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# The case for indexing

Vanguard research

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**Executive summary.** An index is a theoretical “basket” of securities designed to represent a broad market or a portion of the market. By reflecting the performance of a particular market, an index provides investors with a benchmark for that market’s performance. Because indexes are, by definition, intended to mirror the market, they are constructed to be market-capitalization-weighted. An indexed investment strategy such as an index mutual fund or an index-based exchange-traded fund (ETF) seeks to track the performance of an index by assembling a portfolio that invests in the same group of securities, or a sampling of the securities, that compose the index. By investing in a product designed to replicate the performance of a broad market such as the U.S. stock market, an investor can participate, at low cost, in the aggregate performance of that market at all times. By the same token, investing in products designed to replicate the performance of indexes with a narrower focus, such as European stocks or long-term bonds, allows an investor to participate in the purest exposure to a specific market

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segment within a low-cost framework. As a result of these features, indexing has gained in popularity over time. Estimates of index fund assets, including ETFs, are as high as \$1.614 trillion, or 13.2% of the total assets managed by registered investment companies.<sup>1</sup>

Historically over time, an indexing investment strategy has performed favorably in relation to actively managed investment strategies, as a result of indexing's low costs, broad diversification, minimal cash drag, and, for taxable investors, the potential for tax efficiency. Combined, these factors represent a significant hurdle that an active manager must overcome just to break even with a low-cost index strategy over time, in any market. Of course, skilled active managers who have overcome these hurdles do exist, but as our research and other empirical evidence suggest, the likelihood of outperformance by a majority of managers dwindles over time as the compounding of costs becomes more difficult to surmount.

This paper explores both the theory underlying index investing and evidence to support its advantages. To balance data integrity with a robust analysis, we have limited the time period in most of the figures to ten-year windows. We acknowledge that indexing as an investment strategy increases in effectiveness as the time period lengthens. As a result, where data permit, we present longer periods in conjunction with the ten-year periods. For example, when using a broad definition of the market, the large number of funds permits us to analyze periods beyond the decade ended December 31, 2010. However, for analysis that splits the broad market into style and size buckets (or maturity and quality for bonds), the number of funds quickly tails off beyond ten years, limiting our ability to extend the analysis. In addition, when we explore the impact of cyclicalities, we shorten the window further to five years, to amplify its impact.

We first examine investing as a "zero-sum game" and relate it to the "index funds versus active funds" debate. We emphasize the importance of costs in investment management and their impact on index and active strategies. We then offer a broader perspective on relative performance, including sub-asset classes, market cyclicalities, and benchmark differences. We discuss, as well, excess returns as an alternate perspective on relative success. Finally, we address common myths regarding indexing as an investment strategy.

<sup>1</sup> Source for index fund and industry assets: Investment Company Institute (2010).

*Notes about risk and performance data:*

*All investments are subject to market risk.*

*Investments in bond funds are subject to interest rate, credit, and inflation risk.*

*Foreign investing involves additional risks, including currency fluctuations and political uncertainty.*

*Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility.*

*Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks.*

*U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent share-price fluctuations.*

*Because high-yield bonds are considered speculative, investors should be prepared to assume a substantially greater level of credit risk than with other types of bonds.*

*Diversification does not ensure a profit or protect against a loss in a declining market.*

*Stocks of companies in emerging markets are generally more risky than stocks of companies in developed countries.*

*Performance data shown represent past performance, which is not a guarantee of future results. Note that hypothetical illustrations are not exact representations of any particular investment, as you cannot invest directly in an index or fund-group average.*

An index is a group of securities chosen to represent a market or a portion of a market. An investment in conventional or exchange-traded index funds (hereafter, “index funds”) seeks to track the returns of that market or market segment by assembling a portfolio that invests in the same group of securities, or a sampling of the securities, that compose the market with weights proportionate to their market value. Indexing uses quantitative risk-control techniques that seek to replicate the benchmark’s return with minimal expected tracking error (and, by extension, with no expected alpha, or excess return versus the benchmark).<sup>2</sup> In fact, the best index is not necessarily the one that provides the highest return, but the one that most accurately measures the performance of the investing style strategy or market it is intended to track.

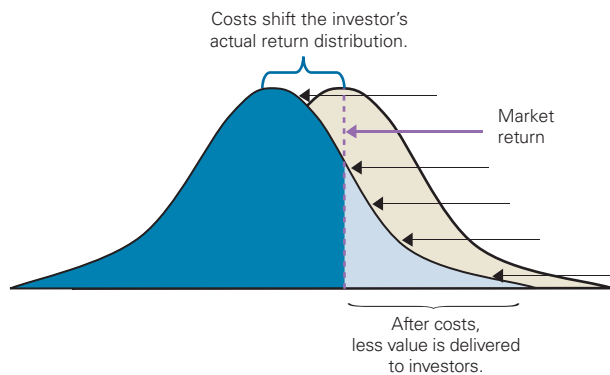
### Understanding the zero-sum game

Before considering the particulars of one investment strategy versus another, it is instructive to consider the market as a whole, where outperformance is often referred to as a “zero-sum game.” The concept of a zero-sum game starts with the understanding that at any given point in time, the holdings of all investors in a particular market, such as the U.S. stock or bond 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.<sup>3</sup> Of course, this holds for any market, such as foreign stock and bond markets, or even specialized markets such as commodities or real estate. The aggregation of all investors’ returns can be thought of as a bell curve (see Figure 1, on page 4), with the market return as the mean. In Figure 1, the market is represented by the tan curve, with the market return as the purple vertical dashed line.

<sup>2</sup> For more on management styles, see *Active Equity Management* (2007).

<sup>3</sup> Dollar weighting gives proportional weight to each holding, based on its market capitalization. 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.

**Figure 1.** Impact of cost on distribution of market returns



Source: Vanguard.

Over any given period, the dollar-weighted excess performance to the right of the market return in Figure 1 equals the inverse of the dollar-weighted excess performance to the left of the market return, 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,<sup>4</sup> and, where applicable, taxes—all of which combine to reduce realized returns over time. The aggregate result of these costs shifts the curve in Figure 1 to the left. We represent the adjustment for costs with a dark-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

### Notes on market-cap weighting

Indexes should reflect the market—or market portion—that they are intended to measure. They are therefore weighted according to market capitalization, where:  $\text{Market Cap} = \text{Price Per Share} \times \text{Number of Shares Outstanding}$ . Market-cap-weighted indexes reflect the consensus estimate of each company's value at any given moment. In any efficient market, new information—economic, financial, or company-specific—affects the price of one or more securities and is reflected instantaneously in the index via the change in its market capitalization. Thus, a continuously updated market index gives an indication of how a market is performing, and of the market's structural and risk characteristics at any given point in time. Since, according to capital market theory—specifically, the Capital Asset Pricing Model—current prices (and, hence, company values) are set based on current and expected events, cap-weighted indexes represent the expected, theoretically mean-variance-efficient, portfolio of securities in a given asset class. In addition, market-cap-weighted indexes are continuously reweighted, and turnover is limited to changes in the constituents or in their shares outstanding due to corporate events such as share buybacks or issuances. Recognizing that market-cap-weighted indexes represent the market proxy for a given market, this analysis focuses on market-cap-weighted indexes and the index funds that track them.

