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# ETF investments versus direct share portfolios: The benefits of diversification

Vanguard commentary

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**Executive summary.** Exchange traded funds that track broad share market indices can help direct share investors reduce risk in their portfolios and lower their transaction costs. In this paper, we discuss portfolio construction theory and explain how including exchange traded funds in a concentrated, equally weighted portfolio of shares can reduce total risk (the overall volatility in portfolio returns) and active risk (the volatility of portfolio returns less benchmark or market returns). We provide comprehensive examples of these concepts using historical returns data to illustrate the diversification and cost reduction benefits of investing in exchange traded funds.

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## Introduction

Many retail investors tend to hold highly concentrated portfolios of shares, with their wealth commonly established in approximately equal weights across a small number of shares.<sup>1</sup> They rebalance their portfolios sporadically and the costs per trade tend to be high,<sup>2</sup> which can lead to significant risk exposures to individual securities or small sets of securities. This phenomenon can be due to investors applying fundamental analysis to identify potential mispricing in specific securities (Piotrowski and So, 2012). Another potential basis could be behavioural factors such as framing bias (Barber and Odean, 2009), learning or asymmetric treatment of gains and losses (Ben-David and Hirshleifer, 2012), or herding and contrarian behaviour (Park and Sabourian, 2011).

Portfolio theory provides a coherent, rational framework for thinking about risk in a portfolio, and ETFs offer a convenient instrument for managing risk. The theory holds that soft costs and hard costs are higher for holding a concentrated portfolio relative to a diversified portfolio. ETFs provide an easy way to lower these costs. The soft costs relate to the overall volatility of returns on concentrated portfolios (total risk), and their volatility relative to returns on the market (active risk). The hard costs are transaction related, incurred upon each trade in directly held portfolios, and via

management fees in an ETF. The rebalancing decision is clearly an important determinant of hard costs in an investment strategy.

In this paper, we evaluate the advantages of ETFs relative to direct investments using a few example trades applied to historical prices. Our key conclusion is that ETFs facilitate the efficient management of cost and risk, whilst enabling investors to retain control over their investment strategy. The remainder of the paper is structured as follows. Section 2 provides an exposition of portfolio construction theory, and defines soft costs and hard costs. Section 3 sets out a comprehensive example of the diversification and cost benefits of including a broad equity market index ETF and a high yield ETF in a concentrated portfolio. Section 4 concludes.

