Myths and misconceptions about indexing

Vanguard research

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Executive summary. Indexing has become an important investment strategy for institutional and individual investors, and the variety of index products in the Australian market has expanded significantly. Index assets in Australia totalled approximately AU$231 billion, or around 16% of the managed fund market, as at 30 March 2012[1].

Indexing, however, has been repeatedly criticised and said to be an inferior investment choice compared to active management strategies. Unfortunately, such criticisms have led to a number of misconceptions despite the success of indexing and despite a vast amount of research which disproves them[2].

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1 *Rainmaker Roundup* March Quarter 2012. Vanguard pays a subscription to use this data.

2 Previous Vanguard research has sought to disprove myths and misconceptions about indexing. See The Vanguard Group Inc, 2004. *Myths and Misconceptions About Indexing.*

These misconceptions include:

Myth 1: Indexing works only in efficient markets

Critics believe that indexing is only successful in the most efficient parts of the market, such as for large-capitalisation securities. However, historical performance of emerging market and bond index funds has shown indexing to be just as successful.

Myth 2: The popularity of index funds drives their outperformance

The theory posits that cash flows into index funds boost the performance of the underlying stocks relative to the market. Evidence shows that the success of indexing as an investment strategy is not due to its popularity, but rather a result of the underperformance of actively managed funds.

Myth 3: Indexing capital flows move markets

A common misconception is that cash flows into and out of index funds impact the price of market securities and may contribute to the effect of bull and bear markets. However, evidence shows a lack of correlation between cash flows and market performance.

Myth 4: Index funds always underperform in a bear market (indexing works only in bull markets)

A frequently heard criticism is that active funds outperform index funds in a bear market because index managers remain fully invested while active managers take a defensive position by converting equities to bonds or cash. Historical evidence indicates that most active funds do not outperform index funds during bear markets.

Myth 5: Equity index funds are tax-inefficient in a bear market

Some critics of equity index funds argue that they are tax-inefficient in bear markets due to a net outflow of index funds which force index managers to realise capital gains on redemptions. In reality, net cash flows for index funds have been positive during the past five bear markets and index funds have been consistently tax-efficient.

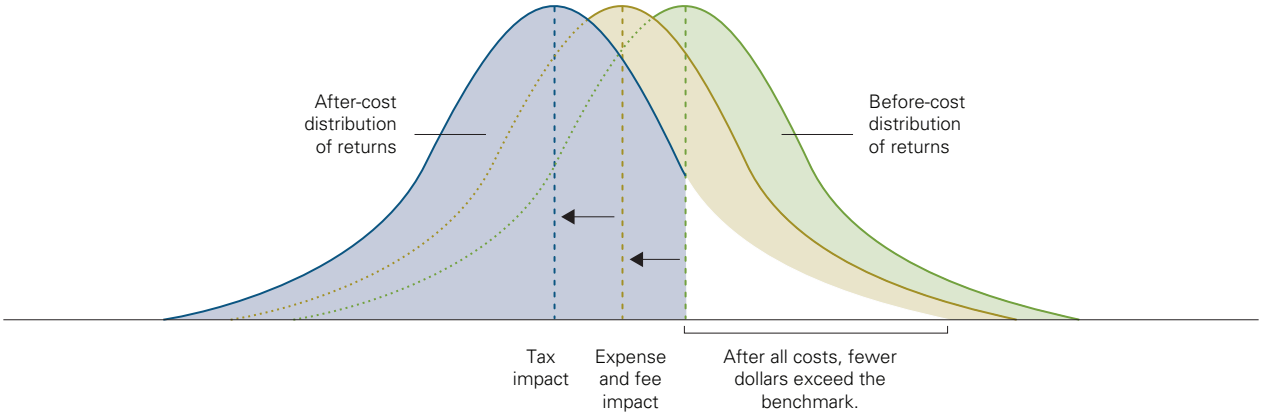
Myth 6: Higher management costs are equivalent to higher returns

Many investors believe that they can buy superior investment performance. However, in the mutual fund industry higher fees typically do not lead to higher returns. Active funds that charge higher fees are at a distinct disadvantage relative to low cost funds, leading most active funds to underperform.

Myth 7: Market-capitalisation-weighted indexing gives greater weight to over-valued securities

Critics of market-cap-weighted indexing argue that they overweight overvalued securities and underweight undervalued securities. This myth assumes that some securities are mispriced. However, the relative efficiency of equity markets makes it extremely difficult for fund managers to consistently profit from the identification of mispriced securities. We illustrate with an example based on European sovereign debt.

Figure 1 The impact of costs on the distribution of market returns



Source: Vanguard Group 2012.