Portfolios that are not market-cap-weighted won't reflect the average return of the money invested in that market. Such portfolios are therefore not indexed to a specific market and may be considered either actively managed or a rules-based passive strategy designed to deliver a return that differs from the market's. Both active managers and those who oversee rules-based passive strategies believe that they possess information not represented in the market capitalization of a specific stock. For example, an active manager may view a highly valued company as overvalued, or a passive manager may design a program to invest only in stocks that pay the highest dividends. Each believes his or her strategy is a formula for success relative to the benchmark. Investment strategies not indexed to the market-cap-weighted benchmark can therefore be viewed as taking specific bets against the index and should be evaluated based on the quality and success of those bets.

<sup>4</sup> 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.

light-blue region in Figure 1, a much larger portion is now to the left of the dashed line, meaning that after costs, most of the dollar-weighted performance of investors falls short of the aggregate market return. By minimizing 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. For example, investors whose fund has a 0.20% expense ratio—a cost hurdle substantially below the average mutual fund’s expense ratio (see Figure 4, on page 8)—stand a greater chance of outperforming a majority of the dollar-weighted, higher-cost investors. This principle is just as relevant in markets often thought to be less “efficient,” such as small-cap or international equities (Waring and Siegel, 2005). We further explore this aspect of indexing in a later section of this paper.

### Applying the zero-sum game to mutual fund performance

The zero-sum framework refers to broad markets, but may also be loosely applied to long-term mutual fund performance. Although mutual funds account for only a portion of the global equity and fixed income markets, we can still show a result similar to that of Figure 1, where the long-term net returns of the aggregate diversified actively managed mutual fund universe shift to the left of the market benchmark over longer periods (see Figure 2, on page 6). However, it’s instructive to note that even using net returns, a wide distribution of active managers exists. Several factors contribute to this wide performance distribution, in addition to differences in cost and any skill the managers may exhibit: The time period analyzed, the benchmark used, and the type of funds included can all affect the return distribution and the conclusions drawn.

It is noteworthy that although the raw statistics show that returns of actively managed funds have been nearly evenly distributed around the benchmark, after

accounting for survivorship bias, the percentage of funds that have underperformed the broad market has increased substantially. This fact, together with market dynamics that are discussed later in this paper, suggests that investors in actively managed funds have found it difficult to outperform the market consistently, after cost. By extension, investors in a low-cost, market-tracking index fund would expect to outperform a majority of higher-cost active managers over similar time periods.<sup>5</sup>

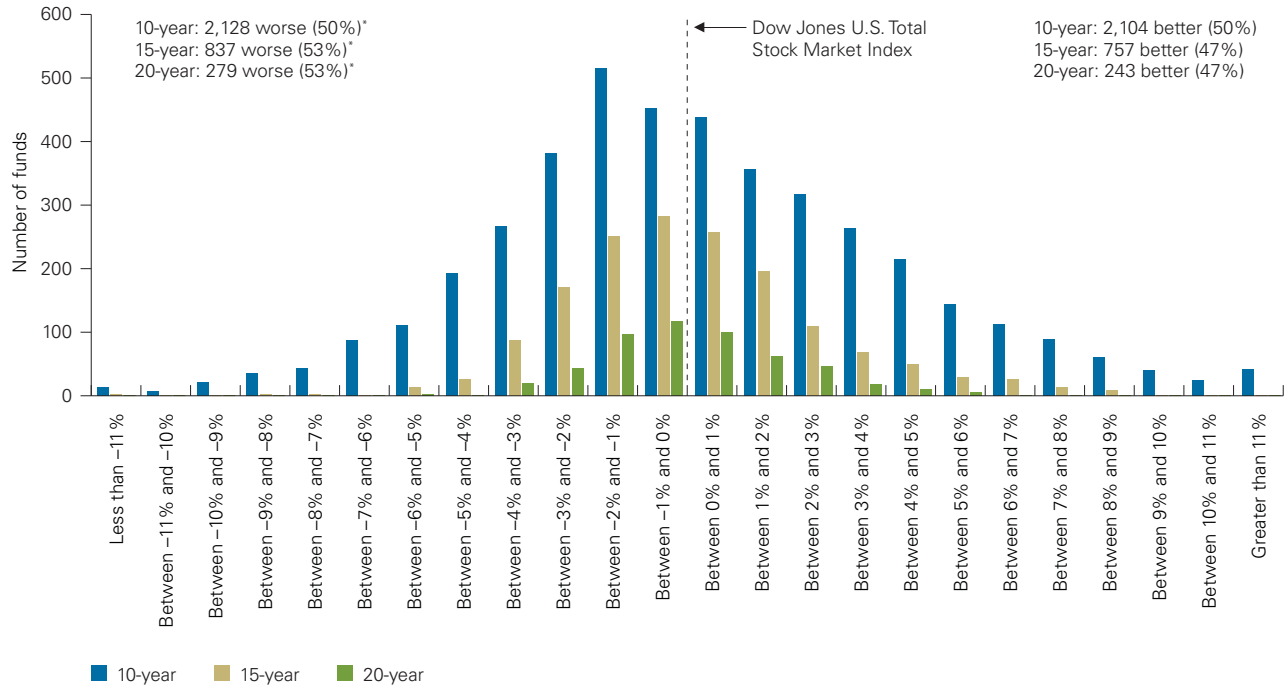
Overall, we expect the magnitude of dispersion in equity returns to be much greater than that of fixed income securities. For example, the performance distribution in Figure 2 is more than twice as broad as that in Figure 3, on page 7. As is typical, performance for funds focused on fixed income is concentrated in the middle bars. The cost advantage of indexing means that an indexed vehicle again had an edge versus active funds in long-term performance. This advantage exists because the relatively narrow range of returns between the best and worst performers in this asset class magnifies the benefits of a low-cost strategy. This narrow distribution occurs because a large portion of bond returns is determined by interest rate fluctuations, movements of the yield curve, and changes in credit quality, as well as by an active manager’s positioning of a fund relative to its peers and benchmarks. These factors represent the primary differences between the relative performance of actively managed bond funds and their benchmarks. This is in contrast to the equity markets, where return dispersion is much wider and risk-factor differentials such as size and style under- or overweights to peers and benchmarks amplify return dispersion. The equity universe also has a much wider security distribution, in which returns are unique to company and sector, which can further affect relative performance.

Although active management in the fixed income arena is significantly affected by costs, indexing with bonds may not be as straightforward as indexing

5 For example, if we reduce the market return by 0.10% annually to approximate the total costs of a broad-market index fund or ETF, the percentages in Figure 2 do not change meaningfully. After accounting for survivorship bias, over the last ten years, the percentage of funds that underperformed or closed changes to 61.6%, from 62.4%.

**Figure 2.** After-cost distribution of actively managed U.S. equity mutual funds

Annualized excess returns versus U.S. stock market: As of December 31, 2010



\* When removing the effects of survivorship bias, the percentage of funds that underperformed the market increased to 62% for the 10-year period, 67% for the 15-year period, and 72% for the 20-year period.