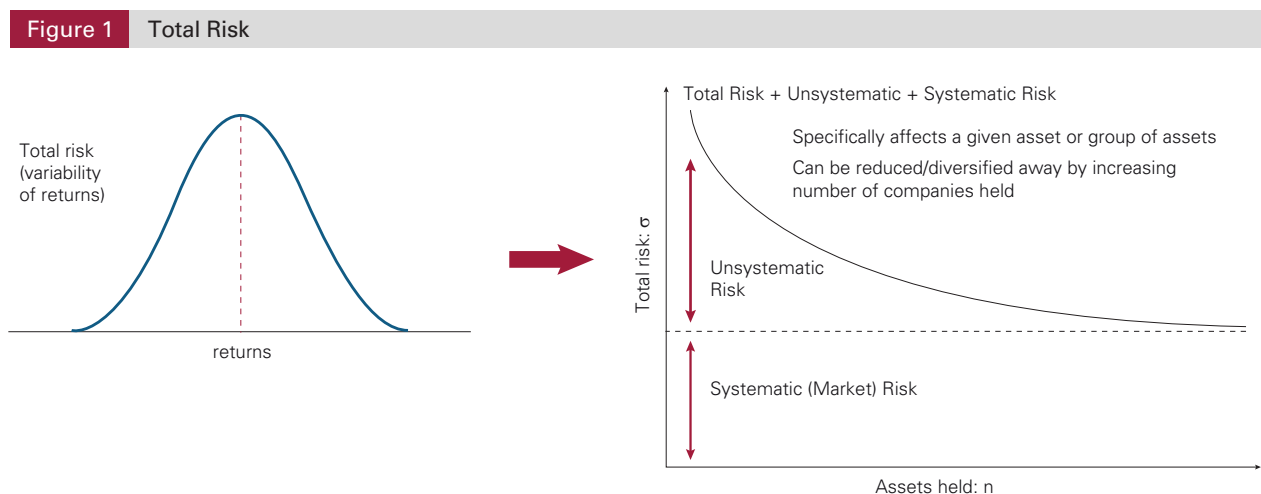
## The portfolio construction theory

### Soft costs: portfolio risk

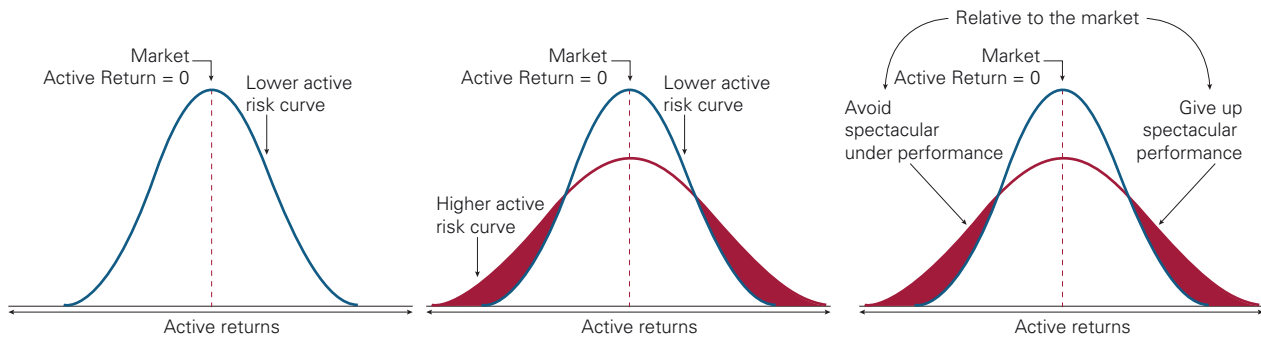
There are two key dimensions to portfolio risk: total risk and active risk. Total risk is simply the volatility of portfolio returns. Hence, total risk indicates the range and relative likelihood of divergent portfolio returns. High total risk can mean that a portfolio is relatively more likely to realise a high or low return. Total risk can be broken down into a systematic component (associated with the volatility of the benchmark) which cannot be diversified, and an unsystematic component. The unsystematic component, captured by active risk, can be diversified away by adding more assets to a concentrated portfolio according to benchmark market cap weights (Figure 1).

<sup>1</sup> See the 2010 Australian Share Ownership Study and the 2008 Australian Share Ownership Study, both published by the Australian Stock Exchange.

<sup>2</sup> Ibid.



