and-whiskers plot the 5th, 25th, 50th, 75th and 95th percentiles. Daily total returns are calculated inclusive of dividends reinvested before taxes and fees from 26 June 2001 to 31 December 2023 using rolling windows and annualised. Australian equities are represented by the S&P/ASX 300 Accumulation Index, broad global equities by the S&P Global Broad Market Index, Australian fixed income by the Bloomberg AusBond Composite 0+ Yr Index, international fixed income by the Bloomberg Global Aggregate TR Index Hedged to AUD.

Sources: Vanguard calculations, using data from Bloomberg.

Figure 7 shows the distribution of forecasted annualised returns and the volatility over a 10-year horizon for the four diversified portfolios based on Vanguard's Capital Markets Model® (VCMM) (see appendix). Higher volatility portfolios are expected to produce higher returns as a compensation for bearing the extra risk. Riskier portfolios are also shown to increase the dispersion of potential returns over the 10-year period to both the upside and downside. In selecting the most appropriate portfolio, an investor and adviser must understand this trade-off to ensure that the chosen SAA best aligns with the investor's risk tolerance, return needs, and time horizon.

FIGURE 7:

Understanding the risk/return trade-off is essential to selecting the portfolio that meets an investor's needs



Notes: Returns are from the VCMM; one-year steady-state projections as of December 2023 were used. For more information about the VCMM, see the appendix. Box-and-whiskers plot the 5th, 25th, 50th, 75th and 95th percentiles, as well as the median volatility (denoted by the yellow dot '•') and the fiftieth percentile returns is denoted by the dash '-'), of forecasted returns for the four diversified portfolios over a ten-year period.

IMPORTANT: The projections or other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modelled asset class in AUD. Simulations are as of December 2023. Results from the model may vary with each use and over time.

Source: Vanguard calculations, using data from the VCMM.

Sub-asset allocation

One of Vanguard's key investment principles is balance. Balance underscores the importance of avoiding uncompensated portfolio risks through diversification. For further information on Vanguard's key investment principles, see Vanguard's Principles for Investing Success. As such, once the appropriate strategic asset allocation between growth and defensive assets has been determined, the focus turns to building diversified sub-asset class exposures. A global asset allocation can reduce risks associated with issuer concentration, sector concentration, and country specific risk, to name a few.

Asset composition within the growth allocation

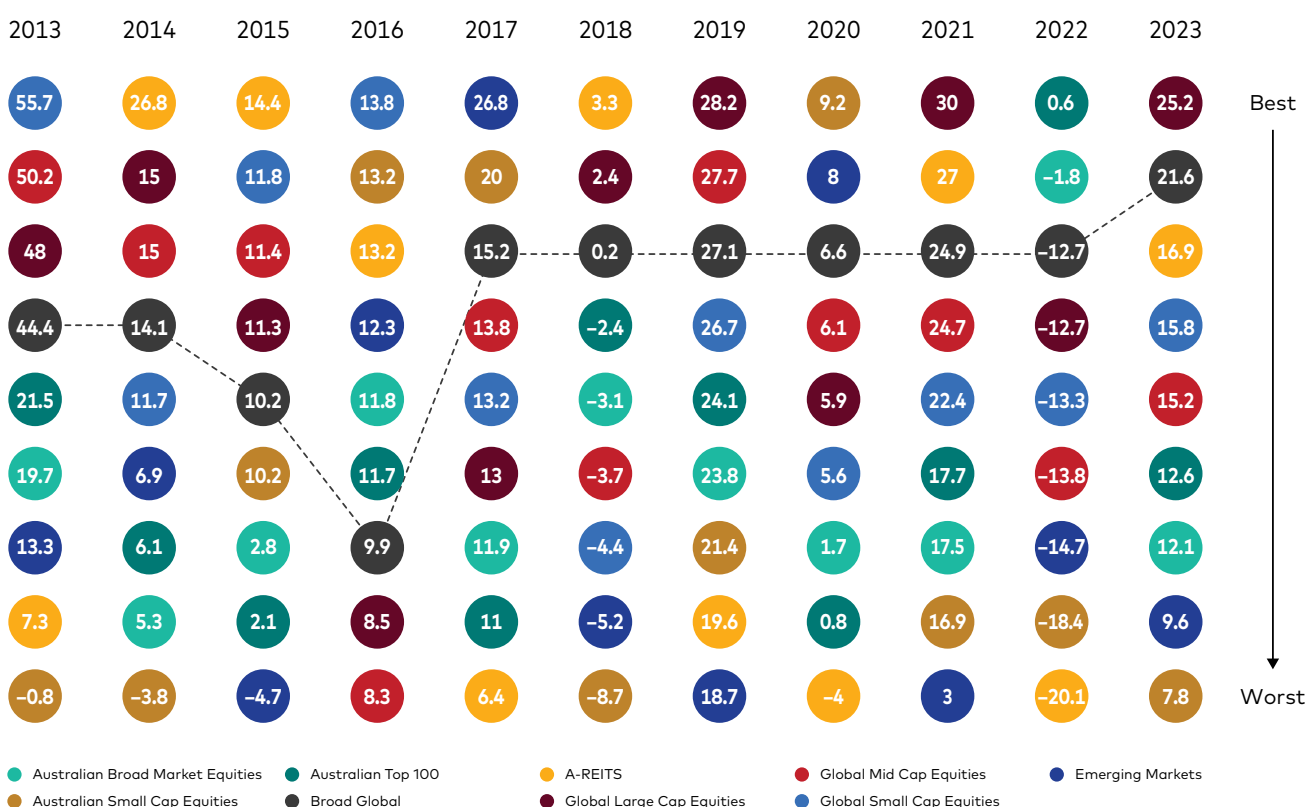
The growth allocation provides exposure to assets with higher expected returns, which serves to protect and grow real spending power

over the long term and is achieved primarily through exposure to equities. Vanguard believes that gaining exposure to these asset classes through a market-cap-weighted portfolio that matches the risk-return profile of the asset-class through broad diversification is a valuable starting point for many investors. See Donaldson et al., 2021.

Figure 8 shows the relative performance of various Australian and global equity market sectors. The annual performance follows no discernible pattern, and strategies that tilt or time the portfolio to outperform also run the risk of substantial underperformance relative to the broad market. Thus, given the long-term investment goals of Vanguard's diversified portfolios, tactical tilts are avoided, reducing active management and factor risk for the end investor.

FIGURE 8:

Outperforming and underperforming sector returns (%) follow a seemingly random pattern



Notes: The chart shows total returns inclusive of dividends reinvested before taxes and fees for the calendar year from January 2013 to December 2023. Global large-cap equities are represented by the MSCI World ex Australia Large Cap Index, global mid-cap equities by the MSCI World ex Australia Mid Cap Index, global small-cap equities by the MSCI World ex Australia Small Cap Index, emerging markets equities by the MSCI Emerging Markets Index, broad global equities by the S&P Global Broad Market Index, Australian broad market equities by the S&P/ASX 300 Accumulation Index, Australian Top 100 by the S&P/ASX 100 Index, Australian small-cap equities by the S&P/ASX Small Ordinaries Index, and A-REITS by the S&P/ASX 300 A-REIT Index.

Sources: Vanguard calculations, using data sourced from Bloomberg.

Factors contributing to home bias – growth assets

Home bias is the tendency for investors to hold a significant portfolio weight in domestic securities, deviating from the allocations that would be implied from market capitalisation. The Australian market capitalisation is 2.0% of the global developed equity markets (MSCI World Index, as of 29 December 2023) but the Australian superannuation asset mix shows a domestic equity allocation of 46% (Rainmaker, Superannuation asset mix (all institutional funds, eg. not-for-profit and retail funds), September 2023) of total listed equities. Reduction in home country equity bias has been taking place both globally and in Australia, due to several trends, including increased access to global investment vehicles, awareness of the value of global diversification, product availability, and lower costs. In Australian superannuation, the reduction in domestic equities has been replaced with exposure to alternatives and global equities (**Figure 9**). Self-Managed Super Funds (SMSFs) demonstrate higher levels of home equity bias – of their assets, 30% are in direct domestic shares, 15% in domestic property, and 25% in cash and term deposits (self-managed super fund statistical report, September 2023).

There are several reasons why investors prefer home country equities, some of which are behavioural and some of which have sound investment rationale. While behavioural drivers can have a strong influence on the degree of home country bias in an investor's portfolio,

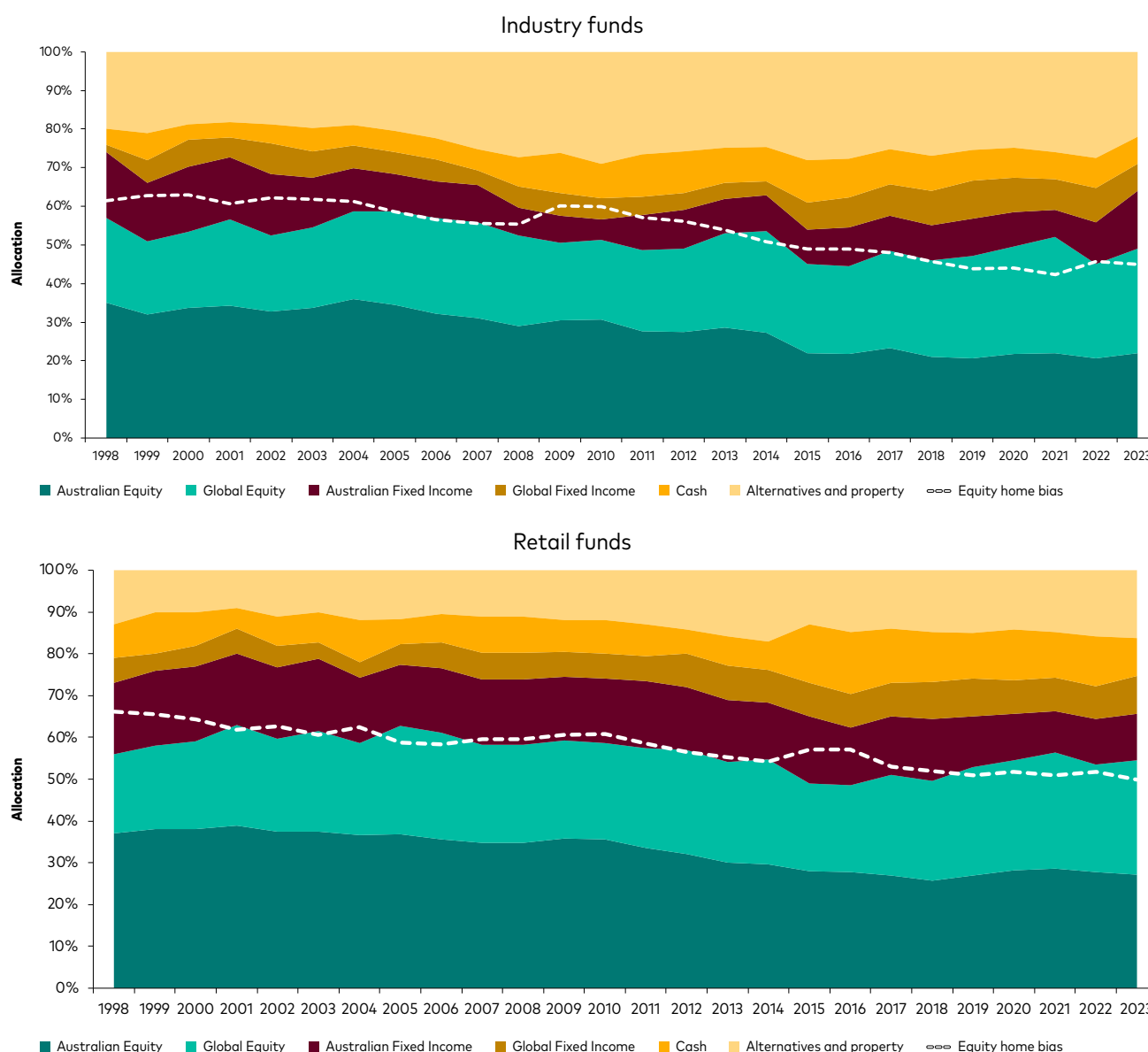
understanding the risks associated with concentrating your portfolio to a single market will lead to better investment outcomes. In determining the preferred level of home bias, key factors to consider include the diversification benefit of adding foreign securities, local market sector and security concentration, domestic tax treatment (a particularly relevant consideration for Australian investors), and other domestic market risk factors.