Zero-sum game: The theory behind indexing

The concept of a zero-sum game starts with the understanding that at any point in time, the holdings of all investors in a particular market aggregate to form that market (*Sharpe*, 1991). Because all investors' holdings are represented, if one investor's dollars outperform the aggregate market over a particular time period, another investor's dollars must underperform, such that the dollar-weighted performance of all investors sums to equal the performance of the market.[3] Of course, this holds for any market, such as global equity and bond markets, or even specialised markets, such as commodities or real estate. The aggregation of all investors' returns can be thought of as a bell curve (see **Figure 1**), with the benchmark return as the mean—the specific market being represented by the green curve, with the market return as the green vertical line.

Over any given period, the dollar-weighted positive active performance equals the inverse of the dollar-weighted underperformance, such that the sum of the two equals the market return. However, in reality, investors are exposed to costs—such as commissions, management fees, bid-ask spreads, administrative costs, market impact[4] and, where applicable, taxes—all of which combine to reduce investors' realised returns over time. The aggregate result of these costs shifts the investors' curve to the left. We represent the after-cost distribution of returns with a blue curve. Although a portion of the after-cost dollar-weighted performance continues to lie to the right of the market return, represented by the white region, a much larger portion is now to the left of the market line, meaning that after costs, most of the dollar-weighted performance of investors falls short of the aggregate market return. By minimising costs, therefore, investors can help ensure that their return is closer to the market return on average, giving them a greater chance of outperforming investors who incur higher costs.

Myth 1: Indexing works only in efficient markets

Many critics claim that indexing strategies only work in efficient markets—as represented by very liquid, large-cap stocks such as the S&P/ASX 300—and not in less efficient markets such as emerging markets, fixed income markets, or market segments represented by small cap stocks. They argue that inefficiency creates a greater dispersion of returns, and therefore, unique opportunities to achieve significant excess returns.

We contend that the majority of active managers underperform their relevant benchmark in all markets—both efficient and so-called inefficient markets—due mostly to increased operating costs. Our conclusions are based on the assertion that investing is a zero sum game. That is, for every manager who outperforms the benchmark, another must underperform. Active management incurs greater expenses than indexing due to increased

3 Dollar weighting gives proportional weight to each holding, based on its market capitalisation. Compared to equal weighting, which helps ensure against any one fund dominating the results but also implicitly makes relatively large bets on smaller constituents, dollar weighting more accurately reflects the aggregate equity and bond markets.

4 In this context, market impact refers to the effect of a market participant's actions—that is, buying or selling—on a stock's price.

portfolio turnover, research and transaction costs. As a result, the majority of active funds under-perform index funds after fees. This result is more pronounced in less efficient markets where active managers face even higher research and transaction costs, and higher market impact costs due to a lack of liquidity.

Table 1 presents annual returns data for active Australian emerging market funds and their benchmark over the ten-year period ending 2011. Active funds underperformed in seven out of ten years, in some years by a significant margin.

Bond index funds

The superior performance of index funds extends to fixed interest markets. Both stock and bond index funds have a low cost base which provides them a significant head start over many active funds. Bond returns, however, are typically lower and less volatile than stocks leading to a more narrow distribution of potential returns. This means that the opportunity for outperformance by active managers is diminished.

Table 2 compares the annual returns of actively managed Australian bond funds to their benchmark over the ten-year period ending December 2011. Active funds underperformed the benchmark in eight out of ten years. During six out of the ten years, more than 75% of active funds underperformed.

Myth 2: The popularity of index funds drives their outperformance

One common misconception is that the popularity of index funds has driven their superior performance over many active funds. In Australia, the introduction of index funds in the early 1990s coincided with an extended equities bull market which continued almost unabated until the global financial crisis in 2007. As a result, many practitioners have argued that the growing popularity of indexing has led to positive cash flows into stocks represented in the index and caused positively skewed returns for the index as a whole.

A brief study of the investment process for active and index managers provides evidence to invalidate the proposition. Figure 2 illustrates historical active and index fund holdings in Australia. Although the growth of index funds holdings has outpaced active holdings, active fund holdings still constituted 84% of the Australian stock market at 30 March 2012, versus 16% for index fund holdings. The actively managed portion of the market therefore contributes more significantly to aggregate market returns than the portion managed by index funds. In addition, the investment decisions of active managers are largely uninfluenced by index fund behaviour, while index funds follow the aggregate end-of-day cash flows and price discovery activity of all market participants represented in the market index. In this sense, active managers drive most of the demand for stocks.

Table 1: Emerging market annual returns (%) – Active Equity Funds vs. Benchmark, 2002-2011.