**Figure 2** Active Risk

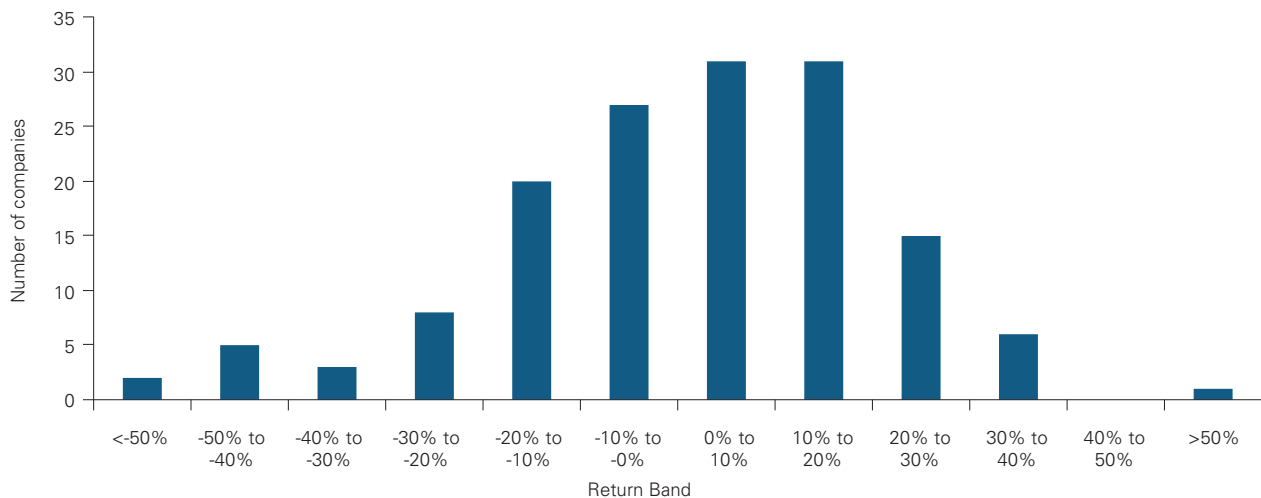


Source: Vanguard Investment Strategy Group

Whilst total risk receives much attention, we submit that investors should be just as concerned about active risk. Active risk is the volatility of the difference between the portfolio returns and the returns of its benchmark. Similarly, active risk is a measure of how likely a portfolio will realise a return that is different to the benchmark return (Figure 2). High active risk might imply that portfolio returns will probably deviate from the benchmark. Investors have control over active risk. Specifically, investors can reduce active risk by diversifying their portfolios. By contrast, systematic risk (otherwise thought of as benchmark volatility) cannot be diversified away because it is the systematic component of portfolio risk, and is already maximally diversified.

A potent example of the portfolio risks inherent in a concentrated portfolio is given by Figure 3, which shows the distribution of annual returns of S&P/ASX 300 constituent shares. It is clear that significantly more than half of the shares underperformed the market in the 3 years to 30 June 2012. Hence, over this particular period, the odds of selecting a single asset or a small set of assets that performed poorly on an absolute basis (total risk) and relative to the market (active risk) are high. When confronted with this type of chart, many analysts would claim that they have special insights that enable them to discriminate the winners from the losers. However, it is very difficult to select shares that will end up outperforming. A far more preferable approach would be to diversify and reduce portfolio risk.

**Figure 3** Return dispersion for ASX 300 shares in 3 years to 30 June 2012



Sources: Vanguard Investment Strategy Group, FACTSFT, November 2012

### Hard costs: rebalancing costs

The other key cost of holding a concentrated portfolio of shares is the so called hard costs implied by transaction fees (which include bid-ask spreads, brokerage/commissions and opportunity costs of not optimally executing). As we alluded to earlier, the magnitude of these costs through time are also directly related to the rebalancing decision. If an investor starts with an equally weighted portfolio, then high performing shares will achieve higher weightings through time, and the opposite for poorly performing shares. If an investor wishes to reset portfolio weights to the weights defined by their original investment strategy, then they will need to trade periodically to return to those weights. These trades will in turn incur transaction costs, which then act as a further drag on performance.

### Risk mitigation strategies: A summary of the argument and a preview of the example

All of these concepts set the scene for the main argument of our paper: diversification of a concentrated portfolio through holding the market portfolio through an ETF index security can reduce the soft costs of total risk and especially active risk.

However, the acquisition of a broader portfolio of shares and periodic rebalancing is costly; direct investments to add shares to a portfolio will only marginally reduce active risk until enough investments are executed to achieve the benchmark weights; and researching and monitoring a defensible view on the appropriate weight for additional assets can incur significant costs in terms of time, energy and potential data subscription fees.

In contrast, the remainder of this paper sets out a comprehensive example of how ETFs can facilitate diversification and trading cost savings for concentrated portfolios in a single trade. Indeed, research from our U.S. colleagues in Vanguard's Investment Strategy Group indicates that ETFs are used by many investors for precisely these reasons (Ameriks et al, 2012).