Dividend imputation tax system

Franking credits were introduced in Australia in 1987 with the objective of preventing double taxation of dividend income. They apply to the tax paid on earnings generated from the domestic activities of Australian companies. The distribution of franking credits reduces the applicable tax rate on dividend income to the end investor. For investors with a lower tax rate than the corporate rate, a cash refund is received. The claims supporting the merits of a dividend imputation system include a reduction in the cost of equity capital, and placing equity and debt capital on an equal footing, which leads to lower leverage in the corporate sector. Counter claims include misallocation of capital toward domestic projects and away from foreign expansion, and higher investor allocations to domestic equities, compromising diversification. The influence of the dividend imputation system is reflected in the payout ratios of Australian companies which at 76% (as of 29 December 2023) is amongst the highest within developed economies.

FIGURE 9:

Home equity bias in superannuation funds has declined with domestic equities replaced by alternatives and global equities



Notes: Allocations are as of the December quarter of each year from 1998 to 2023.

Sources: Vanguard calculations, using data from Rainmaker.

Regardless of the perceived benefits of franking credits, reducing home bias provides substantial benefits in creating a diversified portfolio. At the sector level, the Australian share market is concentrated in Financials and Materials – which (as at January 2024) make up 53% of the market (**Figure 10a**), versus 18% globally (**Figure 10b**). At the issuer level, the top 10 stocks make up over 50% of the market versus 10% globally. These concentration risks can be significantly reduced with an increased global equity allocation.

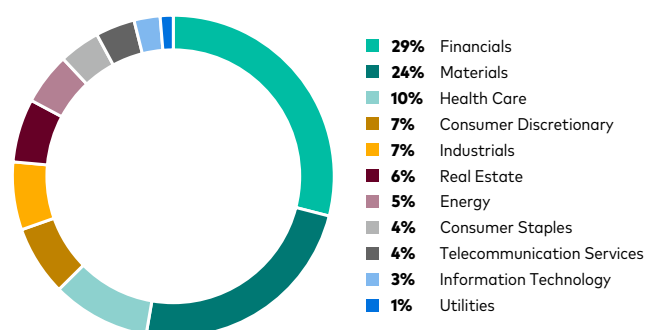
For Vanguard, one of the key factors in resolving the trade-offs for setting home bias is the

reduction of return volatility. Our VCMM analysis on home country equity bias suggests that without sacrificing returns, volatility is reduced when increasing the exposure to global equity. As **Figure 11** shows, based on history, although there is not a consistently optimal, volatility-reducing home bias allocation, the average over the last 20 years is around 40% towards domestic equities. Forward looking VCMM forecasts highlight that volatility is also minimised in the range of 25%-50% allocated to Australian equities. **Figure 12** provides an assessment of home bias factors and how they relate to the Australian equity market.

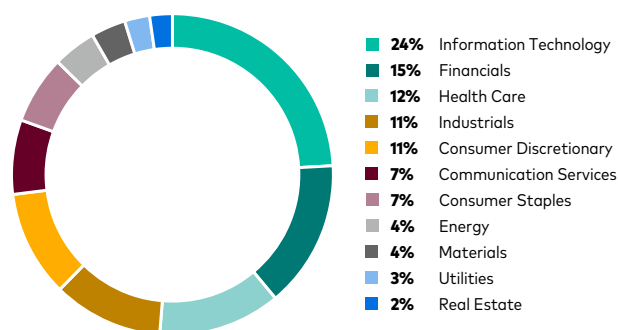
FIGURES 10a and 10b:

The Australian equity market is concentrated at the sector and issuer level

a. Sector concentration S&P/ASX300



b. Sector concentration MSCI World Ex Australia

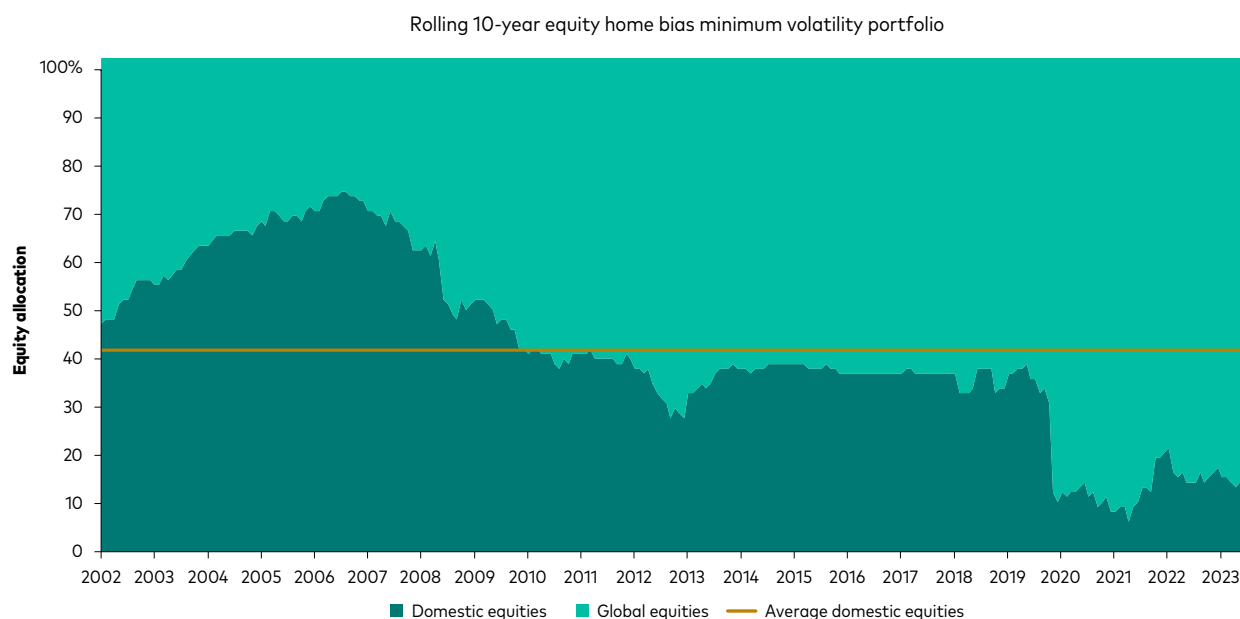


Notes: Data is sourced from the S&P/ASX 300 Accumulation Index and MSCI World ex Australia in AUD, as of 30 January 2024.

Sources: Vanguard calculations, using data from Bloomberg and MSCI.

FIGURE 11:

The volatility minimising home bias has varied through time



Notes: The chart shows the portfolio weights of the minimum volatility equity portfolio using monthly total returns inclusive of dividends reinvested before fees and taxes in rolling 10-year periods from May 1992 to December 2023. Domestic equities are represented by the S&P/ASX 300 Total Return Index and global equities by the MSCI World ex Australia Unhedged Index.

Sources: Vanguard calculations, using data from Bloomberg.

FIGURE 12:

Australian assessment of factors affecting the decision to invest in global assets



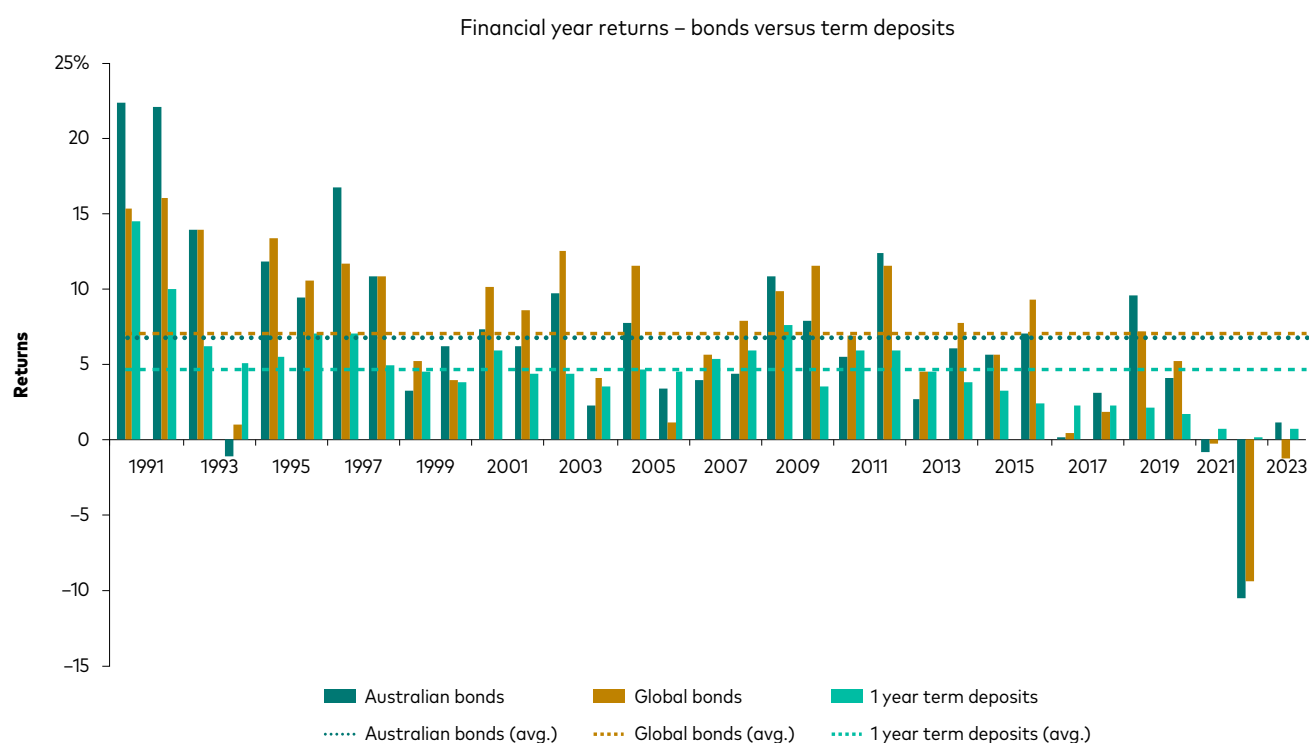
Consideration for changing home bias	Increasing domestic exposure	Increasing global exposure
Risk and return impact of adding foreign securities		Significant diversification benefits
Domestic-sector concentration		Sector concentration is high
Domestic-issuer concentration		Security concentration is high
Domestic transaction cost		Consistent with global markets
Domestic liquidity		Consistent with global markets
Domestic asset taxes	Some benefits exist	
Other domestic market risk factors		Nothing notable for Australia

Sources: Vanguard, adapted from Scott et al., 2016.

Asset composition within the defensive allocation

The Diversified portfolios are tailored to assist medium to long-term investors in achieving their investment objectives and navigating various challenges. We favour fixed income over cash to capture the term premium associated with holding longer dated bonds - see Aliaga-Diaz et al., 2024 (as illustrated in **Figure 13**) and to improve portfolio diversification (**Figure 14**). An allocation to cash as part of an investment portfolio may make sense for those seeking stability but that comfort can come at the cost of lower market returns through time.

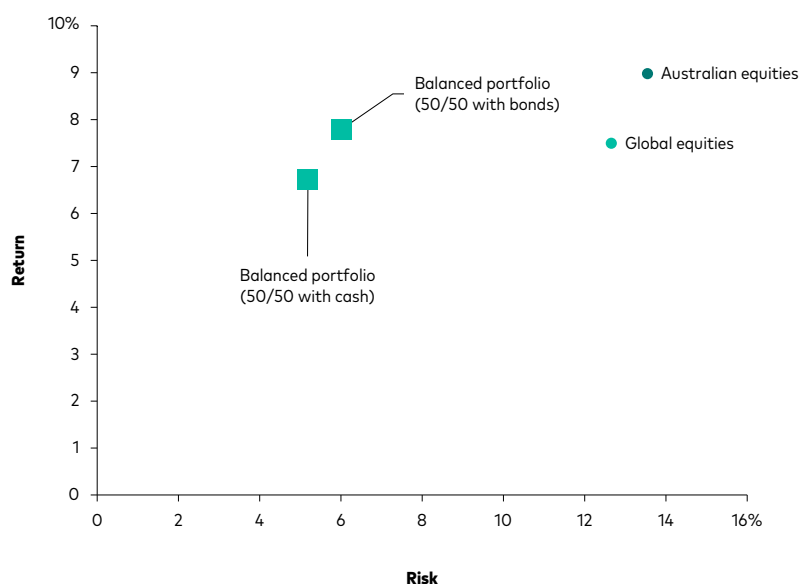
FIGURE 13:
Bonds generally outperform cash over the long term



Notes: Term deposit rates are known in advance, so this chart compares one year term deposit rates for t-minus one year with the historical one-year return from Australian and global bonds from 1991 to 2023. For example, the term deposit rate from 30 June 1991 is compared to bond market returns from 30 June 1992. Australian bonds are represented by the Bloomberg AusBond Composite 0+ Yr Index and global bonds by the Bloomberg Global Aggregate TR Hedged AUD. Long-term deposit rates are sourced from RBA historical data. Past performance is not a reliable indicator of future performance.