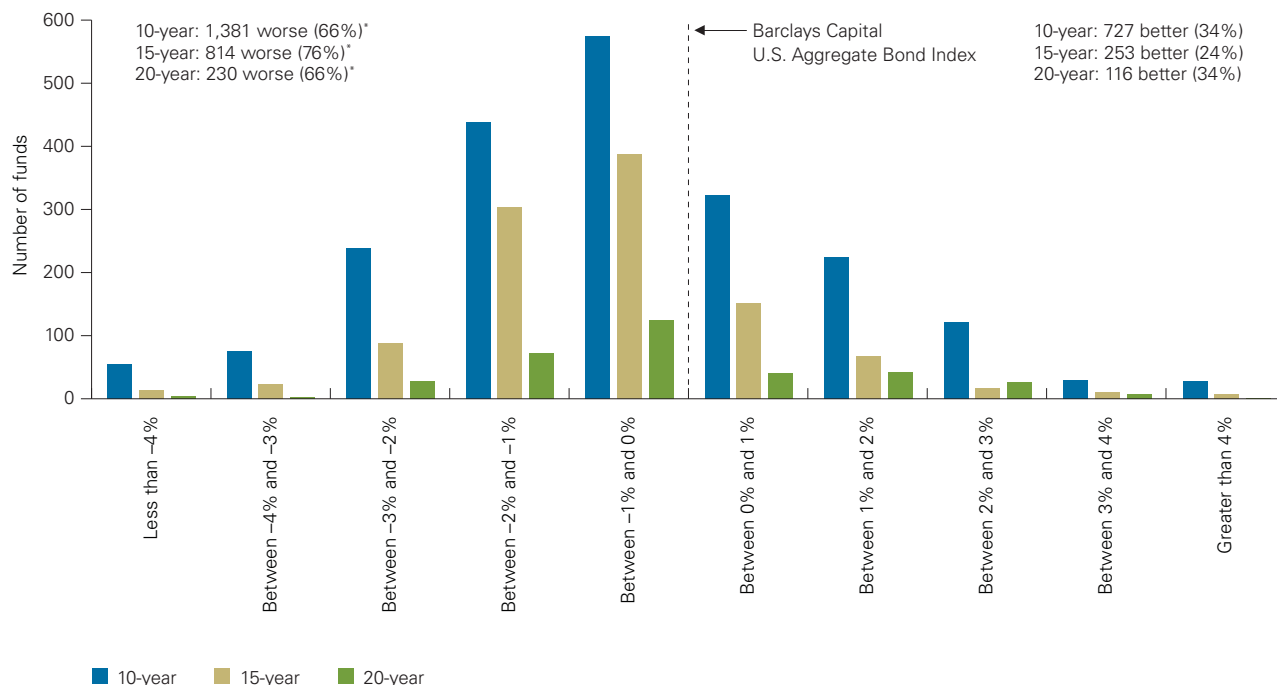
Notes:

- Data include only funds that survived the respective 10-, 15-, or 20-year periods.
- Does not account for front- or back-end sales loads or taxes.
- "U.S. equity mutual funds" refers to all funds, including those focused on a particular style or market capitalization such as large growth or small value. However, we excluded sector funds, specialty funds such as bear market funds, and real estate funds. For this comparison we evaluated active funds after cost against a costless market benchmark. When implementing with an index fund or ETF, transaction costs, expense ratios, and tracking error must be accounted for.
- Mutual fund database survivor bias tends to overstate the average long-term returns reported by active manager databases. Survivorship bias results when mutual fund returns are not adjusted for those funds that no longer exist. Most commercial databases exclude the records of extinct funds, which have usually closed or merged with other funds because of subpar records. This causes the average returns to rise, because as underperformers are removed, new funds replace them. For example, the ten-year distributions in Figures 2 and 3 represent only funds that are currently alive and have a ten-year track record as of December 31, 2010. In fact, when survivorship bias is combined with fees and benchmark mismatching (i.e., holding on to winners), it has been shown that active managers, particularly small-cap managers, tend to underperform a given benchmark (Malkiel and Radisich, 2001; Ennis and Sebastian, 2002).

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

**Figure 3.** After-cost distribution of actively managed U.S. fixed income mutual funds

Annualized excess returns versus U.S. bond market: As of December 31, 2010



\* When removing the effects of survivorship bias, the percentage of funds that underperformed the market increased to 71% for the 10-year period, 85% for the 15-year period, and 81% for the 20-year period.

Notes:

- Data include only funds that survived the respective 10-, 15-, or 20-year periods.
- Does not account for front- or back-end sales loads or taxes.
- "U.S. fixed income mutual funds" refers to all funds, including those focused on a particular style or market capitalization such as short-term government or long-term corporate. However, we excluded municipal funds, money market funds, and any specialty funds. For this comparison, we evaluated active funds after cost against a costless market benchmark. When implementing with an index fund or ETF, transaction costs, expense ratios, and tracking error must be accounted for.

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

with equities. Unlike equities, bonds do not trade on exchanges that are liquid and efficient. Instead, the bond market is dominated by bond brokers, leading to relative illiquidity and higher costs. As a result, bond index funds may incur a larger performance drag relative to equity index funds.

### The indexing cost advantage

A shareholder's net return equals the gross return less the expense ratio and transaction costs. The lower the cost drag, the greater the net return. Over time, lower costs can mean outperformance relative to similar higher-cost funds.

Compared with index funds, actively managed mutual funds typically have higher management fees coupled with higher transaction costs. The higher fees often result from a portion of the management fee that must cover the research process. Higher transaction costs are attributable to the generally higher turnover associated with active management's attempt to outperform the market. **Figure 4** shows the average dollar-weighted expense ratios for actively managed equity and bond mutual funds. For example, as of December 31, 2010, investors in actively managed large-cap equity mutual funds were paying an average of approximately 0.89% annually, and those in actively managed government bond funds were paying 0.54% annually, versus 0.18% and 0.24% for the respective index funds. Index funds generally operate with lower costs, regardless of asset class or sub-asset class.

Index funds derive their low-cost structure from their low management fees and low turnover. Turnover, or the buying and selling of securities within a fund, results in transaction costs such as commissions, bid-ask spreads, market impact, and opportunity cost. These costs, although incurred by every fund, are generally opaque, but do detract from net returns. A mutual fund with abnormally high turnover would thus likely incur large trading costs. All else equal, the impact of these costs would reduce total returns realized by the investors in the fund. A mutual fund's expense ratio, however, is visible and represents shareholder payments to fund managers.

Because costs eat into returns, reported expenses may be a valuable tool when evaluating fund returns. Research bears this out. For example, Financial Research Corporation evaluated the predictive value of different fund metrics, including a fund's past performance, Morningstar rating, alpha, and beta.<sup>6</sup> In the study, a fund's expense ratio was the most reliable predictor of its future performance, with low-cost funds delivering above-average performances in all of the periods examined. A fund's expense ratio is a valuable tool for selecting an investment because the expense ratio is one of the few performance

**Figure 4.** Asset-weighted expense ratios of active and index mutual funds (as of December 31, 2010)

	Actively Managed Funds (bps)	Index funds (bps)	Difference (bps)
Large-cap U.S. equity	89	18	70
Mid-cap U.S. equity	106	24	81
Small-cap U.S. equity	115	33	82
U.S. sector	105	37	68
U.S. real estate	110	26	84
International developed markets	100	31	69
International emerging markets	136	41	95
U.S. corporate bond	56	21	35
U.S. government bond	54	24	30

Note: bps = basis points.