### An example of soft and hard costs in practice

#### VAS with Portfolio 1 and Portfolio 2 selected from ASX50 shares

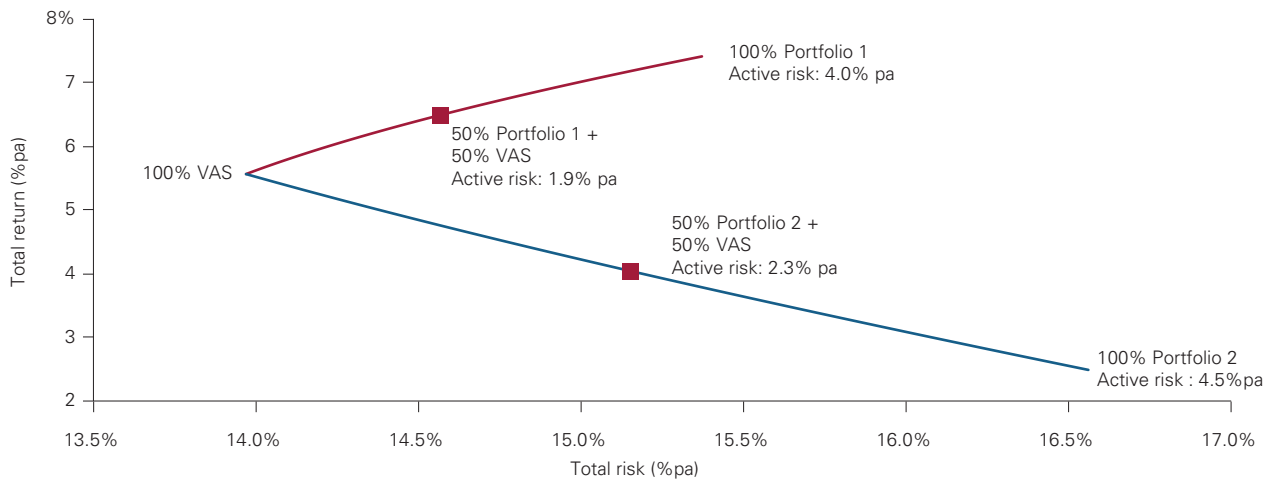
Consider a concrete example of some of the key concepts from the portfolio construction theory and its cornerstone concepts of total risk and active risk (Table 1). As we restrict our discussion to listed equity investments, our example is based on investments in ASX shares and equity ETFs. We form three portfolios starting in June 2009, and calculate total and active return and risk over the three year period to June 2012. Portfolio 3 is the market portfolio. It is an investment in VAS ("Vanguard Australian Shares Index ETF"), which tracks the S&P/ASX 300 index. By definition, the active return and risk of this ETF portfolio are zero, as VAS matches market returns with negligible tracking error. Portfolio 1 is an equally weighted portfolio of ten shares selected randomly from S&P/ASX 50 index constituents as at 30 June 2009. Portfolio 2 is the same as portfolio 1 but for two changes in the share selection.

**Table 1** Portfolios 1 and 2 and VAS

Portfolio 1:		Portfolio 2:		Portfolio 3:
\$500,000 equal weighted portfolio selected across top 50 as at 30 June 2009 – no rebalancing		\$500,000 equal weighted portfolio; drop WBC, ANZ for LEI, QAN – no rebalancing		\$500,000 ASX300 through VAS (before fees)
BHP	As at 30 June 2012:	BHP	As at 30 June 2012:	As at 30 June 2012:
CBA		CBA		
NAB	Portfolio value: \$619,210	NAB	Portfolio value: \$542,830	Portfolio value: \$588,170
WBC		LEI		
ANZ	Portfolio return: 7.4%pa	QAN	Portfolio return: 2.8%pa	Portfolio return: 5.5%pa
TLS	Total risk: 15.5% pa	TLS	Total risk: 16.5% pa	Total risk: 14% pa
QBE		QBE		
RIO	Active return: 1.8%pa	RIO	Active return: -2.7%pa	Active return: 0%pa
WES	Active risk: 3.8% pa	WES	Active risk: 4.3% pa	Active risk: 0% pa
WPL		WPL		

Source: Vanguard Investment Strategy Group

**Figure 4** Combining Portfolios 1 and 2 with VAS



Source: Vanguard Investment Strategy Group

These portfolios can be thought of as typical examples of the holdings of many retail investors. While portfolio 1 outperformed the market and portfolio 2 underperformed, portfolios 1 and 2 have higher total risk than the market (Table 1). These outcomes flow from the concentrated nature of portfolios 1 and 2. Moreover, they illustrate the sensitivity of the performance of concentrated portfolios relative to the market to slight changes in holdings. This exposure is measured by the active risk of portfolios 1 and 2. We view the active risk of portfolios 1 and 2 as an important soft cost of holding a concentrated portfolio – a soft cost that should not be overlooked.