Sources: Vanguard calculations, using data from Lonsec iRate and the RBA.

FIGURE 14:
Including bonds improves risk adjusted returns



Notes: This chart shows the risk/return relationship from 1 January 1990 to 31 December 2023. Australian equities are represented by the S&P/ASX All Ordinaries TR Index, global equities by the MSCI World ex Australia NR Index (AUD), Australian bonds by the Bloomberg AusBond Composite 0+ Yr Index, global bonds by the Bloomberg Global Aggregate TR Index Hedged to AUD. The balanced portfolio (50/50 with bonds) is composed of 30% global equities, 20% Australian equities, 30% global bonds and 20% Australian bonds. The balanced portfolio (50/50 with cash) is composed of 30% global equities, 20% Australian equities, 50% Bloomberg AusBond Bank Bill Index. Past performance is not a reliable indicator of future performance.

Sources: Vanguard calculations, using data from Bloomberg and the RBA.

The benefits of duration

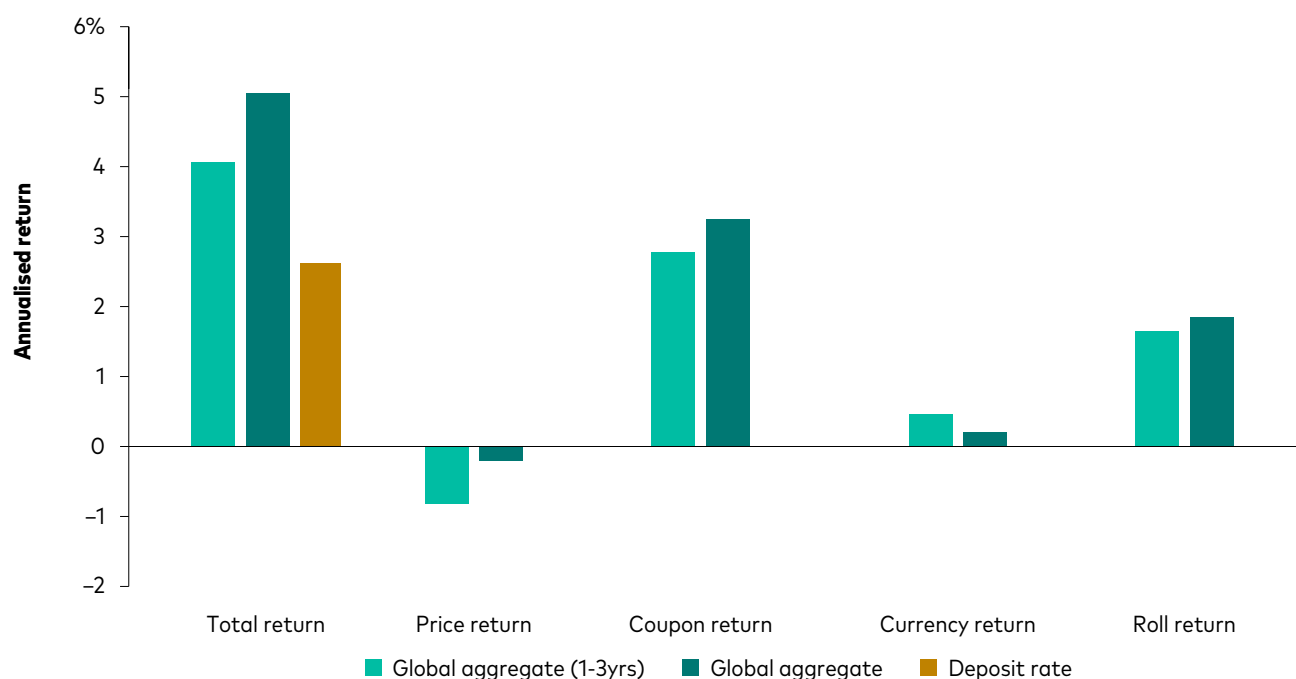
There are two sources of risk in government bond portfolios (bond portfolios with minimal default risk) – interest rate risk and reinvestment risk. These two risks sit on opposite ends of a spectrum that investors must balance. Higher duration bonds are more exposed to interest rate risk with their longer times to maturity, and greater price sensitivity to changes in yield. They generate overall higher returns in normal (upward-sloping) yield curve environments (**Figure 15**) than shorter duration bonds, but with a higher volatility due to increased rate sensitivity. Investors looking to mitigate interest

rate risk by allocating to shorter duration bonds must accept reinvestment risk – the risk that returns from maturing bonds must be reinvested at different rates. Short duration bonds still mitigate equity risk but not as well as their longer-duration counterparts. When yield curves are inverted, shorter duration bonds produce higher returns, but those returns are more fleeting. While it may be tempting to modulate one's duration exposure based on interest rate views, this is very difficult to do (even for professional money managers). Vanguard's diversified portfolios aim to balance these opposite risks by maintaining an index-level market duration.

FIGURE 15:

Coupon reinvestment is greater for longer duration bonds

Annualised returns from Jan 2003 to Dec 2023



Notes: The roll return refers to the component of total return not explained by price or coupon return and includes the effects of duration and convexity. Convexity is the sensitivity of duration (change in a bond's price for a given change in interest rates) to a change in interest rates. It describes the tendency of bond prices to rise more than implied by duration for a given decrease in interest rates, and vice versa. Global aggregate is represented by the Bloomberg Global Aggregate TR Index Hedged to AUD, global aggregate (1–3 yrs) by the Bloomberg Global Aggregate 1–3 Yrs TR Index Hedged to AUD, and the deposit rate using the RBA's 1-year retail deposit and investment rates based on a \$10,000 deposit. Annualised returns are calculated from daily returns from 1 January 2003 to 31 December 2023.

Past performance is not a reliable indicator of future performance. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

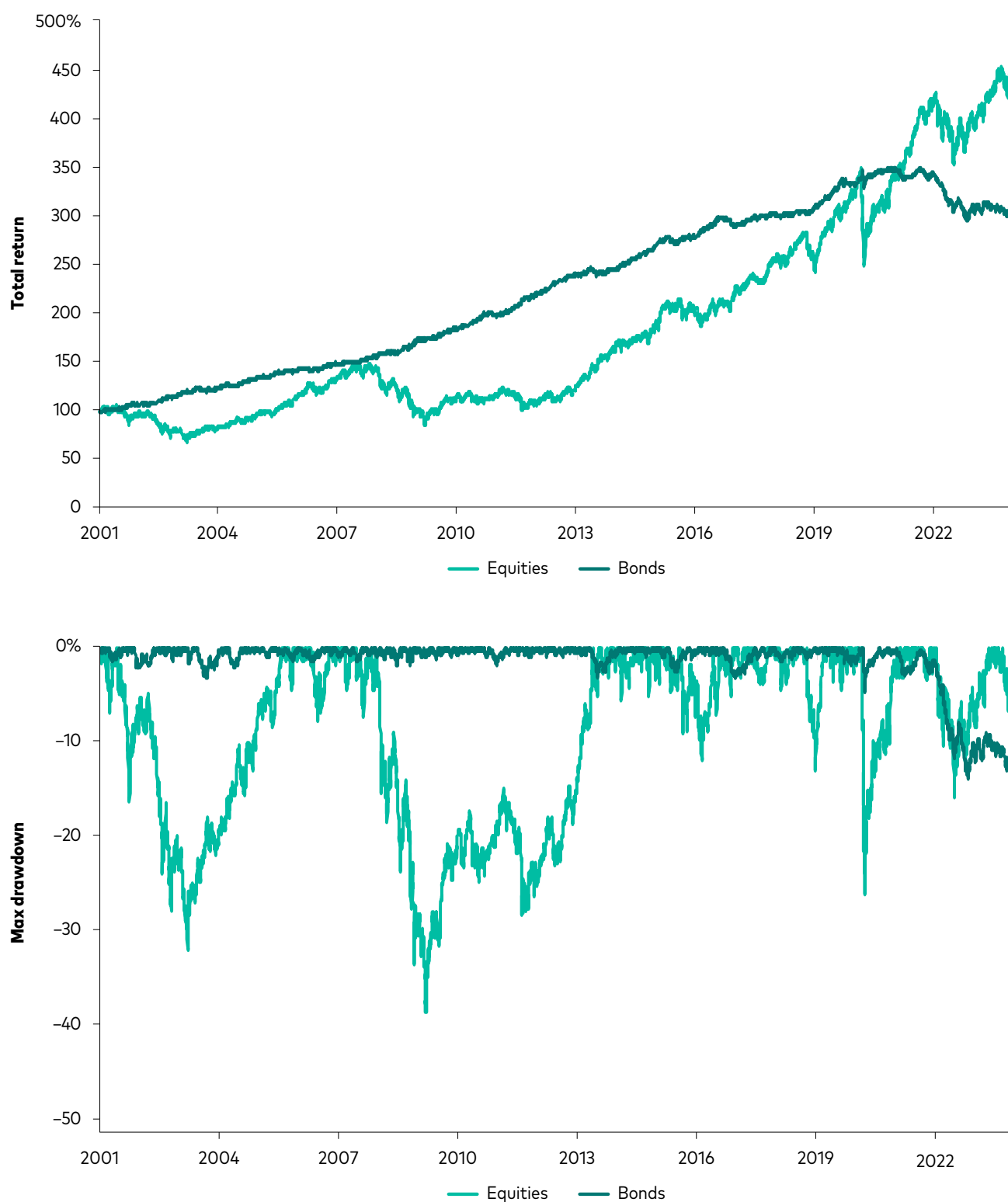
Sources: Vanguard calculations, using data from Bloomberg and the RBA.

Bonds are not risk free

As noted above, bonds act as a portfolio ballast given their low correlation with riskier assets and their positive median returns during market downturns (refer back to **Figure 3a** and **Figure 3b**). However, as illustrated in **Figure 16**, while bonds have mostly exhibited less drawdown risk than equities, they are not completely immune

from drawdowns. During 2021 and 2022, bonds exhibited a sharper drawdown than equities, driven by rising yields. While rising yields do place downward pressure on the capital price of bonds, they will eventually 'self-heal' with the higher yields delivering improved income returns for long-term investors who stay the course during these periods of adjustment (**Figure 17**).

FIGURE 16:
Total return and drawdown series of equities and bonds



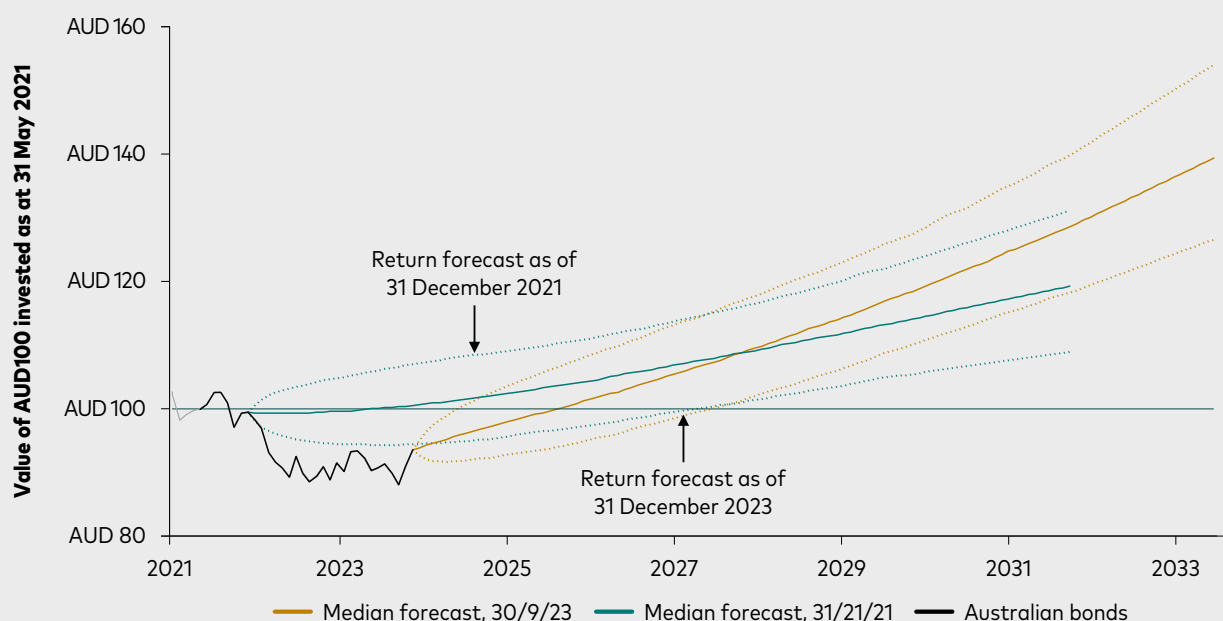
Notes: Drawdown is calculated as the peak-to-trough decline of a total return index using daily data from 1 January 2000 to 31 December 2023. The equities series is composed of a 60% weighting to global equities and a 40% weighting to Australian equities. The bond series is composed of a 70% weighting to global bonds and a 30% weighting to Australian bonds. Global equities are represented by the MSCI World ex Australia Net TR Unhedged AUD Index, Australian equities by the S&P/ASX 300 Total Return Index, global bonds by the Bloomberg Global Aggregate TR Index Hedged to AUD, and Australian bonds to the Bloomberg AusBond Composite 0+ Yr Index.