Sources: Vanguard calculations, using data from Morningstar, Inc. Discrepancies due to rounding.

factors that are known in advance. **Figure 5** provides evidence for the inverse relationship between investment performance and cost within the mutual fund universe. Specifically, the figure shows the ten-year annualized excess return of each fund relative to its style benchmark. To demonstrate the impact of costs, we show a fund's excess return relative to its expense ratio. The red line in each style box represents a trend line that plots the overall relationship between expenses and excess returns for the funds in that style box. This analysis makes clear that higher costs have historically tended to lead to lower relative returns. For investors, the clear implication is that by focusing on low-cost funds, the probability of outperforming higher-cost portfolios increased.

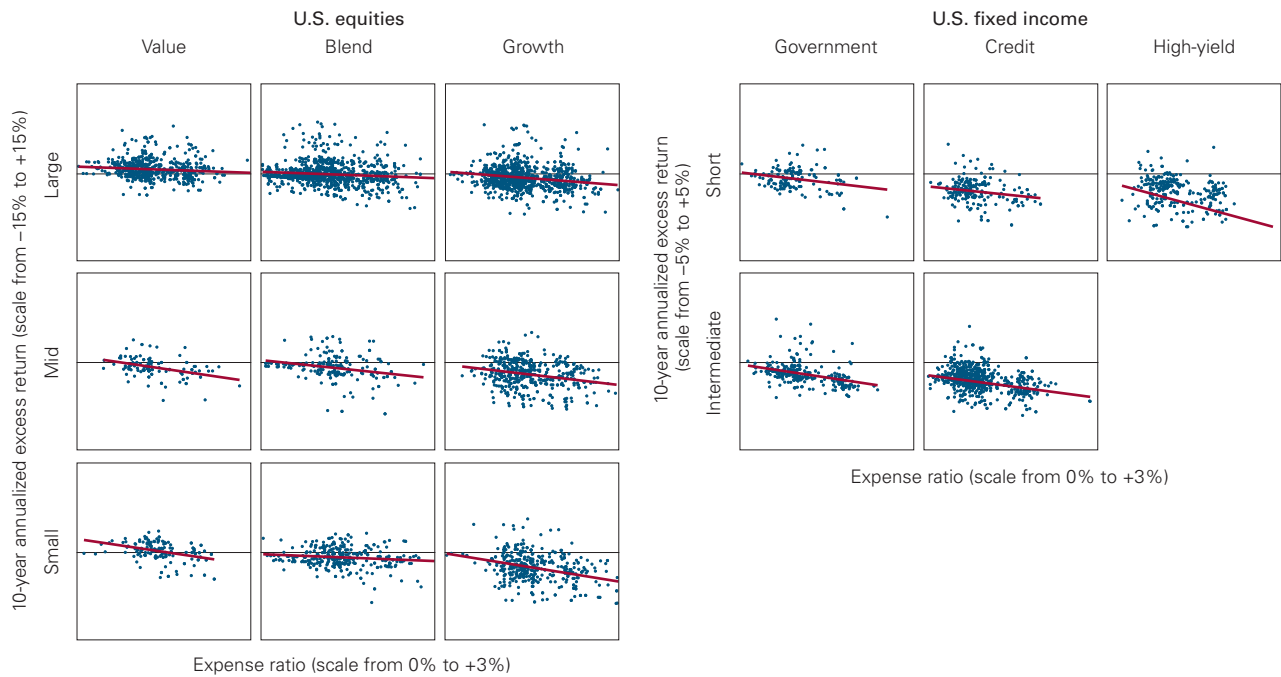
### Impact of cost on mutual fund performance

As shown in Figure 5, over the long term, the cost drag for actively managed mutual funds can detract significantly from actual performance relative to a benchmark. Although cost is important in the

<sup>6</sup> Alpha: A portfolio's risk-adjusted excess return versus its effective benchmark. Beta: A measure of the magnitude of a portfolio's past share-price fluctuations in relation to the ups and downs of the overall market (or appropriate market index).



**Figure 5.** Inverse relationship between expenses and excess returns: Ten years ended December 31, 2010



Notes: Each plotted point represents a fund within the specific size, style, and asset group. The funds are plotted to represent the relationship of their expense ratio (x-axis) versus the ten-year annualized excess return relative to their style benchmark (y-axis). The straight line represents the linear regression, or the best-fit trend line, showing the general relationship of expenses to returns within each asset group. The scales are standardized to show the slopes' relationships to each other, with expenses ranging from 0% to 3% and returns ranging from -15% to 15%. Some funds' expense ratios and returns go beyond the scales and are not shown.

Sources: Vanguard calculations, using data from Standard & Poor's, MSCI, Barclays Capital, and Morningstar, Inc. Style benchmarks represented by the following indexes: Large core—S&P 500 Index, 1/2001 through 11/2002, and MSCI US Prime Market 750 Index thereafter; Large value—S&P 500 Value Index, 1/2001 through 11/2002, and MSCI US Prime Market 750 Value Index thereafter; Large growth—S&P 500 Growth Index, 1/2001 through 11/2002, and MSCI US Prime Market 750 Growth Index thereafter; Mid core—S&P MidCap 400 Index, 1/2001 through 11/2002, and MSCI US Mid Cap 450 Index thereafter; Mid value—S&P MidCap 400 Value Index, 1/2001 through 11/2002, and MSCI US Mid Cap 450 Value Index thereafter; Mid growth—S&P MidCap 400 Growth Index, 1/2001 through 11/2002, and MSCI US Mid Cap 450 Growth Index thereafter; Small core—S&P SmallCap 600 Index, 1/2001 through 11/2002, and MSCI US Small Cap 1750 Index thereafter; Small value—S&P SmallCap 600 Value Index, 1/2001 through 11/2002, and MSCI US Small Cap 1750 Value Index thereafter; Small growth—S&P SmallCap 600 Growth Index, 1/2001 through 11/2002, and MSCI US Small Cap 1750 Growth Index thereafter; Short-term bond—Barclays Capital U.S. 1–5 Year Credit Bond Index; Short-term U.S. government bond—Barclays Capital U.S. 1–5 Year Treasury Bond Index; Intermediate-term bond—Barclays Capital U.S. 5–10 Year Credit Bond Index; Intermediate-term U.S. government bond—Barclays Capital U.S. 5–10 Year Treasury Bond Index; High-yield bond—Barclays Capital U.S. Corporate High Yield Bond Index.

long run, at any given point in time, relative cost differentials may have less of an impact on a fund's or category's relative performance, since active funds' returns vary widely. Depending on the dispersion of returns of active managers, costs may be a small factor over shorter time frames such as one, three, or five years. As time goes by, however, costs become more important. The relative cost advantages

of indexing compound and, when combined with tighter distributions and a lack of strong manager persistence, these advantages become more stable, with an edge toward relative net outperformance. For example, Figure 3 shows that active fixed income managers experience narrower return dispersion relative to equity managers.

We would therefore expect costs to play a more important role over both the short term and long term for fixed income managers and less so for equity managers. But as the time period extends, Figures 2 and 5 show that costs become a primary determinant of relative performance for equity funds as well.