Index	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Active Emerging Markets Funds	-15.78	15.82	16.51	41.82	22.42	22.34	-41.34	35.19	3.26	-20.02
MCSI Emerging Markets Index	-9.07	42.34	13.21	31.54	25.57	30.40	-47.25	58.65	11.69	-14.86
Relative Index Performance	**+6.71**	**+26.52**	**-3.30**	**-10.28**	**+3.15**	**+8.06**	**-5.91**	**+23.46**	**+8.43**	**+5.16**

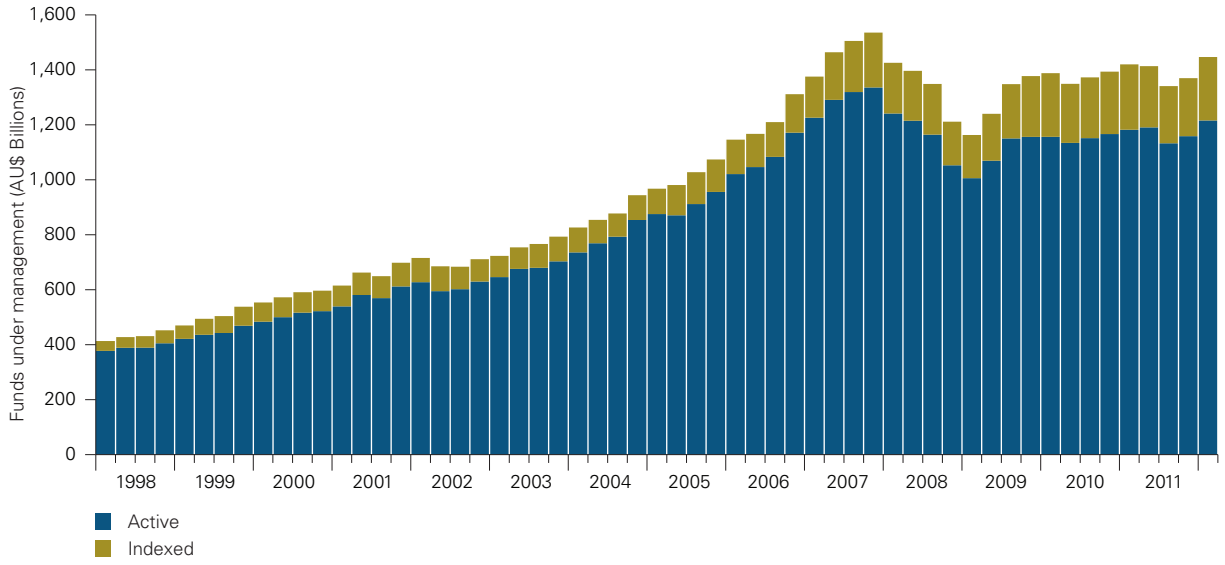
Source: Morningstar, Inc. Data cover the period 01/2002 – 12/2011.
Sample includes all active emerging market equity funds domiciled in Australia—surviving and closed, retail and wholesale. Vanguard Investments Australia Ltd pays a fee for access to the data used in this table but did not commission the research.

Table 2: Bond market annual returns (%) – Active Bond Funds vs. Benchmark, 2002-2011.

Index	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
UBS Composite Bond Index	8.81	3.05	6.96	5.79	3.12	3.50	14.95	1.73	6.04	11.36
Composite Bond Funds	7.94	2.55	6.50	5.31	2.60	2.20	10.65	3.81	6.70	10.63
Relative Index Performance	**+0.87**	**+0.50**	**+0.46**	**+0.48**	**+0.52**	**+1.30**	**+4.30**	**-2.08**	**-0.66**	**+0.73**
Proportion of active funds that underperformed the index	85.4%	63.6%	70.5%	75.5%	78.1%	89.9%	96.9%	22.1%	50.0%	80.2%

Sources: FactSet, Morningstar, Inc. Data cover the period 01/2002 – 12/2011.
Sample includes all active Australian bond funds —surviving and closed, retail and wholesale—with Morningstar category Australian OE Bonds – Australia. Vanguard Investments Australia Ltd pays a fee for access to the data used in this table but did not commission the research.

Figure 2 Active vs. Index funds under management of Australian managers (1998-2012)



Sources: The Rainmaker Group. Vanguard pays a subscription to use this data.

Empirical evidence

Many recent studies on the superior performance of index funds have focused on the returns behaviour of new stock index additions. Investors have commonly observed a short term spike in returns for stocks immediately after the announcement and subsequent addition to the index. This is commonly referred to as the 'index effect'. Standard and Poor's (2008) examined returns on index additions across five leading global indexes—the S&P 500, the Nikkei 225, the FTSE 100, the S&P/TSX60 and the DAX 30—over the 10-year period to August 2008. They found evidence of an initial 'price pop' following the addition of a security to the index, however, within five days of the effective inclusion date securities had lost all of their initial price gain. This is consistent with earlier studies including Malkiel and Radisich (2001) who found no long-run price increase for S&P 500 additions. Standard and Poor's also determined that the short-term index effect has shrunk dramatically since the late 1990s due to the exploitation of arbitrage opportunities by market participants, and due to modified trading behaviour of index funds around index rebalancing dates.