Sources: Vanguard calculations, using data from Bloomberg.

The role of bonds in a rising rate environment

For long-term investors, **Figure 17** shows that there is a silver lining in higher interest rates. When rates rise (like they did in 2022), bond investors realise immediate price losses. But an often-forgotten benefit is that coupons are then able to be reinvested at higher rates. Given sufficient time, the benefit from reinvestment offsets the initial loss and investors end up better off due to, not despite, higher rates.

FIGURE 17:
Rising rates suggest higher returns for long-term bond investors



Past performance is not a reliable indicator of future results. Any projections should be regarded as hypothetical in nature and do not reflect or guarantee future results.

Notes: The chart shows actual returns for the Bloomberg Australian Aggregate Bond Index along with Vanguard's forecast for cumulative returns over the subsequent 10 years as of December 31, 2021 and December 31, 2023. The dotted lines represent the ranges from the 10th to the 90th percentiles of the forecasted distributions.

Source: Vanguard calculations, using data from Refinitiv and VCMM simulations in AUD as of December 31, 2023.

IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. Distribution of return outcomes from VCMM are derived from 10,000 simulations for each modelled asset class. Simulations are as at December 31, 2021 and December 31, 2023. Results from the model may vary with each use and over time.

Principles for using bonds in diversified portfolios

The key objectives underpinning Vanguard's use of bonds for the diversified portfolios are:

Diversify broadly by issuer type and maturity

To capture the defensive characteristics of bonds, it's critical to hold a broadly diversified allocation to high quality, investment grade bonds across maturities. While the potential for additional income from holding high yield bonds may be attractive, it should be consistent with risk tolerance. High yield brings with it a higher correlation to equities, compromising

diversification when it is most needed (Refer ahead to **Figure 27**). **Figure 18** illustrates that the globally diversified broad benchmark (global aggregate) gives a more consistent outcome compared to selecting the individual components in isolation.

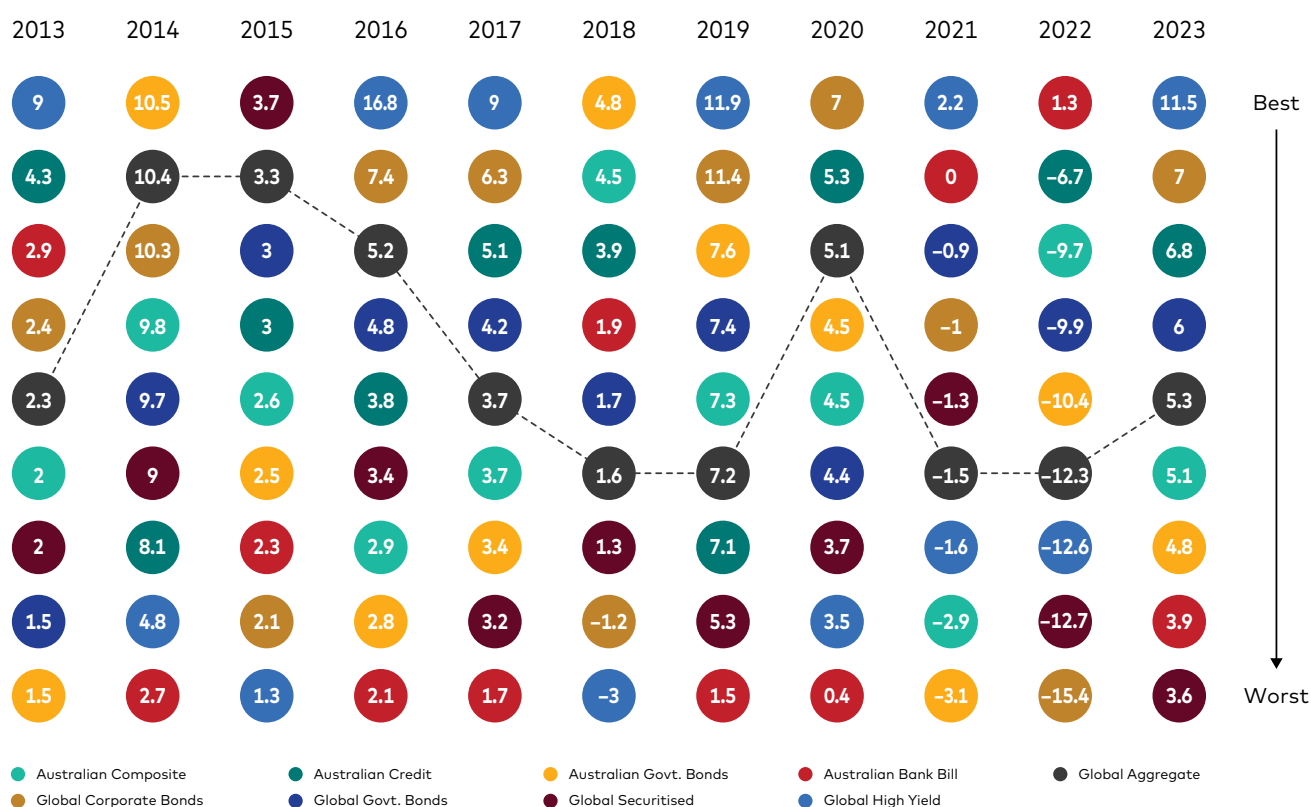
Balance domestic and global exposure to increase diversification benefits

As with the equity allocation, we believe in forming a globally diversified mix of Australian and global bonds. Selecting the preferred domestic/global bond mix can be driven by a range of considerations, including investor goals and objectives, a requirement to match

domestic liabilities, currency hedging costs and risks, and the diversification benefits of holding global bonds. For a more detailed discussion on the case for global bonds, see Philips et al., (2014). The expected portfolio diversification benefits of bonds increase with the inclusion of globally diversified bond exposures. This is due to the imperfect correlation of interest rates and inflation between Australia and other

countries. The global aggregate index also has wider diversity of issuers and exposure to non-government securities. Like equities, there has not been a consistently optimal historical domestic/global bond allocation to minimise volatility (**Figure 19**), with the historical average allocation to minimise volatility around 30% to domestic bonds.

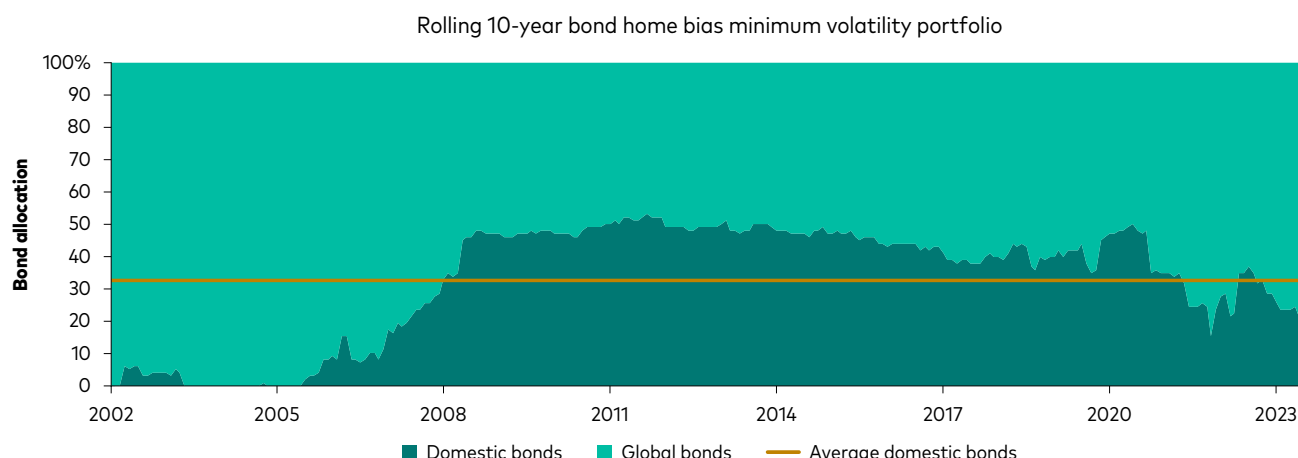
FIGURE 18:
Bond market sub-sectors display wide returns (%) variation relative to the broad market



Notes: The chart shows total returns for the calendar year from January 2013 to December 2023. Australian composite is represented by the Bloomberg AusBond Composite 0+ Yr Index, Australian credit by the Bloomberg AusBond Credit 0+ Yr Index, Australian government bonds by the Bloomberg AusBond Govt 0+ Yr Index, Australian bank bill by the Bloomberg AusBond Bank Bill Index, Global Aggregate by Bloomberg Barclays Global Aggregate Hedged in AUD, global corporate bonds by the Bloomberg Barclays Global Corporates hedged in AUD, and global government bonds by the Bloomberg Barclays Global Gov Index.

Sources: Vanguard calculations, using data sourced from Bloomberg.

FIGURE 19:
The volatility minimising home bias has varied through time



Notes: The chart shows the portfolio weights of the minimum volatility bond portfolio based on monthly total returns in rolling 10-year periods from May 1992 to December 2023. Domestic bonds are represented by the Bloomberg AusBond Composite 0+ Yr Index and global bonds by the Bloomberg Barclays Global Aggregate TR Index Hedged in AUD.

Sources: Vanguard calculations, using data from Bloomberg.

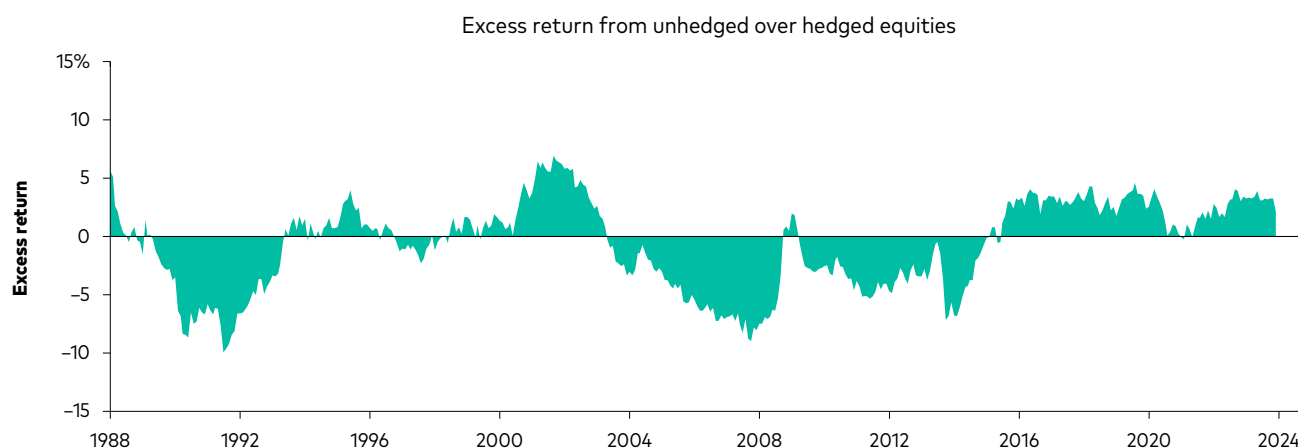
Portfolio currency exposure and hedging considerations

By investing in global assets — be they equities or bonds — exposure to foreign currency is created. An investor's decision to hedge foreign currency exposure should depend on costs, risk tolerance, and expected risk and return. All else equal, hedging more currency exposure lowers risk, but comes at a higher cost. The case for currency hedging requires assessment of a range of factors, which is explored further in the next section.