To help quantify the impact of costs in the short term, **Figure 6** shows the one-year excess returns for large-cap value and large-cap growth funds. Excess returns were used here to better correlate with costs, which detract directly from returns. As we would expect, costs compound consistently through time, while in the short term there is much greater volatility. Of course, this does not indicate that active management is more likely to win in the short term—only that portfolio construction decisions play a much greater role in short-term relative performance. For example, the outperformance of specific market segments may lead to active manager outperformance, as these managers may then outpace the index. In a market with wide return dispersion, such managers benefit directly from the segments’ outperformance, far overshadowing the potential cost disadvantage.

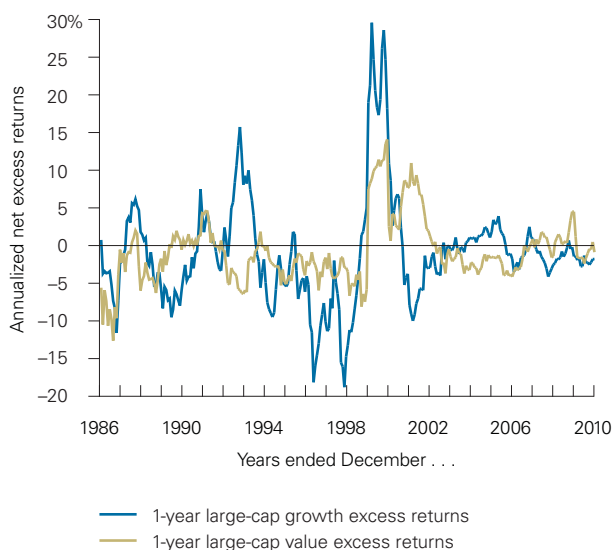
### Deepening the discussion of relative outperformance

#### Relative performance over time

Traditionally, to illustrate the relative performance of indexing and active strategies, point-in-time statistics (referring to one specific time period) such as those presented in Figures 2 and 3 are used. However, alternative analyses can enhance the discussion, potentially leading to a more robust answer regarding relative performance. Over time, the actual percentage of active funds underperforming a particular index will vary, but historically, the long-term return distribution of active managers has been skewed toward underperformance of the broad market, largely owing to the cumulative effect of costs. For example, **Figure 7** shows the percentage of managers underperforming the U.S. stock market

**Figure 6.** Manager costs matter less in short-term outperformance

*Rolling excess returns for large-cap growth and large-cap value funds versus style benchmarks*



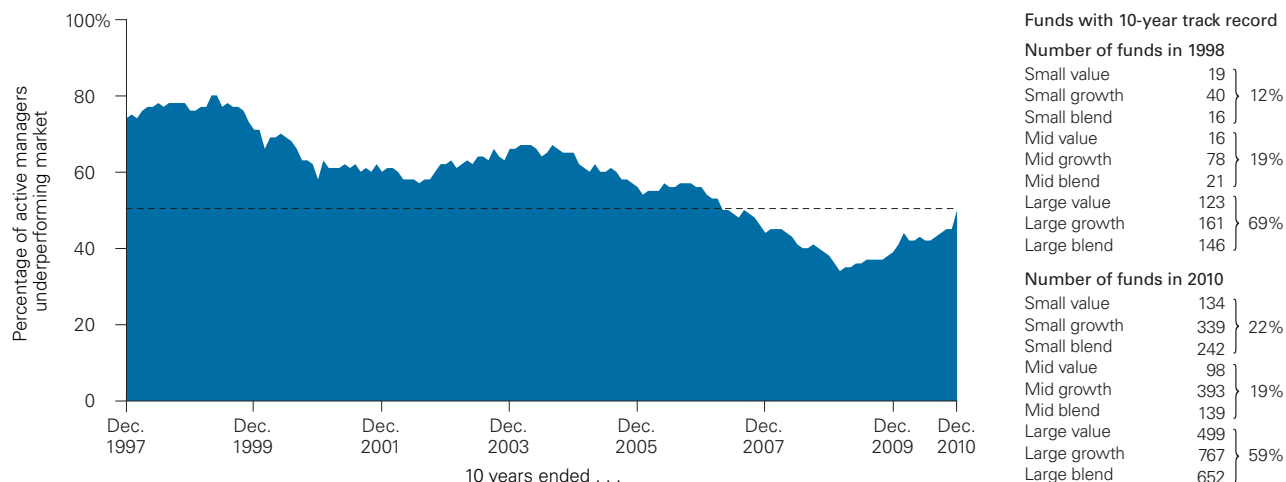
Sources: Vanguard calculations, using data from Morningstar, Inc., Standard & Poor’s, and MSCI. Indexes used include: S&P 500 Growth Index and S&P 500 Value Index, 1986 through 11/2002; MSCI US Prime Market 750 Growth Index and MSCI US Prime Market 750 Value Index thereafter.

over a rolling ten-year window. The figure also inherently suggests how the ten-year distribution in Figure 2 changes over time. Although most actively managed portfolios are shown to underperform the broad market historically, Figure 7 also depicts the volatility associated with the reported group of outperformers. In fact, although we would expect a zero-sum game in the long term, even ten-year periods may be considered short enough for certain market cycles to affect the distribution.

Of course, this figure does not account for survivorship bias, which would shift the reported results, possibly significantly. For example, as reported in Figure 2, after accounting for survivorship bias, the percentage of funds underperforming the market for the ten years ended 2010 increased from

**Figure 7.** Comparison of active managers to a broad-market benchmark can be volatile over time

Rolling 10-year relative performance of active funds versus broad-market benchmark



Sources: Vanguard calculations using data from Morningstar, Inc., and Dow Jones.  
Broad market represented by Dow Jones U.S. Total Stock Market Index.

about 50% to 62%. The volatility observed in Figure 7 occurs primarily because of the broad definition of outperformance, where the results of all active funds are compared with that of the broad market and where each active manager is given the same weight and importance in determining relative out- or underperformance versus the market. For example, there were many more small-cap funds with a ten-year history in 2010 than in the 1990s. As a result of their significant outperformance relative to large-cap funds since 2000, small-cap funds play a much greater role in the aggregate outperformance numbers versus a broad-market benchmark, which is market-cap-weighted. If and when market leadership changes to large-cap, we would expect the overall percentage of active managers outperformed to increase to levels closer to those observed during the late-1990s. On the other hand, if market leadership does not change and small-cap stocks continue to outperform large-caps, we would expect the percentage of managers outperformed to continue to fall.

### Examining market segments and benchmark choice

Traditionally, the percentage of the universe of active managers outperforming a broad benchmark has been the most common measure of the effectiveness of indexing or active management over time. However, evaluating the success of active managers based simply on this percentage assumes that funds are identical and disregards both market and style cyclicity.