Myth 3: Indexing capital flows move markets

Index funds are often accused of moving the market when large cash flows move in and out of their funds. In Australia, index funds hold only 16% of the equities market in Australia versus 84% for active managers. Index holdings are therefore not substantial enough to dictate the direction of the market.

Figure 3 plots the relationship between market returns and net cash flows of Australian equity index funds over the ten-year period ending December 2011. The chart shows that net index cash flows have remained positive for most months over the ten year period ending December 2011. In addition, the chart indicates a lack of correlation between the two variables.[5]

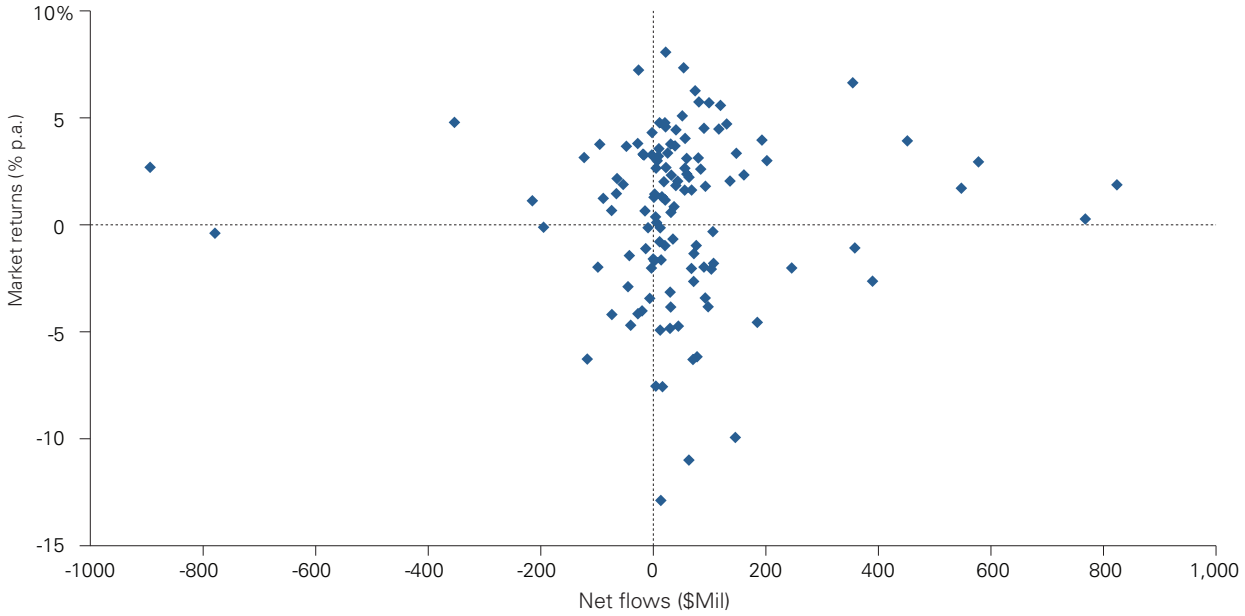
Myth 4: Index funds always underperform in a bear market (indexing works only in bull markets)

This theory asserts that the relative performance of index vs. active funds is dictated by the direction of the market. The implicit assumption is that active managers are able to time the market and take a more offensive/defensive position when necessary to maximise returns. For example, during a bear market an active manager could convert portfolio assets to cash, and in a bull market the same manager may be able to leverage their equities position or at the very least remain fully invested.

In reality, timing the market is extremely difficult. Markets are highly efficient and tend to reflect all publicly available information. For this reason, active managers are rarely able to predict major market turning points. For those managers who are able, on occasion, to anticipate turning points in the market,

5 Correlation between Australian equity index cash flows and annual returns of the S&P/ASX 300 were 0.03 over the period 2002-2011. This indicates a very weak correlation between the two series.

Figure 3 Market returns and net flows of Australian index funds



Sources: FactSet, Morningstar, Inc. Monthly data cover the period 01/2002 – 12/2011. Market returns represented by returns of the S&P/ASX 300 Total Return Index. Vanguard Investments Australia Ltd pays a fee for access to the data used in this table but did not commission the research.

the cost of reallocating investments must be lower than the reward for doing so. Table 3 illustrates how difficult it has been for active managers to outperform the S&P/ASX 300. In only two of the past five bear markets, and in two of the 12-month periods following each, were active funds able to outperform their benchmark. We therefore find no evidence to demonstrate that active managers can consistently time markets.