The case for currency hedging global equities

As **Figure 20** shows, excess return from unhedged versus hedged equities has varied over time. Since 1988, however, the average five-year annualised excess return has averaged only 0.4% — not significantly different than zero. Therefore, we believe that the investment case for hedging foreign currency exposure should be based primarily on risk, not return.

FIGURE 20:
Returns from currency vary, though currency exposure doesn't deliver a long-term expected return



Notes: The excess return of unhedged equities is calculated by subtracting the return of hedged equities from the return of unhedged equities from 31 December 1983 to 31 December 2023. The return of unhedged equities is the rolling 5-year annualised return of the MSCI World ex Australia Index AUD Unhedged. The return of hedged equities is the rolling 5-year annualised return of the MSCI World ex Australia Index Hedged to AUD.

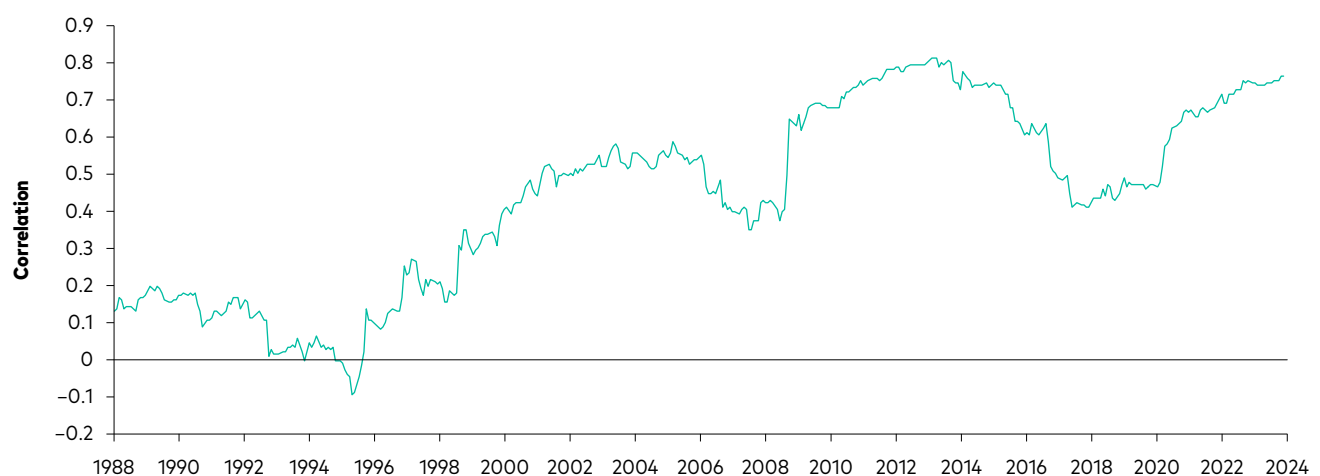
Sources: Vanguard calculations, using data from Bloomberg.

If risk is the primary consideration for hedging, then volatility and correlation are key considerations. Starting with correlation, the Australian dollar (AUD) has displayed a positive correlation to global equities through most of its post-float history (the Australian dollar floated in December 1983). This would suggest a higher allocation to foreign currency is appropriate for Australian investors. However, the correlation has varied considerably through time and can't always be relied upon to be a source of

diversification over shorter time periods (**Figure 21a** and **Figure 21b**). Further, Rodel (2014) found that so long as local and nonlocal inflation rate correlations are less than one, global equities act as a local inflation hedge over long time horizons due to local currency depreciation. Hedging a portion of foreign currency can provide a more consistent experience across different investors regardless of the period during which they were invested.

FIGURE 21a:

The Australian dollar has tended to correlate positively with global equities, though the relationship varies through time

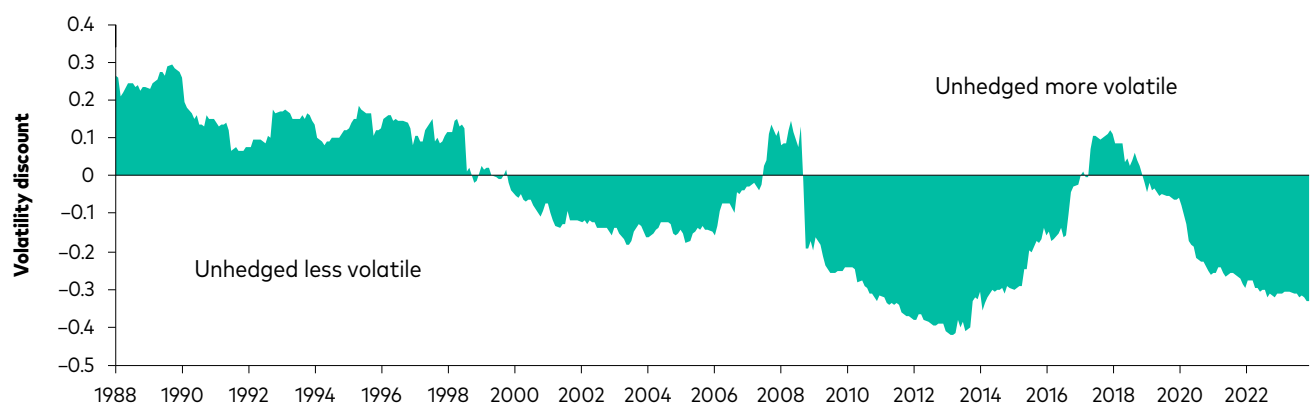


Notes: The chart shows the rolling 5-year correlation of the Australian dollar return against the MSCI World ex Australia Index in local currency from 1 January 1984 to 31 December 2023. The Australian dollar return is estimated by subtracting the MSCI World ex Australia Index (in AUD) from the same index measured in the MSCI local currency composite. The MSCI currency composite is not investable.

Sources: Vanguard calculations, using data from MSCI and Bloomberg.

FIGURE 21b:

Unhedged equities don't always demonstrate less volatility than hedged equities



Notes: The volatility discount is calculated by dividing the volatility of unhedged equities by the volatility of hedged equities from 31 December 1983 to 31 December 2023. Unhedged equities are the rolling 5-year annualised standard deviation of the MSCI World ex Australia AUD Unhedged. Hedged equities are the rolling 5-year annualised standard deviation of the MSCI World ex Australia Hedged to AUD return. The chart shows the ratio minus 1 to more intuitively centre results around zero.

Sources: Vanguard calculations, using data from MSCI and Bloomberg.

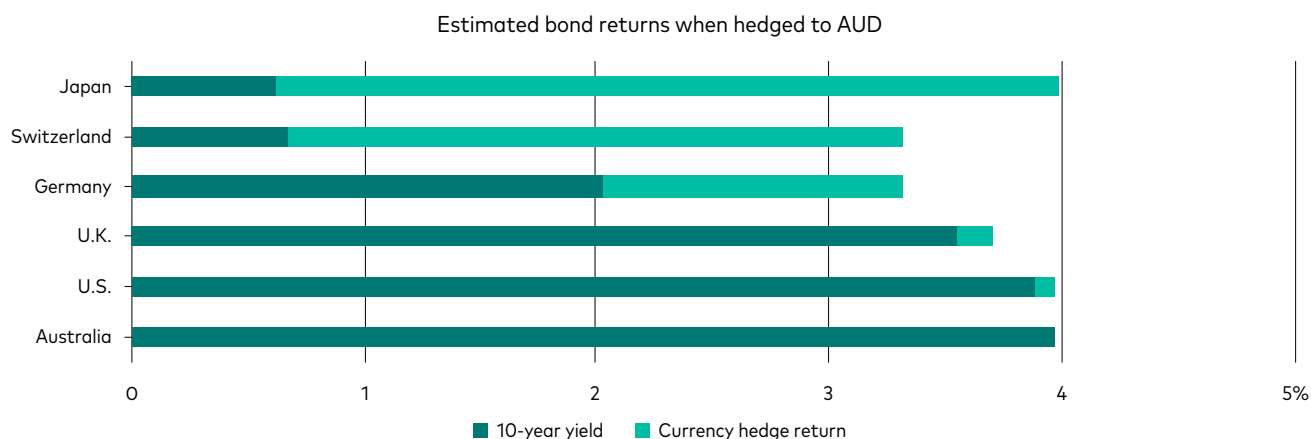
Costs are also an important consideration. The foreign currency market is very deep and liquid with more than \$5 trillion traded daily. Hedging developed market currency exposure can be achieved cost effectively. The historical correlation of the AUD with emerging markets equities shows a similar pattern to developed markets, however, the costs for hedging emerging markets currencies continue to be elevated in comparison. As such, Vanguard's preferred implementation of currency hedging is through the developed markets portion of the portfolio.

The case for currency hedging bonds

Holding global bonds, regardless of yield, can still make sense for long-term investors looking to harvest the diversification benefits of a global portfolio if they hedge currency risk. Currency-hedged global bond investments can capture the difference in yield when an investor's home currency has higher short-term interest rates than the currencies of other bond markets. For an Australian investor, when currency is hedged to AUD, global bonds provide similar returns to domestic bonds of similar quality and duration, while capturing the additional diversification benefits of a global portfolio (see **Figure 22**).

FIGURE 22:

Currency hedging provides additional return when the bonds of low yield countries are hedged back to Australian dollars



Notes: The volatility discount is calculated by dividing the volatility of unhedged equities by the volatility of hedged equities from 31 December 1983 to 31 December 2023. Unhedged equities are the rolling 5-year annualised standard deviation of the MSCI World ex Australia AUD Unhedged. Hedged equities are the rolling 5-year annualised standard deviation of the MSCI World ex Australia Hedged to AUD return. The chart shows the ratio minus 1 to more intuitively centre results around zero.

Sources: Vanguard calculations, using data from MSCI and Bloomberg.

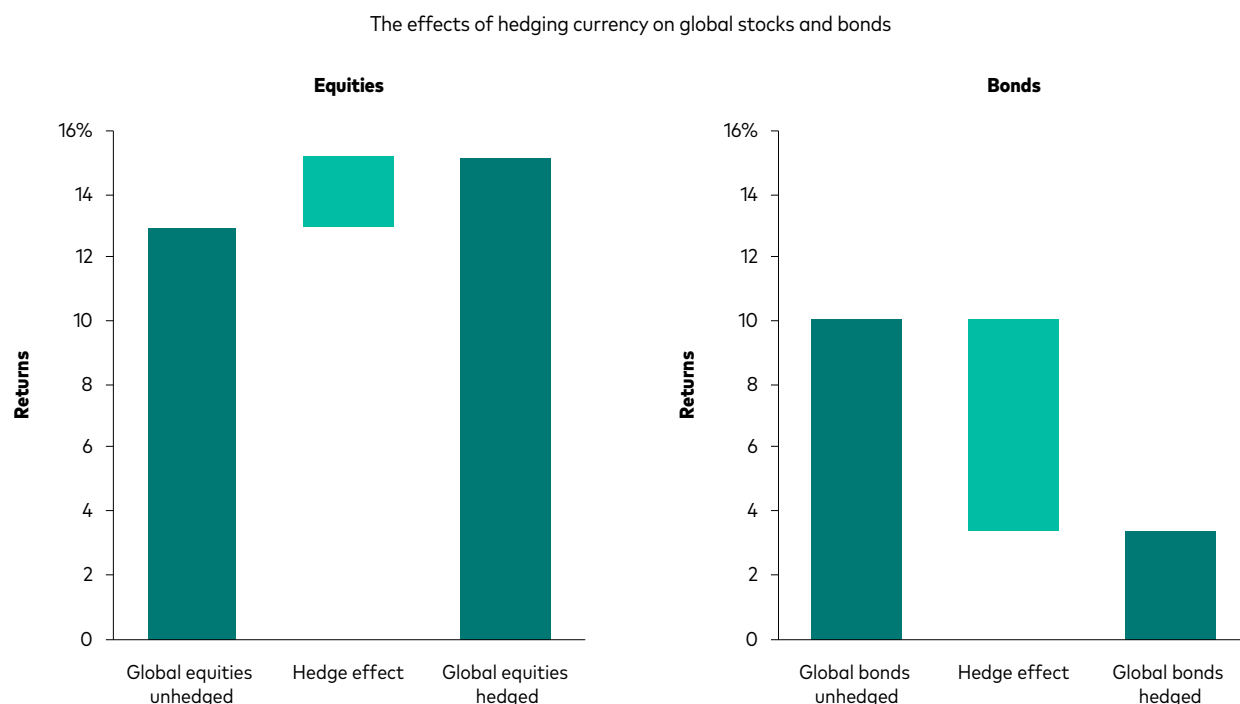
In the case of bonds, the investment considerations are clear cut — when global bonds are left unhedged, the volatility of the currency can offset the diversification benefits of holding

bonds in a multi-asset portfolio (**Figure 23**).