Evaluating each fund as identical does not address the cyclicity of the markets or the distribution of fund count. Figure 7 touches on this cyclicity, but **Figure 8**, on page 12, digs deeper, in two ways. First, instead of comparing all funds to the same broad benchmark, it compares funds to style benchmarks. Thus, the performance of small-cap value managers, for instance, can be compared with that of a small-cap value benchmark, while results of large-cap blend managers can be compared with returns of a

**Figure 8.** Shorter time periods and market segmentation can be highly cyclical

Percentage of funds underperforming style benchmark

	Five years ended . . .													
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Large value	94%	86%	94%	82%	53%	40%	39%	29%	32%	70%	79%	71%	51%	50%
Large blend	84	95	90	74	67	57	46	41	55	63	70	64	61	65
Large growth	86	99	90	62	67	55	38	50	71	63	46	57	65	76
Mid value	71	80	64	77	83	81	71	80	94	97	77	75	63	50
Mid blend	74	85	73	82	83	72	64	67	69	82	82	74	67	61
Mid growth	57	86	67	88	94	90	81	80	85	85	76	47	53	49
Small value	89	82	81	88	82	41	41	49	35	53	73	60	50	46
Small blend	46	59	69	58	54	55	50	45	60	71	81	57	63	67
Small growth	29	32	21	28	34	56	64	81	86	90	81	74	80	82

Sources: Vanguard calculations, using data from Morningstar, Inc., MSCI, and Standard & Poor's. Style benchmarks represented by the following indexes: Large blend—S&P 500 Index, 1/1997 through 11/2002, and MSCI US Prime Market 750 Index thereafter; Large value—S&P 500 Value Index, 1/1997 through 11/2002, and MSCI US Prime Market 750 Value Index thereafter; Large growth—S&P 500 Growth Index, 1/1997 through 11/2002, and MSCI US Prime Market 750 Growth Index thereafter; Mid blend—S&P MidCap 400 Index, 1/1997 through 11/2002, and MSCI US Mid Cap 450 Index thereafter; Mid value—S&P MidCap 400 Value Index, 1/1997 through 11/2002, and MSCI US Mid Cap 450 Value Index thereafter; Mid growth—S&P MidCap 400 Growth Index, 1/1997 through 11/2002, and MSCI US Mid Cap 450 Growth Index thereafter; Small blend—S&P SmallCap 600 Index, 1/1997 through 11/2002, and MSCI US Small Cap 1750 Index thereafter; Small value—S&P SmallCap 600 Value Index, 1/1997 through 11/2002, and MSCI US Small Cap 1750 Value Index thereafter; Small growth—S&P SmallCap 600 Growth Index, 1/1997 through 11/2002, and MSCI US Small Cap 1750 Growth Index thereafter.

large-cap blend benchmark. The use of a style-box approach in Figure 8 addresses the fund-distribution concern. The second point is that current statistics (as exhibited in the figure's highlighted 2010 results) may not be representative of all time periods. As the figure demonstrates, even within style boxes, market cyclicity is an important factor in determining the relative success of indexing or active management.

Market cyclicity is more obvious in short (three- or five-year) periods, because as the time lengthens, market cycles tend to wash out and costs become the primary factor affecting relative performance. To illustrate market cyclicity within the style boxes, we focused on periods of five-year performance. Even within this time frame, Figure 8 shows how the percentage of managers that a particular style index outperforms can change substantially over

time. In fact, in most style boxes, the range of outperformance by the benchmark indexes shifts rather significantly.

Style-box cyclicity is further influenced by the relative performance of one style benchmark versus another. First, because many managers have holdings that fall within other boxes, when there is large return dispersion across all nine style boxes, managers in the lower-performing boxes can be expected to stand a greater chance of outperforming their respective style box. For example, if mid-cap value outperforms large-cap value by 300 basis points, and mid-cap value stocks constitute 20% of a large-cap value manager's portfolio, the large-cap manager would realize 60 basis points of excess return relative to the large-cap value benchmark, which could result in that manager outperforming

the large-cap value benchmark. Second, the effect of holdings that fall outside the style box combined with cash drag means that, on average, active managers have a beta of less than 1 relative to their style box. Since the style box necessarily has a beta of 1, during strong performance within that style, the index will tend to outperform a greater percentage of managers within that style box, and vice versa. For example, large-cap growth managers fared poorly during the growth-dominated bull market of the late-1990s, small-cap managers underperformed their benchmark during the small-cap bull market of the 2000s, and Asia/Pacific managers lagged their benchmark during the Japan-led bull market in international equities in the mid-1980s.

It's also important to note the vital role of benchmark selection in gauging the success of certain market segments (Sauter, 2002). **Figure 9**, on page 14, uses the same universe of active managers covering the five-year period ended December 31, 2010, and demonstrates that the perception of active manager success can vary substantially, depending upon which benchmark is used. Although mid-cap performance stands out for the period, different benchmarks led to changes in relative outperformance across the board. This is because different benchmarks cover varying ranges of stocks, have different selection criteria for growth versus value, and are even maintained and rebalanced differently (Philips, 2010b). The point is significant, because selecting one benchmark over another can mean the difference between an outperforming manager and an underperforming manager.

#### **Excess returns and survivorship bias provide additional insight**

Evaluating managers using the percentage who simply outperform an index assumes that a manager who outperforms a benchmark by 0.01% has achieved a result as significant as one who outperforms a benchmark by 10%. In other words, there is no information on the magnitude of out- or underperformance.

To account for the magnitude of performance, we can look at average excess returns of active managers versus a benchmark. Such a statistic provides investors with a sense of how active management has performed on average—whether delivering positive or negative excess returns and *how much*. **Figure 10**, on page 15, calculates the average excess returns for active managers in both equity and fixed income segments. For example, it shows that the average active large-cap growth fund underperformed the benchmark by 110 basis points, whereas mid-cap value funds underperformed by 266 basis points. Even small-cap managers, on average, underperformed their benchmark in terms of excess returns.

Although excess returns add additional perspective, it bears emphasizing that as the time period lengthens, excess returns should converge closer to the average cost drag of active managers. For example, mid-cap value funds would not be expected to underperform a mid-cap value benchmark by 266 basis points or more (see **Figure 10**) for an extended period. Most likely, the performance gap is cyclical and will tend to narrow in the future. Similarly, we would not expect such a narrow gap as reported by large-cap value funds to last indefinitely.

**Figure 10** also shows the impact of survivorship bias across equity and fixed income sectors. In addition to market cyclicality, benchmark selection, cost, and excess return analysis, investors must also be aware of the possibility that an active fund could close owing to poor performance. Accounting for this risk further shifts the analysis in favor of indexing.

**Figure 9.** Extent of index outperformance depends on which index is used

*Russell benchmarks*

	5-year return	Percentage of managers underperforming benchmark
Russell 1000	2.59	62%
Russell 1000 Growth	3.75	73%
Russell 1000 Value	1.28	48%
Russell Midcap	4.66	67%
Russell Midcap Growth	4.88	59%
Russell Midcap Value	4.08	54%
Russell 2000	4.47	56%
Russell 2000 Growth	5.30	70%
Russell 2000 Value	3.52	42%

*MSCI benchmarks*

	5-year return	Percentage of managers underperforming benchmark
MSCI 750	2.79	65%
MSCI 750 Growth	4.01	75%
MSCI 750 Value	1.45	51%
MSCI 450	4.42	63%
MSCI 450 Growth	4.72	57%
MSCI 450 Value	3.75	52%
MSCI 1750	5.40	67%
MSCI 1750 Growth	6.44	80%
MSCI 1750 Value	4.21	50%

*Standard and Poor's benchmarks*

	5-year return	Percentage of managers underperforming benchmark
S&P 500	2.29	57%
S&P 500 Growth	3.60	71%
S&P 500 Value	0.87	40%
S&P MidCap 400	5.74	80%
S&P MidCap 400 Growth	6.66	77%
S&P MidCap 400 Value	4.70	66%
S&P SmallCap 600	4.64	57%
S&P SmallCap 600 Growth	5.16	69%
S&P SmallCap 600 Value	4.06	49%