To illustrate the tradeoffs involved between investing in portfolios 1 and 2 relative to investing in the ETF VAS, we show the risk-return characteristics of the portfolios over the same three year horizon to June 2012 (Figure 4). The 100% VAS point on the chart, at the intersection of the red and blue lines, shows the total risk and total return for VAS as set out in Table 1. Similarly, the 100% portfolio 1 and 100% portfolio 2 points plot the risk and return characteristics from Table 1. The red and blue lines show the risk and return measures for combinations of VAS with portfolio 1 and portfolio 2, respectively, where the weight on VAS varies from 0% to 100% and the remainder is allocated to portfolio 1 or 2 as the case may be.

Figure 4 demonstrates how substituting funds out of portfolios 1 or 2 towards VAS will reduce total risk. Importantly, due to the risk-return characteristics of the market relative to portfolios 1 and 2, the reduction in total risk is relatively higher in magnitude than the impact on portfolio returns. Note that there is an implicit cost in rebalancing these portfolios to achieve the desired weights – in practice these investment strategies would involve hard costs, as allocating a fixed proportion of a directly held portfolio of 10 equally weighted shares into an ETF like VAS would require 10 trades to maintain the equal weightings.

#### VHY with Portfolio 1 and Portfolio 2 selected from High Yield Australian shares

We can also provide an example on similar lines for high yield shares. Table 2 sets out our risk and return calculations for two portfolios of high yield shares, relative to a diversified portfolio of high yield shares, as represented by the VHY (“Vanguard Australian Shares High Yield ETF”). The higher portfolio return and total risk measures for the high yield portfolios relative to the previously analysed portfolios flow from the fact that the universe of high yield shares is of course much smaller than the set of shares in the S&P/ASX 300. Given the focus on high dividend paying shares, yield is another dimension of the analysis. In this example, the yield on portfolios 1 and 2 are broadly comparable to those on the high yield index (portfolio 3).

**Table 2** Portfolios 1 and 2 and VHY

Portfolio 1:		Portfolio 2:		Portfolio 3:
\$500,000 equal weighted portfolio holding from Top 50, selection based on above average forecast dividend yield as at 30 June 2009 – no rebalancing		\$500,000 equal weighted portfolio; replace SYD with LLC – no rebalancing		\$500,000 through VHY (before fees)
CBA	As at 30 June 2012:	CBA	As at 30 June 2012:	As at 30 June 2012:
TLS		TLS		
NAB	Portfolio value: \$723,650	NAB	Portfolio value: \$633,660	Portfolio value: \$676,160
QBE		QBE		
SYD	Portfolio return: 13.1%pa Total risk: 14.2% pa Yield: 7.0%	LLC	Portfolio return: 8.2%pa Total risk: 16.5% pa Yield: 6.4%	Portfolio return: 10.6%pa* Total risk: 13.0% pa* Yield: 6.6%
	Active return: 2.5%pa Active risk: 6.7% pa		Active return: -2.4%pa Active risk: 8.0% pa	Active return: 0%pa Active risk: 0% pa