As such, Vanguard's position is to fully hedge the currency exposure of global bonds.

FIGURE 23:

Unlike the case for currency exposure within equities, if bonds are left unhedged, currency volatility will significantly add to risk



Notes: Comparisons of unconditional volatilities are based on monthly returns from 28 February 1990 to 31 December 2023. AUD hedged global equities is proxied by the MSCI World ex Australia Index in local currency. Unhedged global equities are represented by the MSCI World ex Australia Index, global hedged bonds by the Bloomberg Barclays Global Aggregate TR Index Hedged in AUD and unhedged global bonds by the Bloomberg Barclays Global Aggregate TR Index Unhedged in AUD.

Sources: Vanguard calculations, using data from Bloomberg.

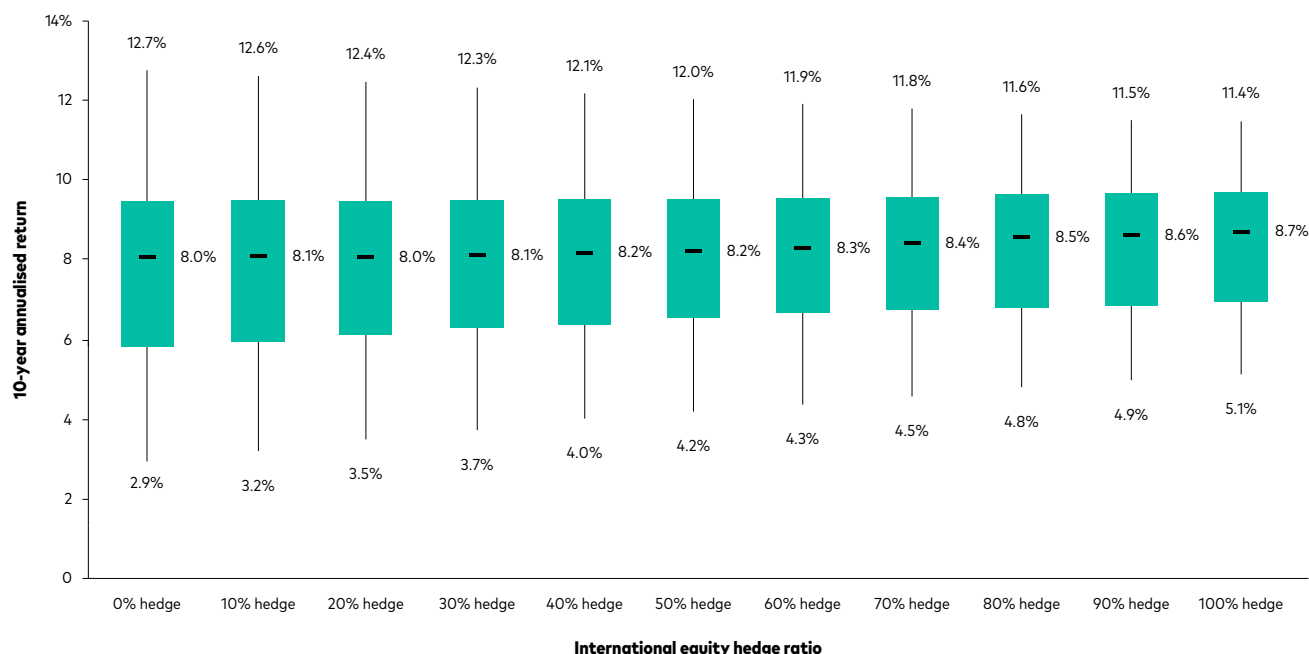
The hedging decision requires a whole-of-portfolio perspective

Lastly, the decision to hedge foreign currency cannot be made in isolation. A decision to reduce equity home bias needs to take account of the additional currency exposure introduced to the portfolio and may warrant an increased allocation to hedged global equities to appropriately balance the factors driving

the decision to hedge. The uncertain impact of currency volatility on portfolio outcomes reduces as the investment time horizon lengthens. As such, it is appropriate that portfolios with higher levels of growth assets can also accommodate a proportionally higher allocation to foreign currency, as the potential diversification benefits of holding foreign currency exposure have time to play out. This is reflected in the sample portfolios in **Figure 24**.

FIGURE 24:

Dispersion of annualised 10-year returns (1990-2023) 40% equity home bias – 70/30 portfolio



Notes: Return distribution of different levels of foreign equity currency exposure for the period 28 February 1990 to 31 December 2023. Portfolios are constructed with a 70% allocation to equities, split 40% to Australian equities and 60% to Global equities; and a 30% allocation to bonds, split 30% to Australian bonds and 70% to Global bonds. Indices used: Australian equity – MSCI Australia Total Return; Global equity – MSCI World ex Australia, with net dividends reinvested, unhedged in AUD or hedged to AUD based on hedge ratio; Australian bonds – Bloomberg AusBond Composite Index; Global bonds – Bloomberg Barclay's Global Aggregate Index, hedged in AUD.

Sources: Vanguard calculations, using data from MSCI, Factset, and Bloomberg.

Alternative asset classes

There are a variety of other asset classes that are considered in the construction of the funds. Several of these and the rationale behind their non-inclusion are as follows:

Property

No specific over-weighting to property (listed or unlisted) is included within the diversified portfolios. Historically, Australian investors have shown a preference for property investment, and in managed funds, this exposure is typically achieved through Real Estate Investment Trusts (REITs). However, REITs are already included in the relevant broader Australian equity benchmark, accounting for 6.4% of the index weight, as seen in **Figure 25a** for the ASX 300 and is heavily concentrated (**Figure 25b**). Similarly, the global equity exposure achieved through the MSCI World ex Australia Index includes a 3% weight to REITs.

Further, the use of REITs to diversify the broader portfolio is met with significant challenges. Since 1990, REITs have maintained a correlation with the broader equities of about 0.7, considerably greater than the correlations seen for defensive asset classes used to shield against equity downturns like fixed income with a correlation of -0.10 (Refer back to **Figure 3a**).

Encompassing a broader view of a household's assets, Australian investors already maintain significant property holdings, with investment properties (net of mortgage) forming 44% of total personal investments outside of superannuation (Rice Warner's 2020 Personal Investments Market Projections), so additional property exposure in the form of REITs or private real estate fund shares only adds to a household's total exposure to property.

FIGURE 25a:
Listed property is already included
in the broad benchmark

Sector weights in S&P/ASX300

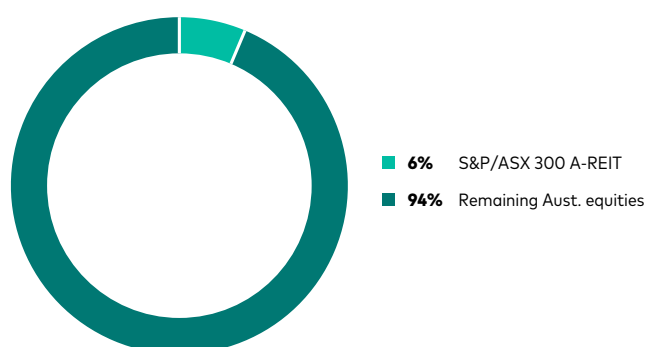
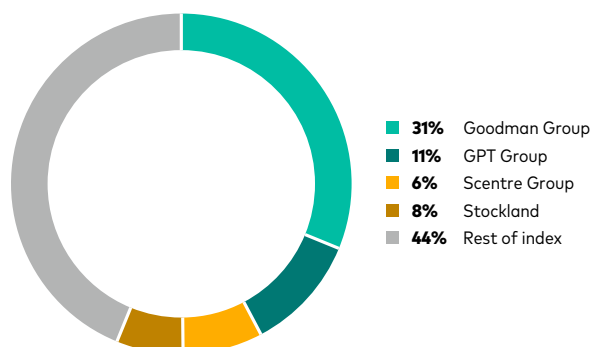


FIGURE 25b:
Australian REIT indexes are heavily
concentrated

S&P/ASX 300 A-REIT - Top 4 holdings and rest of index



Notes: S&P/ASX 300 and S&P/ASX 300 A-REIT sector and holding data as of 31 December 2023.

Sources: Vanguard calculations, using data from Bloomberg.

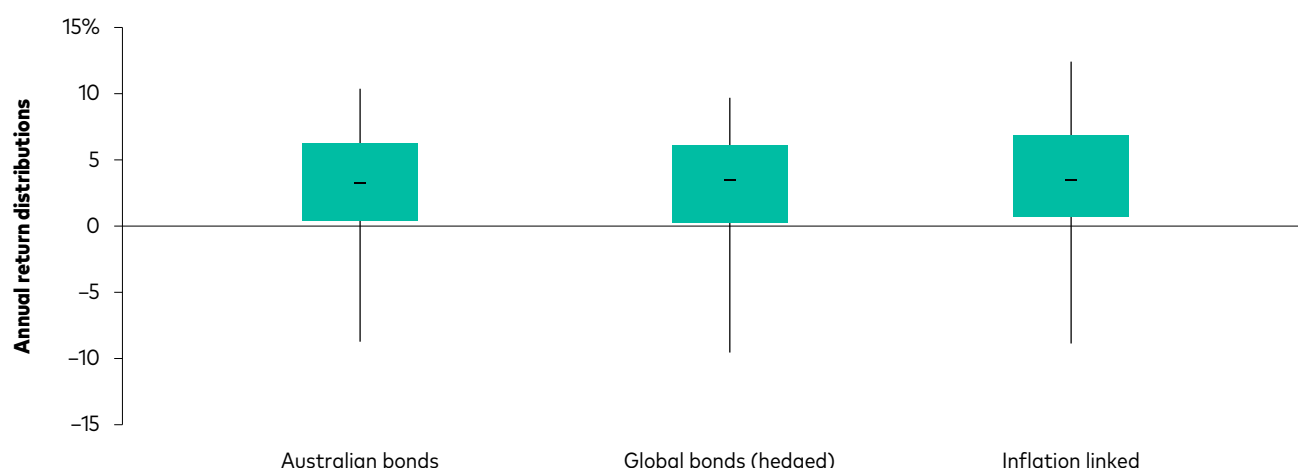
Inflation-linked bonds

Inflation-linked bonds, or 'linkers', can provide protection to real spending power, but they are not without risks. Given inflation expectations are already priced into nominal bonds, inflation-linked bonds can only outperform if realised inflation during the investment horizon exceeds inflation that is discounted by markets, or the breakeven rate. Inflation-linked bonds, just like nominal bonds, have underlying interest rate risk exposure; therefore, the price of the bond can fall with rising real yields further than the principal adjustment from inflation indexation.

For investors with the goal of hedging inflation in the short to intermediate term, adding a strategic allocation to short- and intermediate-

term inflation-linked bonds may be an attractive option, as these assets have greater inflation hedging properties given their high correlation with inflation. However, it's important to note that these assets also have a low inflation beta. This means while inflation-linked bonds hedge themselves well, they don't do the same for an investor's broader portfolio. See Schlanger et al., 2023. In Australia, the inflation-linked bond market is also consistently less liquid than the treasury bond market, with a narrower investor base and fewer active price makers. For more detailed information on inflation-linked bonds, refer to Australian Office of Financial Management, 2021. Additionally, inflation linked bonds have not shown significant outperformance or lower volatility than other fixed income assets (**Figure 26**).

FIGURE 26:
Inflation-linked bonds exhibit high volatility



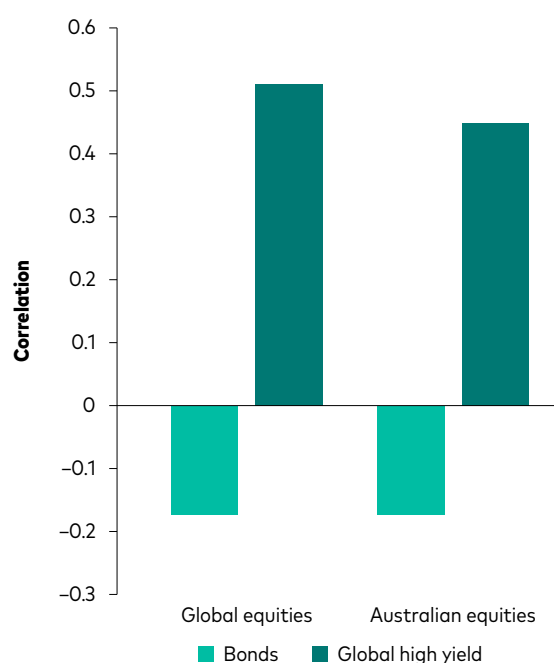
Notes: Box-and-whiskers plot the 5th, 25th, 50th, 75th and 95th percentiles. Annual returns calculated using a 1-year rolling window of monthly return data from 1 January 2013 to 31 December 2023. Australian bonds are represented by the Bloomberg AusBond Composite 0+ Yr Index, hedged global bonds by the Bloomberg Global Aggregate TR Index Hedged to AUD, and inflation-linked bonds by the Bloomberg AusBond Infl Tsy 1+ Yr Index.