*Wilshire benchmarks*

	5-year return	Percentage of managers underperforming benchmark
Wilshire US Large	2.59	62%
Wilshire US Large Growth	3.57	70%
Wilshire US Large Value	1.41	50%
Wilshire US Mid	5.73	80%
Wilshire US Mid Growth	7.18	83%
Wilshire US Mid Value	4.08	54%
Wilshire US Small	6.29	76%
Wilshire US Small Growth	6.75	82%
Wilshire US Small Value	5.79	69%

Notes: Data as of December 31, 2010. For several reasons, outperformance numbers may differ when using mutual fund databases provided by Lipper Inc. or Morningstar, Inc. A primary reason for potential differences is the actual style boxes used. Lipper classifies U.S. stock funds across 12 categories, including 3 categories for multi-cap growth, value, and blend funds, while Morningstar uses 9 categories. A second difference stems from the way in which each database provider sorts funds across capitalization and style groups. Both use median market capitalization to determine size. However, to determine style, Morningstar uses more metrics (price/earnings, price/book, price/sales, price/cash flow, yield, and growth—EPS growth, historical EPS growth, sales growth, CF growth, and book-value growth), while Lipper uses price/earnings, price/book, and three-year operating-cash-flow growth, thus resulting in categorization differences.

Two primary biases exist when using either Lipper or Morningstar mutual fund databases: instability and historical performance.

- Instability results from the frequent reclassifications of peer groups. For example, of the 934 funds in Morningstar's large-cap blend category at the end of 1999, only 696 were still there as of May 31, 2001. Eighty-nine funds left the category because they were merged or liquidated, but 149 were reclassified into other categories. Of the 491 funds in Lipper's multi-cap core category at the end of 1999, only 162 were still there as of May 31, 2001, due to reclassification or removal.
- Complicating the instability of a given style box, each time a fund is put into a new style box, its historical performance is related to the new group, regardless of what style box it came from. A fund that is large value today is measured against large-cap value funds. If it is reclassified as large growth, its entire performance history will now be evaluated relative to that new set of peer funds. This can lead to a dramatic shift—positive or negative—in a fund's relative ranking, even though actual performance did not change.

Sources: Vanguard calculations, using data from Morningstar, Inc., MSCI, Standard & Poor's, Wilshire, and Russell.

**Figure 10.** Excess returns help quantify relative performance of active managers

Based on 15-year annualized returns as of 12/31/2010

	Value	Blend	Growth
Large	38% / 63%	71% / 84%	64% / 79%
	0.02%	-1.43%	-1.10%
Medium	93% / 96%	89% / 94%	94% / 97%
	-2.66%	-2.98%	-4.45%
Small	69% / 82%	89% / 93%	69% / 83%
	-1.18%	-3.36%	-1.38%

Based on 15-year annualized returns as of 12/31/2010

	Government	Corporate	GNMA	High-yield
Short	94% / 97%	96% / 98%	100% / 100%	87% / 90%
	-0.77%	-1.49%	-0.70%	-1.10%
Intermediate	72% / 87%	85% / 92%		
	-0.35%	-0.83%		

- Percentage of funds underperforming benchmark / Percentage underperforming, adjusted for survivorship bias
- Median fund excess return

Notes: Long government and long corporate funds were excluded owing to a small sample size and a duration mismatch with available long-term bond benchmarks. Because duration is the dominant return factor, small differences in duration between a fund (or group of funds) and an index can lead to significant out- or underperformance, independent of cost differentials. Any discrepancies in underperformance figures are due to rounding.

Sources: Vanguard calculations, using data from Morningstar, Inc., MSCI, Standard & Poor's, and Barclays Capital. Equity benchmarks represented by the following indexes: Large blend—S&P 500 Index, 1/1996 through 11/2002, and MSCI US Prime Market 750 Index thereafter; Large value—S&P 500 Value Index, 1/1996 through 11/2002, and MSCI US Prime Market 750 Value Index thereafter; Large growth—S&P 500 Growth Index, 1/1996 through 11/2002, and MSCI US Prime Market 750 Growth Index thereafter; Mid blend—S&P MidCap 400 Index, 1/1996 through 11/2002, and MSCI US Mid Cap 450 Index thereafter; Mid value—S&P MidCap 400 Value Index, 1/1996 through 11/2002, and MSCI US Mid Cap 450 Value Index thereafter; Mid growth—S&P MidCap 400 Growth Index, 1/1996 through 11/2002, and MSCI US Mid Cap 450 Growth Index thereafter; Small blend—S&P SmallCap 600 Index, 1/1996 through 11/2002, and MSCI US Small Cap 1750 Index thereafter; Small value—S&P SmallCap 600 Value Index, 1/1996 through 11/2002, and MSCI US Small Cap 1750 Value Index thereafter; Small growth—S&P SmallCap 600 Growth Index, 1/1996 through 11/2002, and MSCI US Small Cap 1750 Growth Index thereafter. Bond benchmarks represented by the following Barclays Capital indexes: U.S. 1–5 Year Government Bond Index, U.S. 1–5 Year Credit Bond Index, U.S. Intermediate Government Bond Index, U.S. Intermediate Credit Bond Index, U.S. GNMA Bond Index, U.S. Corporate High Yield Bond Index.

## Benefits of indexing in portfolio makeup

Although active managers must manage a portfolio in ways that are different from a benchmark if they are to try to outperform it, investors primarily interested in obtaining the market return or in reducing a fund's volatility around a benchmark should strongly consider indexing. Historically, broad diversification and style consistency have helped to provide more predictable returns relative to the targeted benchmark. As a result, index funds and ETFs play an important role in the portfolio construction process. An indexed mandate also allows greater control of the risks in a portfolio. For example, filling a recommended equity allocation with a concentrated

portfolio would result in an allocation that will likely differ at any given point in time from the risk-and-return characteristics of the equity market.

## Diversification

Index funds typically are more diversified than actively managed funds, a by-product of the way indexes are constructed. Except for index funds that track narrow market segments, most index funds must hold a broad range of securities to accurately track their target benchmarks, whether by replicating them outright or by a sampling method. The broad range of securities dampens the risk associated with specific securities and removes a component

of return volatility. Actively managed funds, on the other hand, tend to hold fewer securities with varying degrees of return correlation.

### Style consistency

An index fund maintains its style consistency by attempting to closely track the characteristics of the index. An investor who desires exposure to a particular market and selects an index fund that tracks that market is assured of a consistent allocation. An active manager may have a broader mandate, causing the fund to be a “moving target” from a style point of view. Many active managers can choose to vary their investments among small-, medium-, or large-cap stocks, betting on whichever segment is expected to perform best. Even if a manager has a well-defined mandate, the decision to hold more or less of a security than the index will lead to performance differences.

### The tax advantage

From an after-tax perspective, broad index funds and ETFs may provide an additional advantage over actively managed funds. Because of the way index funds are managed, they rarely realize and distribute capital gains to shareholders.