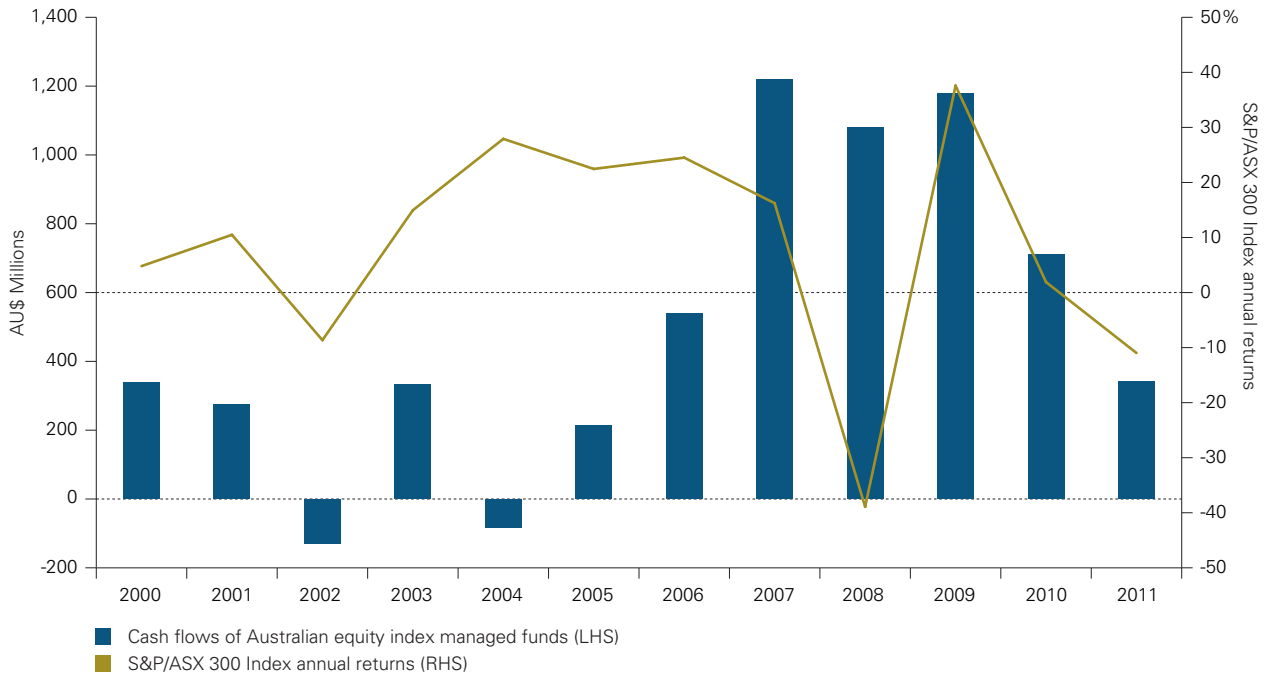
Table 3: Performance of general equity managers

During Five Bear Markets	Index	Morningstar General Equity Average	Relative Index Performance
October 1987 – February 1988	-43.52%	-45.60%	+2.08%
September 1989 – December 1990	-20.13%	-17.79%	-2.34%
February 1994 – January 1995	-17.76%	-17.26%	-0.50%
February 2002 – February 2003	-15.25%	-15.89%	+0.64%
November 2007 – February 2009	-47.55%	-48.51%	+0.97%

During the 12-Month Periods Following Five Bear Markets	Index	Morningstar General Equity Average	Relative Index Performance
March 1988 – February 1989	24.24%	13.05%	+11.19%
January 1991 – December 1991	34.24%	19.67%	+14.57%
February 1995 – January 1996	30.47%	25.38%	+5.09%
March 2003 – February 2004	25.77%	28.26%	-2.49%
March 2009 – February 2010	45.06%	48.76%	-3.70%

Sources: Bloomberg, Morningstar, Inc. Data cover the period 01/1981 – 12/2012.
The index here is represented by the All Ordinaries index for the period January 1980 – March 1988, and the ASX/S&P 300 for the period April 1989 – December 2011. Vanguard Investments Australia Ltd pays a fee for access to the data used in this table but did not commission the research.

Figure 4 Cash flows of Australian equity Index managed funds vs S&P/ASX 300 Index annual returns



Source: Morningstar, Inc. Data cover the period 01/2000 – 12/2011..

Active managers on average hold higher cash positions than index funds which create a performance drag in bull markets. Active funds typically have cash and short sell limits (most are long only managers) which would limit the outcome of any successful market timing. Index funds remain fully invested ensuring their portfolio is fully invested when markets turn—this is especially important in volatile markets. Over the 250 trading days to 31 May 2012, the S&P/ASX 300 earned a return of -9.2%. On only 13 days the market provided a return greater than 2.0%. An unlucky market timer who missed the market's best 13 days would only have earned a return of -35.2% over the same period.

Myth 5: Equity index funds are tax-inefficient in a bear market

Some critics of equity index funds argue that they are tax-inefficient in bear markets. They contend that bear markets result in a net outflow of index funds and force index managers to realise capital gains from selling assets to meet redemptions. These claims are incorrect for two reasons.