Sources: Vanguard calculations, using data from Bloomberg.

High yield bonds

High yield bonds can offer attractive yields compared to more traditional investment-grade bonds, which can be beneficial in portfolios focused on income generation. High yield bonds tend to behave more like equities, which is evident in their much higher correlation with global equities than global investment-grade bonds, as shown in **Figure 27**. Therefore, these bonds do not diversify the same way as traditional bonds and allocating to them could be considered comparable to changing the asset allocation (equity/bond mix) of the portfolio.

FIGURE 27:
Correlations of traditional and high yield bonds to equities since 2003



Notes: Correlations are calculated from daily data from 2 January 2003 to 31 December 2023. Global equities are represented by the MSCI World Net TR Local Index, Australian equities by the S&P/ASX 300 Total Return Index, Global high yield bonds by the Bloomberg Global High Yield TR Index Hedged to AUD, and Global bonds by the Bloomberg Global Aggregate TR Index Hedged to AUD.

Sources: Vanguard calculations, using data from Bloomberg.

Commodities

Commodities may present potential diversification and inflation protection benefits. For inflation-hedging portfolios that require exposure to assets with high sensitivity to inflation, commodities can effectively help mitigate inflation risk over the short term. See Schlanger et al., (2023). However, for a longer-term time horizon, stocks/bonds are a better mix for inflation hedging. Equity risk premium also outpaces inflation and commodity risk premium over a longer time horizon. See Shtekhman et al., (2022). For most of the last decade, commodities have also had negative returns, which would have been a drag on any portfolio's performance. Furthermore, there's a strong overlap between commodities and Australian equities given the large materials sector (Refer back to **Figure 10a**).

Infrastructure

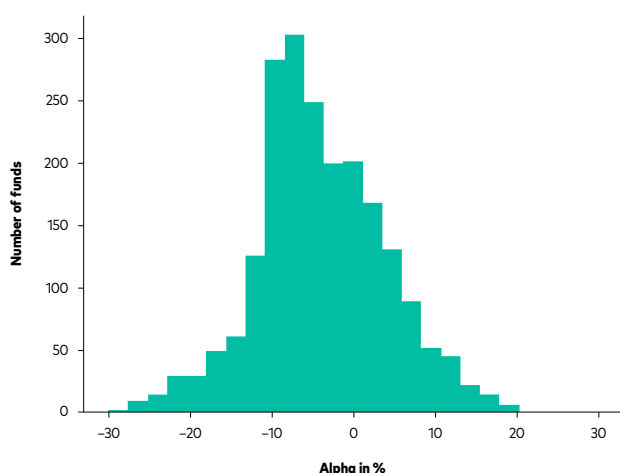
Listed infrastructure is already included within global and Australian equity indexes. While non-traditional and alternative investment asset classes and strategies may offer potential incremental improvements to a portfolio of traditional equities, bonds and cash, there are numerous challenges that do not align well with the objective of Vanguard's diversified portfolios.

Unlisted property and infrastructure

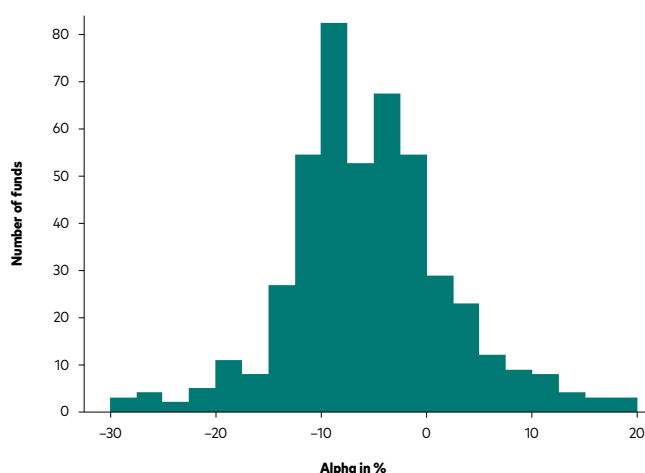
Vanguard views unlisted assets as an active, overweight exposure to listed assets (e.g., REITs and Infrastructure equities already included in broad market-cap equity exposures). Such an allocation can be appropriate for investors who are willing to accept the associated risks in pursuit of active outperformance. While active managers can outperform, investors must be willing to pay higher costs and accept the risks that past outperformance will likely not persist, and they may not pick an outperforming manager ex-ante. **Figure 28** below shows the distribution of excess fund-level returns relative to the Preqin Quarterly Return index for each asset class. The median fund for both private real estate and infrastructure underperforms by 4.8 and 6.2 percentage points respectively.

FIGURE 28:
Median unlisted real asset funds tend to underperform

Distribution of annual alpha – global private real estate



Distribution of annual alpha – global private infrastructure



Notes: The charts show the empirical distributions of annualised excess returns for closed-end private real estate and infrastructure funds for vintages 2000 to 2020. Private real estate includes 2,511 funds and private infrastructure includes 569. Fund strategies included are Real Estate Core, Real Estate Core-Plus, Real Estate Value Added, Real Estate Opportunistic, Real Estate Fund of Funds, Infrastructure Core, Infrastructure Core-Plus, Infrastructure Opportunistic, Infrastructure Secondaries, Infrastructure Fund of Funds. Neither benchmark nor fund returns are controlled for leverage.

Sources: Vanguard calculations, using data from Preqin, as of 31 March 2024.

Reported returns on unlisted assets are not comparable to listed counterparts due to infrequent reporting, smoothed returns, and cash drag. Finally, there are no investable market indexes tracking unlisted property and infrastructure assets. This forces investors to take idiosyncratic risk which can result in different outcomes (positive or negative) than widely cited unlisted asset indexes. While none of these challenges are a reason to forgo private assets, they are inconsistent with the cost, balance, diversification, and discipline principles for an SAA portfolio.

Private equity

Private equity faces the same set of challenges and considerations for investors as unlisted property and infrastructure. There is no passive option so active risk must be taken and hopefully compensated. Private/alternative asset classes have higher costs and more complexity and, in many cases, higher fees, which can drag on returns. Investors must disentangle return smoothing effects, infrequent pricing, cash drag, etc. to make an apples-to-apples comparison to public markets. The risks associated with private investments are not appropriate for all investors and depend on unique considerations. Such individual tailoring requires a deeper understanding of a client's goals and needs. For a more detailed discussion on the role of private equity in portfolios, see Aliaga-Díaz et al., 2020.

Passive implementation

In portfolio construction, the role of any passive investment is to provide relative performance predictability. The preference for passive may be driven by an aversion to active risk or a lack of conviction in the ability to predict outperformance in active funds.

Active management typically comes with higher costs, manager risk, decreased tax efficiency, and wider variability of returns relative to the market portfolio. For a more detailed discussion on tax-efficient investing, see Donaldson et al., 2015. After accounting for all applicable

costs (commissions, management fees, bid-ask spreads, administrative costs, market impact), the average active investor trails the market. Although skilled managers exist and can provide the opportunity for outperformance, identifying managers that can persistently beat the market eludes most investors (for a more detailed discussion on indexing, see Harbron et al., 2016, and Lawrence et al., 2024).

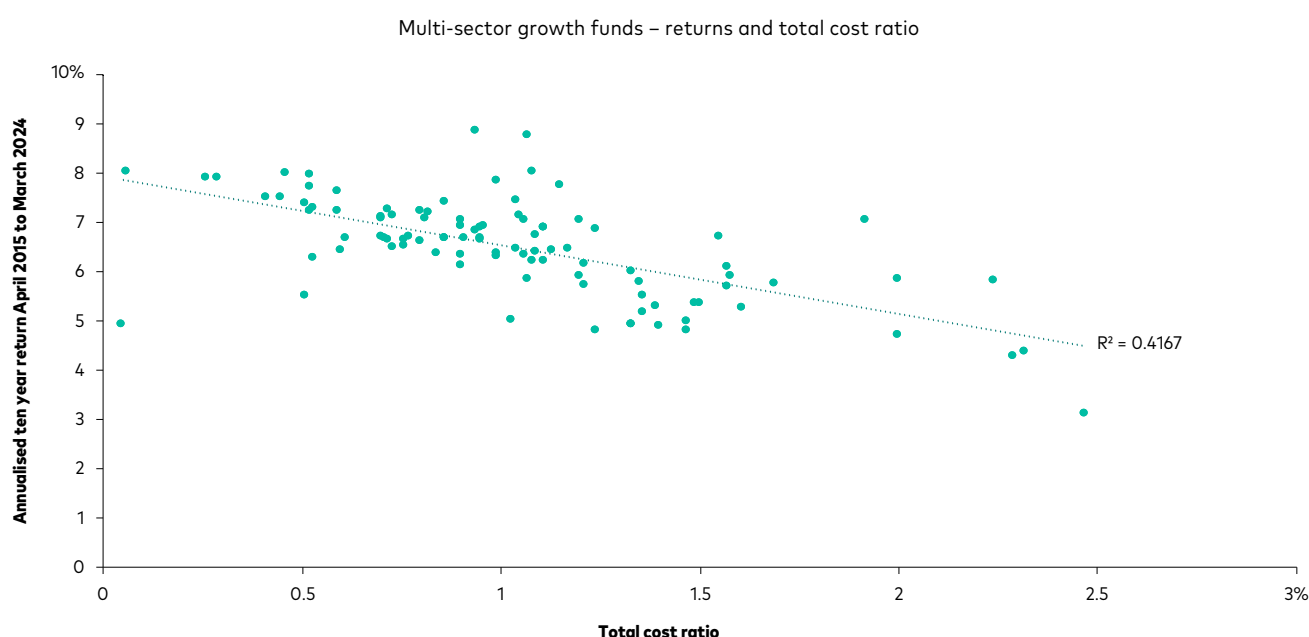
The broad equity and fixed income allocations in the diversified portfolios are built using market-cap-weighted index funds. Market-cap-weighted indexing is a valuable starting point for many investors. It can be delivered inexpensively and provides exposure to the broad market while offering diversification and transparency.

With use of an active manager, selection is critical to success, and successfully choosing a manager that will outperform in the future is difficult. Focusing on the firm and its people, philosophy, and process can help in the search for a skilled manager. Ultimately, identifying talent, choosing low-cost investments, and staying patient are important to succeeding with active management. For investors inclined toward active management, (for a more detailed discussion on active management, see Wallick et al., 2015) risk tolerance, cost, tracking error, and conviction in their ability to pick winning managers can all be factors in deciding the active/passive mix.

When constructing diversified portfolios, Vanguard's starting point is for the fund to have an enduring place in a portfolio, and to have broad applicability for investors. Designing the right blend of active exposure is conditional on the unique goals and requirements of an individual investor, with the preferred position varying widely. Owing to the highly wide array of beliefs and preferences with respect to active investing, generally higher costs, and wider dispersion of relative returns – for many investors, a globally diversified low-cost index portfolio will form the basis of a suitable investment strategy.

FIGURE 29:

The relationship between low cost and higher returns is an enduring one



Notes: The chart shows the relationship between the 10-year returns of funds against their total cost ratio. A calculated R^2 shows the variation in the returns of the sample funds that is explained by the variation in the indirect cost ratios. 100 growth funds were selected from the Morningstar Australia Fund Multisector Growth Category from 1 April 2015 to 31 March 2024 out of a total of 190 funds. Funds were excluded from calculations if they were classified as index funds, did not include a total cost ratio or 10-year return datapoints, or were liquidated during the period. Results are consistent across Morningstar categories.

Sources: Vanguard calculations, using data from Morningstar, Inc.

The active/passive decision – defensive assets

The volatile interest rate movements in 2021 and 2022 may have led some investors to believe that active portfolios are better placed to outperform the market-capitalisation-weighted benchmark. In fixed income, two of the main levers to deliver fund outperformance are duration and credit. Both levers can also introduce additional risks. The pro-cyclical nature of credit (particularly lower quality credit) can mean that excess returns may increase during periods of market upswings and fall during market selloffs. This is not an ideal situation for multi-asset portfolios looking to fixed income for risk mitigation, liquidity, and rebalancing purposes. Vanguard's analysis suggests that much of the risk that active fixed income managers take is typically via increased allocations to credit.