According to Bergstresser and Poterba (2002), the typical mutual fund distributed, on average, 50% of its annual price appreciation in the form of capital gains. It should be noted that very few conventional broad index funds or broad ETFs have distributed capital gains in past bull or bear market cycles. Historically, approximately one-third of the distributions from actively managed funds have been in the form of short-term gains and two-thirds in the form of long-term gains. Index funds, on the other hand, distribute far less (an estimated 0.50%) as long-term gains, primarily because selling occurs only when the composition of the market index changes. This can result in return advantages over the long term because the majority of the investment compounds over time instead of being lost to taxes.

### Debunking some misconceptions regarding indexing

Although the indexing strategy has proven to be successful over time, indexing has also been continually criticized. These criticisms have given rise to a number of misconceptions, which persist despite research that has refuted them and despite the historical performance of index mutual funds.

The first myth regarding the viability of indexing is that indexing only works in markets traditionally viewed as highly efficient. For example, the U.S. government bond market is considered one of the most efficient markets, meaning there is not a great deal of room for active managers to add value. In such a market, it would be expected that an overwhelming majority of active managers would fail to beat a benchmark. On the flip side, markets such as high-yield bonds or international markets are often viewed as much less efficient. Investors tend to view these markets as better suited for active management. In this view, indexing would be expected to underperform a large majority of active managers.

Figure 11 addresses these arguments by showing the percentage of active managers that beat a relevant benchmark over the 15 years ended December 31, 2010. After adjusting for survivorship bias, funds focused on the global and regional markets underperformed their benchmarks, on average. Especially notable has been the relative underperformance of emerging markets. In addition, Figure 10 shows that managers in both small-cap U.S. equity and high-yield U.S. bond funds underperformed significantly, even though these are thought to be areas of opportunity for active managers. Further, in a parallel study of offshore-domiciled funds (Philips, 2010a), we found that the average manager significantly underperformed the benchmark. These results held across investment mandates, including U.S., Europe, global, Eurozone, and emerging markets. Similar to the findings in this paper, these numbers will change over time and



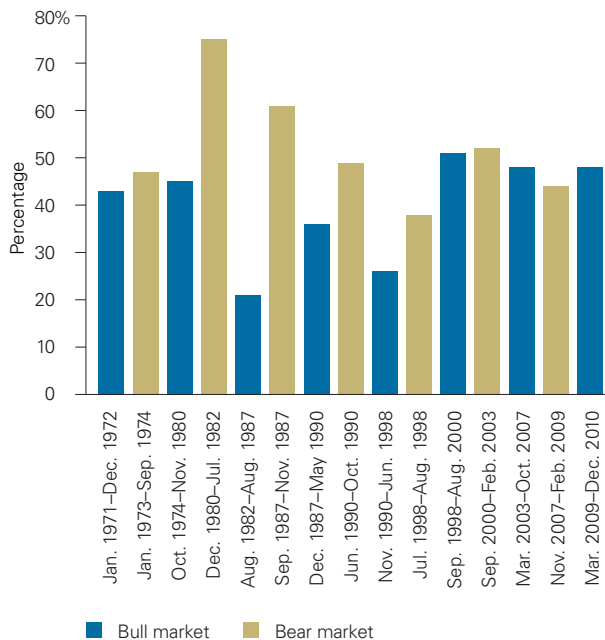
across benchmarks; however, the case for indexing across asset classes and sub-asset classes remains robust. Further, as more funds enter the arena, both results are likely to become more robust.

A second misconception about indexing is that actively managed funds will outperform index funds in a bear market. This belief is based on the idea that active managers can accurately time market declines and upturns. Relatively efficient markets, however, make it difficult to consistently time market movements with accuracy.

Many investors believe that managers of active funds can shift fund assets out of stocks in time to curb portfolio losses during market downturns. In reality, the probability that these managers will move fund assets to defensive stocks or cash at just the right time is very low. Most events that result in major changes in market direction are unanticipated. To succeed, an active manager would have to not only time the market but also do so at a cost that was less than the benefit provided. **Figure 12** illustrates how hard it has been for active fund managers to

**Figure 12.** Percentage of managers outperforming market during bull and bear cycles

*U.S. funds versus Dow Jones U.S. Total Stock Market Index*

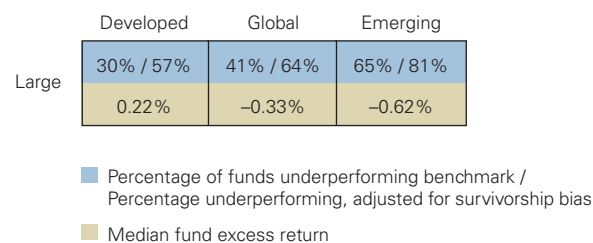


Sources: Vanguard calculations, using data from Morningstar, Inc., and Dow Jones.

**Figure 11.** Indexing has been effective across asset classes and sub-asset classes

*Percentage of managers outperformed by benchmark and equal-weighted excess returns of active managers*

International equity: 15-year annualized returns as of 12/31/2010



Sources: Vanguard calculations, using data from Morningstar, Inc., and MSCI. Benchmarks include the following MSCI indexes: All Country World Index, EAFE Index, and Emerging Markets Index.

outperform the Dow Jones U.S. Total Stock Market Index. In four of seven bear markets since January 1973, and seven of the eight bull markets, the average mutual fund underperformed the index. These results are particularly noteworthy, given that most bear markets are relatively brief, while the indexing cost advantage grows in magnitude over 5-, 10-, and 20-year periods.

Similarly, Lipper studied active managers' performances in bear markets (defined as a drop of 10% or more in the equity markets).<sup>7</sup> Lipper found that active managers underperformed the S&P 500 Index in the six market corrections occurring between August 31, 1978, and October 11, 1990.

7 As cited in Evans and Malkiel (1999).

For example, the average loss for the S&P in these episodes was 15.1%, versus a 17.0% average loss for large-cap growth funds.

Another common misconception about equity index funds is that their managers will be forced to sell fund holdings, and thus realize substantial capital gains, because of investors' increased redemptions during bear markets. There are two errors in this argument. The first error assumes that market downturns necessarily cause money to flow out of index funds. Net cash flows for broad equity index funds in aggregate actually remained positive during the 2000–2002 bear market. According to the Investment Company Institute, from 2000 through 2002, over \$62 billion in new cash flow went into equity index funds. Similarly, in 2008, \$31 billion went into equity index funds.

The second error in this myth is that embedded capital gains distributions for equity index mutual funds (expressed as a percentage of their average net asset values) decreased during the 2000–2002 bear market in lockstep with the market decline.

Because cash flows of equity index funds have been largely positive over time, index fund managers purchase stocks across a wide range of prices. When redemptions result in net cash outflows, the managers can sell cost lots that they purchased at high prices and realize losses that can then be stockpiled to offset gains elsewhere in the portfolio.

A well-managed index fund will use its high-cost lots to accommodate redemption requests. In reality, redemptions in a bear market can help an index fund to remain tax-efficient, creating losses, not gains, for tax purposes.

## Conclusion

Since its beginnings in the early 1970s, indexing has grown rapidly because it provides a simplified, efficient investment vehicle with the potential to increase shareholder wealth across a broad range of asset classes and sub-asset classes. Primarily because of their low-cost structure, indexed investments have generally offered long-term outperformance relative to a majority of actively managed funds. In fact, if broadly diversified active funds were able to minimize fees and turnover on a par with index funds, much of the indexing advantage would be eliminated. The reality of active management, however, is that costs are generally higher, giving index funds a significant head start in relative performance.

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