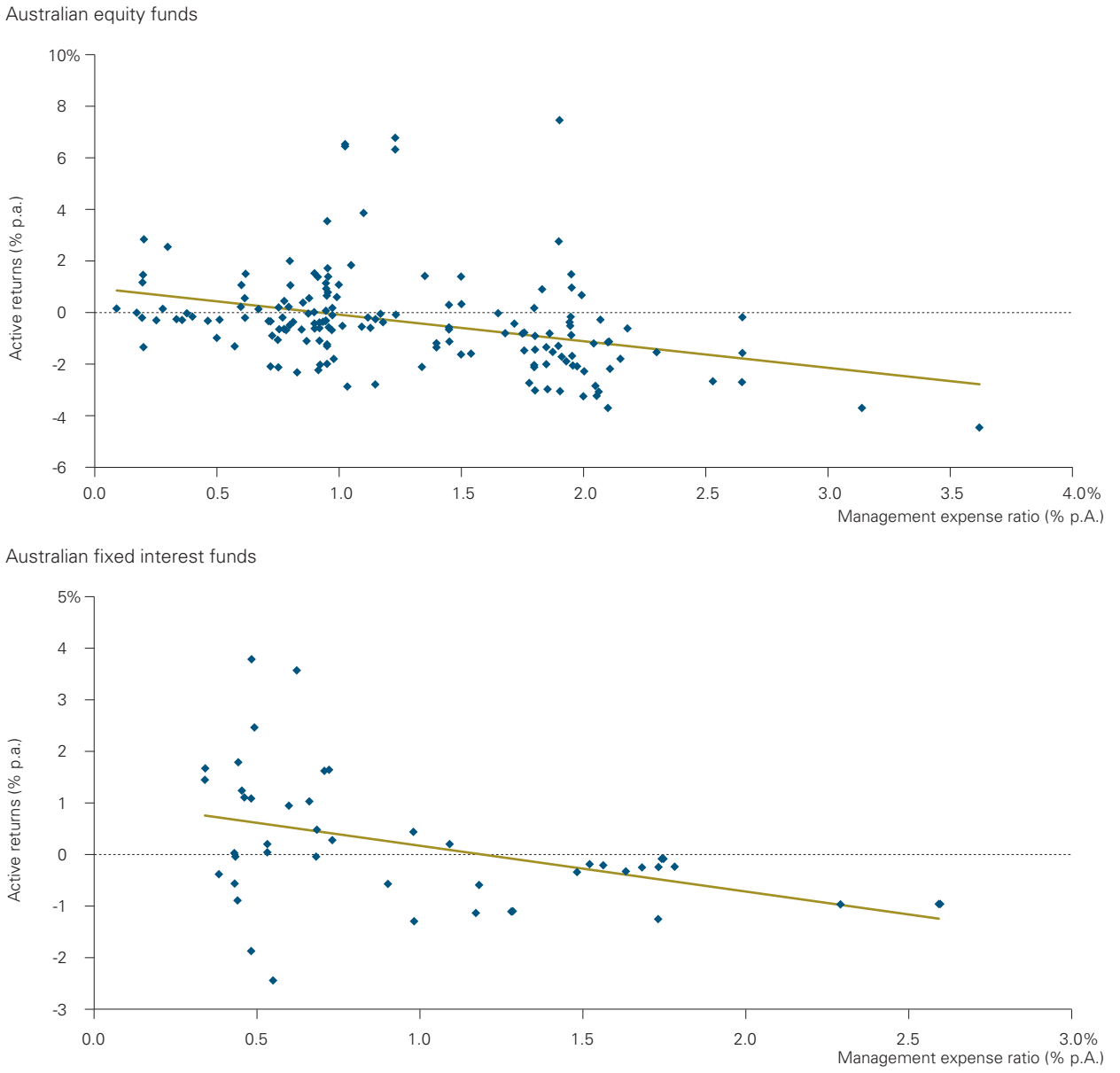
Firstly, bear markets do not typically result in outflows of index funds. To the contrary, **Figure 4** demonstrates that cash flows into Australian index funds have been positive in 10 out of the past 12 years. This period included the dot com crash of 2000-2002 and the financial crisis of 2007-2012. During the most recent financial crisis cash flows have been significantly positive, totalling around AU$4.5 billion over the five years ending December 2011.

Secondly, when redemptions result in net cash outflows, index fund managers typically act to minimise capital gains incurred. Index managers can achieve this because, over time, parcels of securities are purchased at a wide range of prices. By selling the highest cost base parcels first, a manager will minimise capital gains incurred and delay unrealised gains on lower cost base parcels into the future. In Australia, there is a benefit to delay the realisation of capital gains because assets held for one year or more receive a 50% capital gains tax discount.

Myth 6: Higher management costs are equivalent to higher returns

Some investors believe that they can buy superior investment performance. However, in the mutual fund industry higher fees typically do not mean higher returns. Actively managed mutual funds in general charge higher fees than index funds to cover the costs of high portfolio turnover and larger research teams. This creates a greater hurdle for active managers to overcome in order to outperform index funds. In reality, most active managers do not succeed.