Source: Vanguard Investment Strategy Group

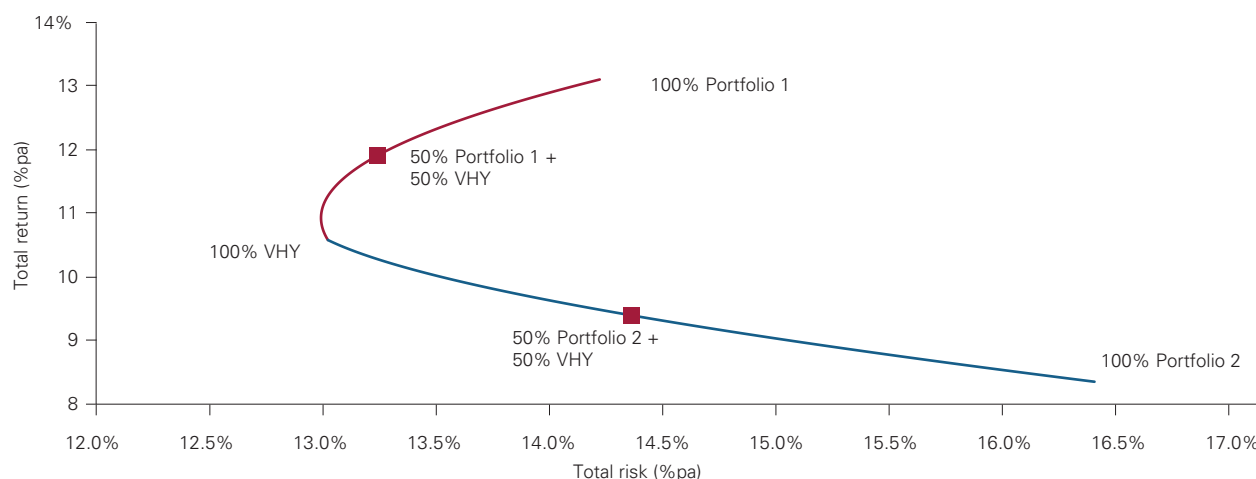
Again the key implications of this example are that different return outcomes can result from various equally weighted portfolios of high yield shares, and the outcomes are very sensitive to even slight changes in portfolio composition. For those investors who wish to focus on high yielding shares, diversification through investing in a high yield ETF (VHY in this case) can lead to risk reduction in both a total risk and an active risk sense. Then, to illustrate the tradeoffs involved between investing in portfolios 1 and 2 relative to investing in the ETF VHY, Figure 5 shows the risk-return characteristics of the portfolios and their combinations over the same three year horizon to June 2012. As before, increasing allocations to the diversified high yield portfolio VHY away from the concentrated portfolios 1 and 2 has the effect of

reducing the investors total and active risk.

There are two additional comments in this case. First, the risk scale (horizontal axis) has a much larger range than in the VAS example. This is a result of fewer securities in the direct portfolio driving greater variability of returns. If yield is an important objective, then VHY provides simple way to enhance one's portfolio across a wide range of securities. Second, the reduction in risk that results from allocating away from portfolios 1 and 2 towards VHY outweighs the magnitude of the change in return in both cases.

#### Hard costs: A cost/benefit analysis

As we mentioned above, the other key cost of holding a concentrated portfolio of shares is the so called hard costs implied by transaction fees. The

**Figure 5** Combining Portfolios 1 and 2 with VHY

Source: Vanguard Investment Strategy Group

## Investment implications of franking credits

One of the key benefits to investing in a portfolio of Australian shares are the franking credits that flow from these investments. Of course, the broader the portfolio of higher yielding shares, the more diversified the sources of potential dividend payments and franking credits. Importantly, the benefits from franking credits flow equally to investors in direct shares, ETFs and managed funds.

The impact of franking credits upon portfolio outcomes will depend on a particular investors' tax circumstances.