Duration

For an active manager to add value relative to a benchmark using duration, it's not simply a case of accurately predicting the future path of interest rates, but also positioning the portfolio in such a way as to benefit from outsmarting all the other professional active managers attempting to achieve the same end.

Active managers could seek to harvest the term premium in bonds by sustaining a duration longer than their benchmark and outperform over the long-term provided yield curves are positively sloped. However, this is likely to be punctuated by periods of shorter-term underperformance as the shape of the yield curve fluctuates through the cycle.

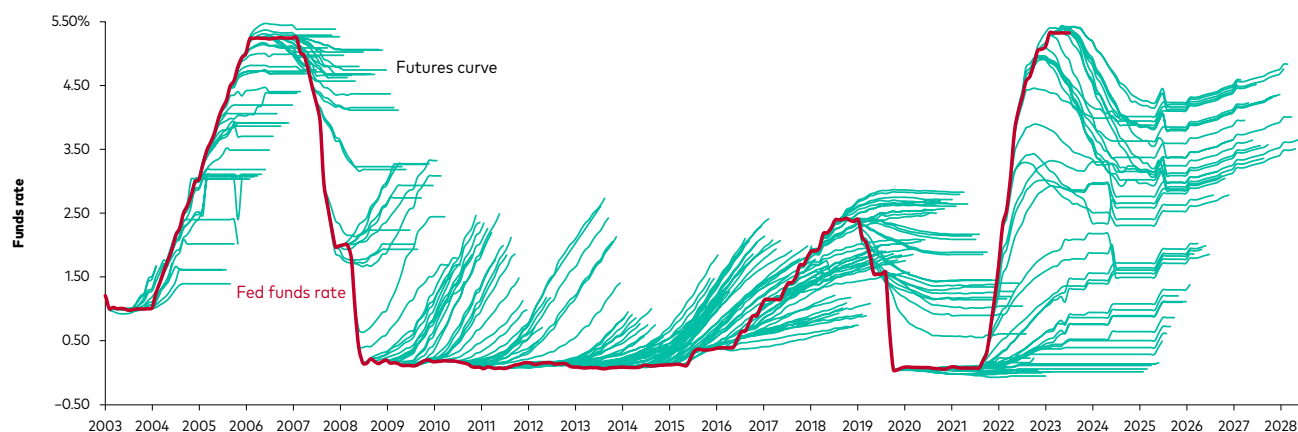
Another duration strategy that may outperform the benchmark over shorter timeframes is to hold a portfolio with longer-than-benchmark duration when yields fall and be shorter than the benchmark when yields rise. It tends to be difficult to correctly make these short-term timing decisions consistently given the need to

be 'in the right place (of the yield curve) at the right time' to be successful.

The market appetite for debt of different maturities offered by issuers is also ultimately reflected in the price of those securities, considering the expected future path of interest rates. And the future path of interest rates is not

often an area of unanimous agreement between the market (as proxied by the futures curve) and the ultimate path taken by policy makers as depicted by the Fed funds rate (**Figure 30**). This underscores the difficulty of successfully executing a duration-based strategy which requires accurate prediction of future rates.

FIGURE 30:
Actual Federal Reserve policy rate versus market expectations



Notes: The chart shows the realised Federal Reserve policy rate compared with the futures curve for each month from January 2013 to December 2023. The Federal Funds futures curve is used as a proxy for the market expectations regarding future Fed funds rate movements. Each futures curve is created by plotting expected forward rate derived from the available Federal Fund Futures contract for that time period.

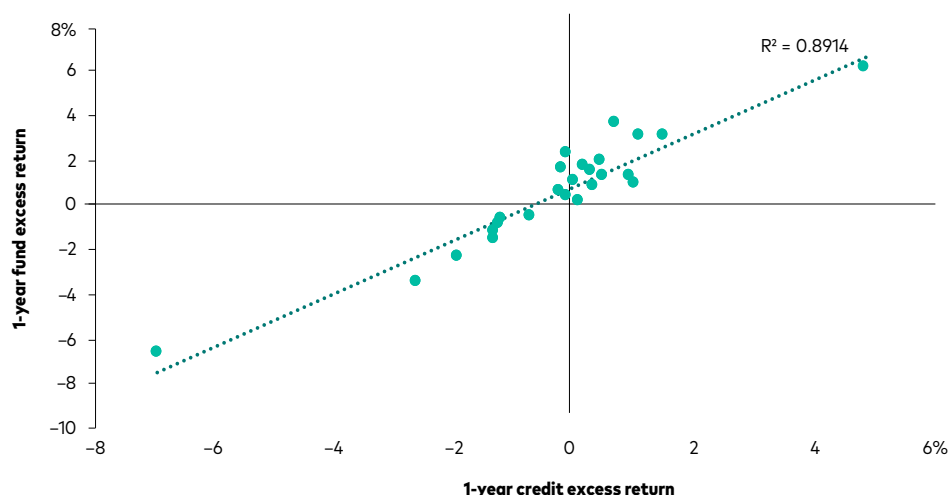
Sources: Vanguard calculations, using data from Bloomberg.

Credit

Historically, credit has shown to be a reliable source of excess returns for active fixed income managers and has been a large contributor of active fund performance. **Figure 31** shows that manager outperformance is largely due to an overweight of credit risk. For a more detailed discussion on the determinants of active bond returns, see Bosse et al., 2013.

Over the long term, the credit spread (the additional return relative to government/treasury bonds) can offer a positive return premium. However, we have seen in past credit cycles that credit can provide negative excess returns over the short term, often coinciding with periods of equity market contraction. This can reduce the diversification benefit of including bonds in the portfolio.

FIGURE 31:
Excess fund returns are attributable to credit excess return



Notes: The chart shows the relationship between the annual excess return of active fixed income funds against credit excess return from 1999 to 2023. Active fixed income funds comprise of Australia-domiciled funds benchmarked to the Bloomberg AusBond Composite 0+ Yr Index in the prospectus as listed in Morningstar. The dataset includes merged and liquidated funds to account for survivorship bias and excludes platform variants of existing funds. Active fund excess return is measured as the average 1-year fund performance relative to the 1-year performance of the Bloomberg AusBond Composite 0+ Yr Index, and credit excess return is measured as the 1-year performance of the Bloomberg AusBond Credit 0+ Yr Index relative to the Bloomberg AusBond Govt 0+ Yr Index. The benchmarks used for calculating the credit excess returns differ in modified duration, with the AusBond Credit 0+ Yr Index historically having shorter duration than the AusBond Govt 0+ Yr Index. While duration may have an effect on the calculated excess return, it reflects the typical practice of active managers who overweight short-duration credit to chase outperformance relative to the benchmark.

Sources: Vanguard calculations, using data from Bloomberg and Morningstar, Inc.

Do issuers have control over their market cap weighting?

Like equity issuers, fixed income issuers can come to the market with new securities at any time. This has raised concerns for some fixed income investors because it seems to imply that index investors are at the mercy of issuers. It's true that an issuer can increase the total par, or face value, of its outstanding supply of debt, but this doesn't necessarily imply that an issuer can control its market weighting.

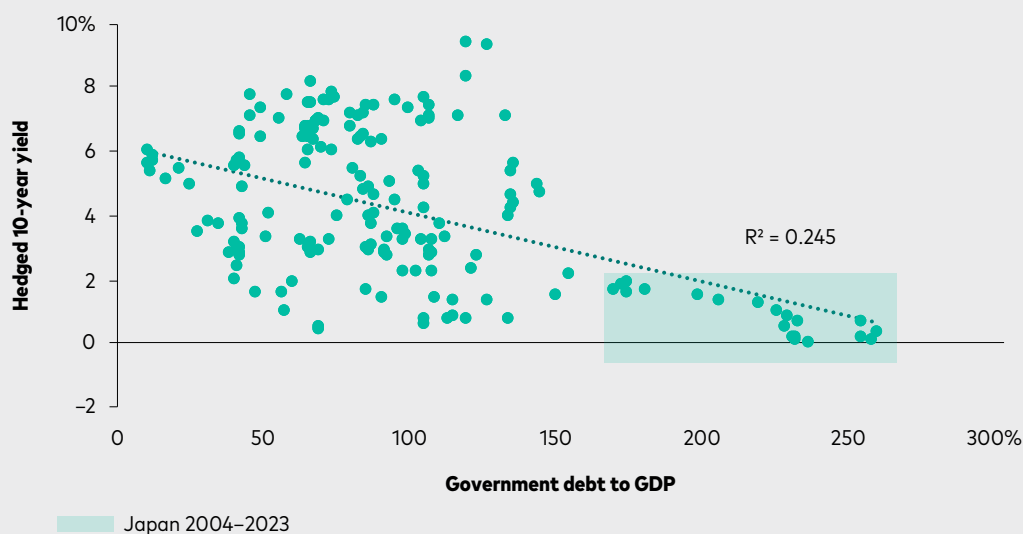
In the global fixed income marketplace, investors buy and sell bonds based on a variety of considerations, notably including the investor's perception of the issuer's willingness and ability to honour the terms of the obligation. As a result, default risk is an important consideration in fixed income valuation and is reflected in the prices of an issuer's bonds. Continuous buying and selling ensures that the price of any given bond reflects the consensus estimate of its intrinsic value, accounting for the expected risk and return from every investor's valuation process. In this sense, when a benchmark is weighted by market cap, it reflects all market

participants' views regarding the relative value of all fixed income securities within that market.

Market cap is ultimately based on the price of the debt, which is set by market participants, not the issuer. Investors choose to purchase the debt at a price they believe fairly represents its value, which is determined not just by the volume of debt on issue.

While some investors may become concerned that bond index funds are too concentrated in what they believe to be 'overly-indebted' issuers, what is often overlooked is the size of each issuer's debt relative to its assets and income. Further, when compared to other factors (inflation, central bank activity, economic expectations, fiscal policies and priorities, liquidity, currency, and market accessibility to name a few), a government's debt outstanding may be relatively unimportant in determining appropriate yields. This is demonstrated in **Figure 32**, where government indebtedness had minimal impact in explaining yield levels (keeping in mind that prices and yields of bonds are inversely related) of long-term sovereign bonds.

FIGURE 32:
Debt levels and yields have a weak relationship



Notes: The chart shows the relationship between the government debt ratio and bond yields of the G-7 countries plus Australia and Switzerland, annually from 2004 to 2023. The bond yields are calculated using the generic 10-year government bond yields for each country, then hedged to AUD using the 3-month cross-currency forward rates. Government debt is shown gross of financial assets, as defined by the IMF.

Sources: Vanguard calculations, using data from Bloomberg and IMF.

Rebalancing

The weights of assets within a portfolio will tend to drift over time based on differences in their returns. This creates a shift from the target strategic asset allocation of the fund and therefore a change in its risk-return profile. Historically, given the strong equity risk premium, a portfolio that has been left without rebalancing has typically seen itself become overweight to equities relative to its target and subsequently increase in overall volatility. By rebalancing a portfolio to its strategic allocation, the investor can increase the likelihood of selling high and buying low and ensure that the portfolio is aligned to its original risk-return profile.

Professionally managed portfolios, such as Vanguard's diversified portfolios, monitor and adjust allocations with a regularity beyond the scope of most investors. In practice, a disciplined monitoring approach in conjunction with a threshold rule ensures that the portfolio is distanced from any tactical or dynamic biases. For a more detailed discussion on rebalancing, see Zilbering et al., 2015. The rebalancing process is made more efficient from a cost perspective through the use of cash flows, including fund inflows and outflows to adjust the portfolios back to original targets.

This strategy ensures that the number of rebalancing events can be kept at a minimum, reducing costs and tax impacts, yet still enables investors to maintain an asset allocation aligned with their intended risk-return characteristics.

Conclusion

Vanguard's diversified portfolios are professionally managed solutions whose design reflects our key investment principles of goals, balance, cost and discipline. They are a product of our global expertise in capital markets and portfolio construction research as well as Vanguard's extensive practical experience with investors.

To the detriment of their portfolio and performance, too many investors focus on the markets, the economy, individual manager performance, or the performance of a given security or strategy instead of focusing their efforts on the core fundamentals of balanced asset allocation and a long-term investment perspective.

We believe a top-down approach to asset allocation and a straightforward design that keeps investment costs low offers investors the best chance of investment success.

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