Figure 5 Higher cost correlates with lower returns



Sources: Vanguard Investments Australia Ltd. analysis, based on data from Morningstar, Inc.

Empirical evidence: Equity funds

Haslem, Baker and Smith (2009) studied the relationship between the expense ratio and performance of US-based active managers over various time horizons. In a regression of performance on fund characteristics including the expense ratio, net assets, portfolio turnover, beta, dividend yield and cash, they found that the expense ratio has a negative impact on performance. They also examined the median performance of funds grouped by expense ratio class, and found a downward trend across increasingly higher expense ratios.

Similarly, Wallick et al (2011) performed a Fama-Macbeth[6] regression analysis of the impact of fund expense ratio, portfolio turnover, fund asset size and fund age on the performance of US-based active managers(as measured by the funds alpha - the active return of a fund above the risk free rate). They found a negative correlation between a funds expense ratio and alpha. They estimated that for every 1% increase in expenses, alpha declined by 0.78%. In a further piece of analysis, the authors identified that funds

6 Fama, Eugene F., and James D. MacBeth, 1973. *Risk, Return, and Equilibrium: Empirical Tests.* Journal of Political Economy 81: 607–36.

whose expense ratio falls in the lowest quartile (or decile) are more likely to outperform their peers over 5, 10, 15 and 20 year periods.

In Australia, Steinfort and McIntosh (2012) assessed the relationship between returns and expenses of Australian equity and fixed interest managers over the five-year period ending 31 December 2011. They discovered a negative relationship between costs and net returns for both equity and fixed interest markets. Results are presented in **Figure 5**.

Empirical evidence: Bond funds

Domain and Reichenstein (2011) analysed the ability of expense ratios to predict bond returns over three distinct five-year periods between 1995 and 2009. They found that investors who selected a low-cost bond fund were more likely to produce above average returns over the subsequent five-year period.

Myth 7: Market capitalisation weighted equity indexing gives greater weight to over-valued securities

Critics of market cap weighted indexing argue that they over-weight overvalued securities and under-weight undervalued securities[7]. Instead, critics propose alternative weighting methodologies such as equal-security-weighted or company-fundamental-weighted indexes. These strategies typically lead to portfolio tilts towards value, small-cap and mid-cap stocks. Proponents of alternative strategies claim they typically hold companies according to their "fair value". In reality, any asset's fair or intrinsic value that may differ from its market price is difficult to measure ex-ante, if at all. Alternative strategies therefore contain a style and size bias which does not consistently produce excess returns over market-cap weighted indexes that track those specific segments.

Traditionally, the goal of index funds is to allow investors to purchase a portfolio of securities which accurately captures the risk return characteristics, or beta, of a particular market or market segment. Market cap-weighted investing provides the mechanism to obtain the beta of the market. The market capitalisation of a company's stock is the product of the number of shares outstanding, which is controlled by the company, and its price, which is collectively determined by market participants. Given that the price of a stock reflects the consensus estimate of all market participants, the market cap-weighted index reflects investors' valuation of the market as a whole. Alternative weighting methodologies implicitly assume that market participants have mispriced certain securities. In reality, the relative efficiency of equity markets makes it extremely difficult to identify mispriced securities. Any investor who can consistently identify and profit from mispricing will be quickly copied, thus eliminating any mispricing.

Alternative weighting methods rely on identifying mispriced securities and reweighting them to form a new index. Reweighting means that the index no longer targets the risk-return characteristics (beta) of the market. Instead, it introduces a tilt towards certain sectors and therefore targets the beta of alternative market segments. During periods where a particular sector outperforms the market, an alternative index that contains a sector bias will outperform the market index. However, evidence shows that on average alternative indexes do not outperform market-cap-weighted indexes that track those segments[8]. The fact is, market-cap-weighted indexes that focus on a particular market segment have a significant cost advantage which makes it difficult for alternatively weighted funds to outperform.

An example from Europe

This issue has been widely discussed in recent years with relation to the European sovereign debt crisis. Many investors fear that a government can issue limitless amounts of debt and cause their market cap weighted value in a bond index to rise.