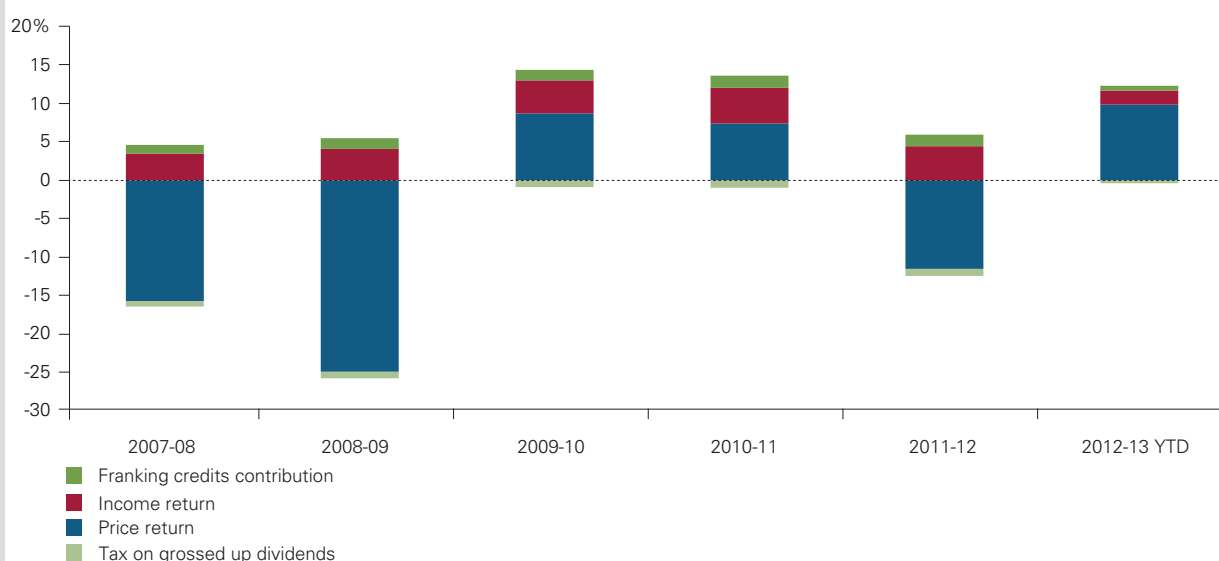
It is not just the level of franking credits across shares in a portfolio that matter for investors. Indeed, investors should care most about the grossed up yield on their dividend paying shares. This is especially important for self managed super fund investors in the pension or retirement phase of their lives. These investors (who fall within the 0% to 15% tax bracket) stand to receive significant income benefits from investments in diversified portfolios relative to concentrated portfolios of shares.

To give a sense of the benefits from franking credits flowing to Australian managed fund and ETF investors, Figure 6 presents a decomposition of Australian equity returns by financial year.

This chart shows the price, income and franking credit components of returns on the FTSE/ASFA Australia 300 index since 2007-08. The chart also shows the tax payable on the grossed up dividends by investors in the 15% tax bracket, which is typically applicable to superannuation contributions. From this chart, it can be seen that, for superannuation investors, franking credits contribute on average around 1.3% per annum to total returns on investments in the Australian share market with reference to the past five financial years.

Investors, such as retirees and not-for-profit organisations, who fall into the tax exempt bracket, would stand to receive the entire benefit of the franking credits without paying the tax on grossed up yields.

**Figure 6** Breakdown of Australian equity returns



Note: The returns in the chart, and the tax calculations are based on the FTSE/ASFA Australia 300 Index – Superannuation CGT version.

Source: FTSE, October 2012

magnitude of these costs through time are also directly related to the rebalancing decision. If an investor starts with an equally weighted portfolio, then high performing shares will achieve higher weightings through time, and the opposite for poorly performing shares. We show the impact of no rebalancing for portfolios 1 and 2 (from Table 1) in Figure 7. These charts show how, at the end of the three year period to 30 June 2012, shares whose price appreciated significantly over the period comprise a relatively larger portion of the portfolio (eg. CBA, WES); and vice versa for shares exhibiting capital losses (eg. QAN, QBE). To ameliorate this situation (and if the initial equal portfolio weights are indeed desirable), investors need to rebalance their portfolio at least once per year. This in turn incurs brokerage fees, which will accumulate as a function of the number of shares held and the frequency at which rebalancing takes place.