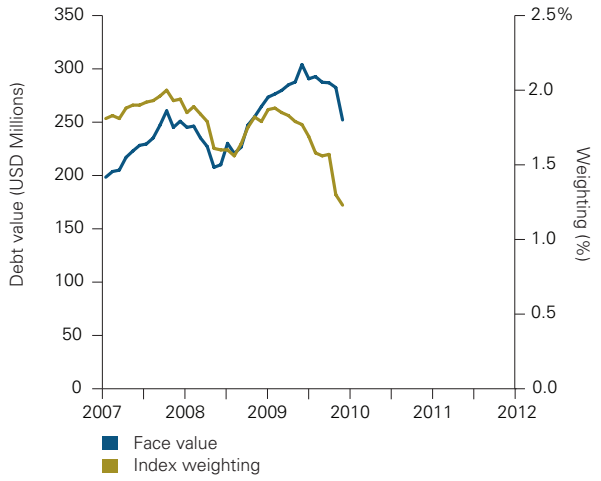
Since the start of the Global Financial Crisis in 2007 many of Europe's weakest nations—including Greece, Italy and Spain—have increased their debt supply in an effort to stimulate economic growth. This increase is evident in the total face value of government debt represented in the Barclays Global Treasury Index illustrated in **Figures 6**. The figures also show that the relative bond index weightings of these nations actually declined over this period. This can be attributed to a decline in the market value of debt relative to other nations represented in the index. The trend was most evident for Greece who dropped out of the index altogether in June 2010 when it's debt was downgraded by key ratings agencies. The key point here is that although governments and private entities can issue more debt, their market cap bond index weighting will ultimately be determined by the market valuation of all debt on issue.

7 Hsu, Jason C., and Campollo, Carmen, 2006. *New Frontiers in Index Investing: An Examination of Fundamental Indexation.* Journal of Indexes (Jan./Feb.): 32-37; available at www.Indexuniverse.com.

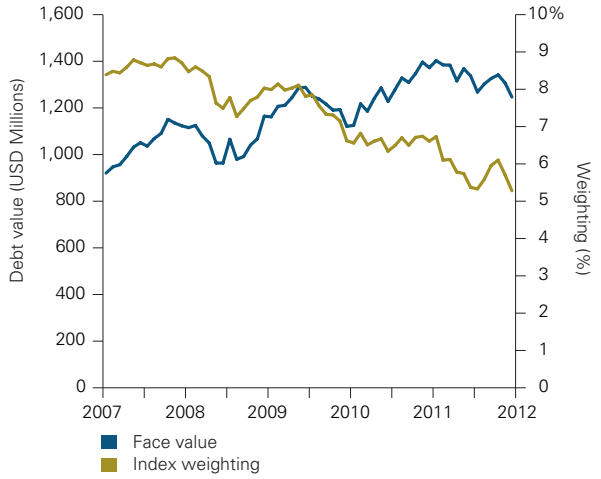
8 Philips, Christopher B., Kinniry, Francis M., Walker, David J. and Thomas, Charles J., 2011. *A review of alternative approaches to equity indexing.* The Vanguard Group.

Figure 6 Greek, Italian and Spanish government debt as represented in the Barclays Global Treasury Index

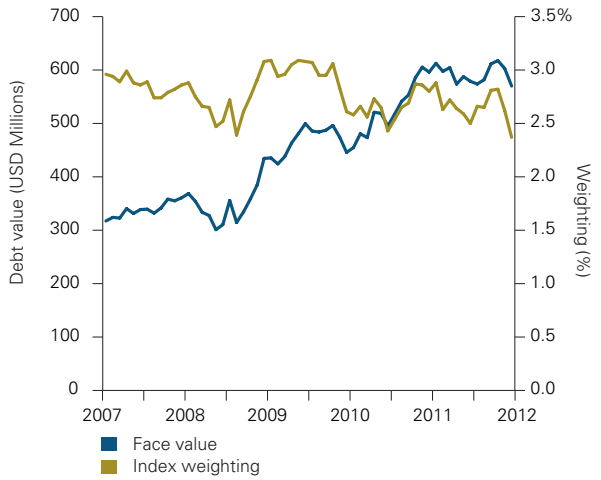
Greek government debt



Italian government debt



Spanish government debt



Source: Barclays. Data cover the period 07/2007 – 06/2012.

Conclusion

Myths and misconceptions about indexing have been disproved many times in the past. However, with each new crisis or major market event a new group of experts surface with claims that the old rules of investing no longer apply. A review of historical evidence on Australian financial markets once again dispels these myths. According to the Rainmaker Group[9], in the 10 years to 31 December 2011 Australian index fund holdings increased 168%, to AU$211 billion. In the same period, active funds increased by only 99% to AU$1,159 billion. These results suggest that indexing remains a popular strategy for Australian investors during difficult market conditions. The growing success of indexing can be attributed to several key factors. Indexing is low cost and therefore leads to better returns; highly diversified, which means greater risk control; tax-efficient and able to achieve competitive long-run performance. Moreover, indexing outperforms in efficient and less-efficient markets because of its cost advantage over active investments.

Across a wide variety of asset classes, index funds are the ideal core portfolio for almost all investors. Warren Buffet supported this claim stating that "most investors, both institutional and individual, will find that the best way to own common stocks is through an index fund that charges minimal fees. Those following this path are sure to beat the net results (after fees and expenses) of the great majority of investment professionals".[10]

9 Vanguard pays a subscription to use this data.

10 Berkshire Hathaway Inc., Chairman's letter, 1996.

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