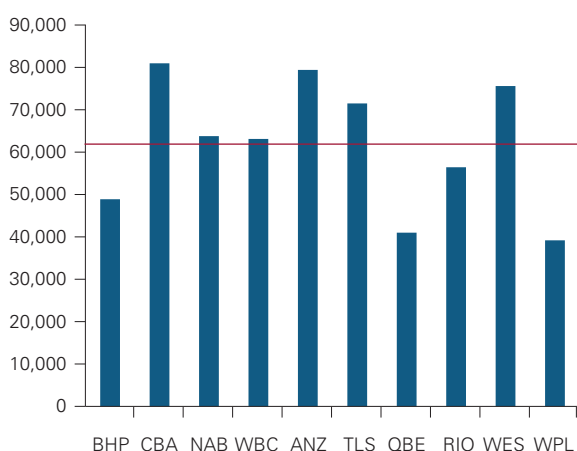
To further quantify the impact of hard costs, we can assume that the cost of a single trade via a counterparty in the share market is \$30 (in practice, this will also depend on the size of the trade and the type of the brokerage [full service or online discount]). We note that the annual Indirect Cost Ratio (management cost) of VAS is 0.15% per annum. Given this information we can make a direct comparison between the annual cost of holding the ETF VAS and acquiring or reweighting annually an equally weighted portfolio of ten shares. Under

our brokerage cost assumption, purchasing or rebalancing ten shares will cost \$300 per annum. Hence, purely in terms of transaction costs, there is an “indifference point” where an investor is neutral between acquiring the shares directly and purchasing the ETF VAS with an investment of \$200,000 in VAS, which has an annual cost of \$300. For smaller investments in VAS, the ETF is lower cost than the direct investments and vice versa for larger investments in VAS. It is also important to note that stepped brokerage fees on ticket size in practice could further tilt the cost advantage in favour of VAS.

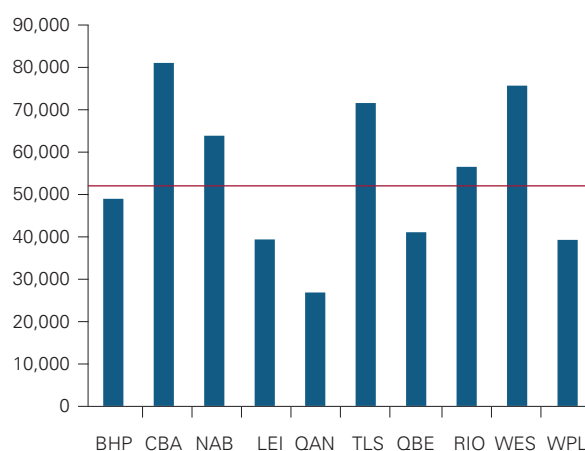
There are of course other costs to direct investments: any corporate action such as dividends or rights issues which affects cash flows to equity holders needs to be accounted for (reinvested, reallocated, placed into cash account, or withdrawn) as part of the underlying investment strategy. Further, selection and monitoring of individual securities tends to require paid subscription to data services to assist with decision making.

**Figure 7** Weight drift

Portfolio 1: No rebalance



Portfolio 2: No rebalance



Note: This figure sets out the value at 30 June 2012 of \$50,000 invested in each of the shares in Portfolios 1 and 2 as at 30 June 2009 (with dividends reinvested). The labels on the horizontal axes in both charts are ASX share tickers, which correspond to the shares in Portfolios 1 and 2. The green lines show the levels where the allocations to each of the shares in Portfolios 1 and 2 need to be rebalanced towards, in order to achieve an equally weighted portfolio as at 30 June 2012.

Sources: Vanguard Investment Strategy Group, FACTSET, November 2012



#### 4. Conclusion

In this paper, we have analysed some of the major costs and risks associated with concentrated direct equity portfolios that form a major component of many retail investors' investment strategies. These portfolios typically hold only a small number of shares and typically carry higher or similar total risk to the broad market. Concentrated portfolios can incur opportunity costs in terms of high active and total risk. It is easy to overlook the soft costs that arise from these risks – they are typically unseen until ex post performance data is available.

Hard costs associated with direct equity investing increased with the number of securities and the rebalancing frequency of an investment strategy. Ongoing rebalancing costs can be higher than the cost of holding an ETF. It is also costly to maintain concentrated portfolios, due to brokerage fees. These costs recur whenever a portfolio is rebalanced.

Hence, for investors who wish to focus on listed products, ETFs provide a low cost instrument for achieving broad diversification. ETFs as part of investment strategy present an easy way to reduce the risk of volatile portfolio returns whilst retaining flexibility and control of asset selection.

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