**Executive summary.** Since its beginnings in the early 1970s, indexing as an investment strategy has grown tremendously, to the point that according to data from Morningstar, assets in U.S.-domiciled index mutual funds and ETFs accounted for 28% of equity and 17% of fixed income funds as of year-end 2011. Indexing refers to an investment methodology that attempts to track a specific market index (either broadly or narrowly focused) as closely as possible. This paper explores the theory behind indexing as an investment strategy and provides evidence to support its use in investor portfolios.\(^1\) To do so, we first establish a baseline by comparing the records of actively managed funds with various unmanaged benchmarks. We demonstrate, first, that the average U.S.-domiciled actively managed fund has underperformed a style benchmark with greater volatility over long time periods; second, that reported performance statistics can change markedly once survivorship bias is accounted for; and, third, that persistence among past winners is no more predictable than a flip of a coin.

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\(^1\) Throughout this paper, when referring to indexing, we assume a strategy that is weighted according to market capitalization. For an evaluation of indexes that are not weighted according to market capitalization and the strategies that seek to track those indexes, see Philips et al. (2011) and Thomas and Bennyhoff (2012).
Following our evaluation of active management, we describe the theory behind indexing, focusing on the zero-sum game. We show how both indexed and active strategies performed within this framework and discuss how using a low-cost index fund can lead to a greater probability of outperforming higher-cost actively managed funds. We furthermore focus on key characteristics of well-managed index funds, and ultimately conclude that indexing can be a viable strategy for a wide range of investors.

An indexed investment strategy—via a mutual fund or an exchange-traded fund (ETF), for example—seeks to track the returns of a particular 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. To track the returns of a specific market or market segment, indexing strategies use quantitative risk-control techniques that seek to replicate the benchmark’s return with minimal expected deviations (and, by extension, with no expected alpha, or excess return versus the benchmark). In contrast, actively managed funds, either fundamentally or quantitatively managed, seek to provide a return that exceeds that of a benchmark. In fact, any strategy that operates with an objective of differentiation from a given benchmark can be considered active management and should therefore be evaluated based on the success of the differentiation.

The record of actively managed mutual funds

The clear objective of actively managed portfolios is to outperform a given benchmark. Depending on the active strategy, the target benchmark could be a traditional market index such as the Standard & Poor’s 500 Index or the Barclays Capital U.S. Aggregate Bond Index, or the objective could be to generate a positive

Notes about risk and performance data:
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.
return in excess of U.S. Treasury bills (that is, an absolute-return strategy), with Treasury bills the benchmark. Some managers even seek to deliver outperformance while taking on less risk than their targeted benchmark. Of course, all managers experience times when their investing style is out of favor, but over a reasonably long period of time—covering multiple market cycles and environments—a skilled active manager should be able to deliver positive excess returns versus the targeted benchmark for the full period. Although the theory of such active outperformance is intuitive, the actual track record of actively managed funds is underwhelming, suggesting that such skill is difficult to find.

Note: Performance data reflect 15 years through December 31, 2011.

Figure 1, on page 3, shows the relative 15-year performance (as of December 31, 2011) of actively managed mutual funds when evaluated versus benchmarks considered by Vanguard to be representative of the funds’ investing style. For example, funds categorized by Morningstar as “large-cap U.S. value” were compared against a large-capitalization U.S. value index, and so on. Figure 1 reveals several points. First, we show the percentage of funds in each category that survived the full 15 years but underperformed their benchmark. In 15 of the 18 categories, a majority of funds that survived nevertheless underperformed. Digging beneath the headline numbers can be revealing: For example, although it appears, on the surface, that managers in the developed international space have done well versus their benchmarks, deeper analysis would show that many of these funds do not limit their investment pool to developed international markets. Indeed, we found that 76% of these funds included emerging markets in their portfolios, even though their benchmarks, on average, did not. Emerging markets have significantly outperformed developed markets over the last 15 years. Of course, in Figure 1 we also show that a majority of actively managed emerging markets funds underperformed when evaluated against an emerging markets benchmark. (See the accompanying box, “Importance of style-box analysis.”)

Next, we attempted to account for survivorship bias (that is, reflecting returns of funds that were closed or no longer report returns to the database) by identifying those funds that were alive at the start of the 15-year period (on January 1, 1997) but dropped out of the database at some point (see Figure 2 for more discussion on survivorship bias).

Importance of style-box analysis

Rather than evaluate actively managed funds versus the broad equity or fixed income market (represented by an index such as the MSCI US Broad Market Index or the Barclays Capital U.S. Aggregate Bond Index), we separated funds according to their categorization within each market. The rationale for this is straightforward—comparing all funds versus a broad market benchmark results in a mismatch of market risk factors, in that a small-cap manager may outperform the broad market simply because small-cap stocks in general outperformed the broad market, but through no specific skill or management technique. In our view, comparing a small-cap manager against a small-cap benchmark addresses this mismatch and thus permits a more reasonable evaluation of outperformance.

After accounting for these funds, all 18 categories ended up on the losing side—that is, the average investor in any of these fund categories would have underperformed the cost-free benchmarks.

Finally, Figure 1 shows the annualized excess returns for the median surviving fund in each category. We show excess returns because to evaluate managers using solely the percentage of managers underperforming assumes that a manager who underperforms by 0.01% has achieved a result

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2 As we discuss later, the mutual fund universe is but one segment of all investors. So although 100% of mid-cap value and GNMA mutual funds underperformed, not all investors underperformed those benchmarks. There are two potential categories of investors who may have outperformed. The first group would be those who did not hold mutual funds but owned individual securities or other forms of investment such as separate accounts, commingled trusts, hedge funds, and so on. The second group would be investors in mutual funds that are in another category (such as large-cap value) but nevertheless held mid-cap value securities.

3 For the 15 years ended December 31, 2011, the MSCI Emerging Markets Index returned 7.12% annually, while the MSCI World Index ex USA returned 4.19% annually.

4 The actual number of funds that were closed owing to poor performance is likely less than the percentage adjusted for survivorship bias cited in Figure 1. This is because some poorly performing funds are merged into other better-performing funds. An investor in such a fund would then receive the performance of the new fund, provided he or she held on to the investment. Unfortunately, there is no easy way to identify which funds were the recipients of poorly performing funds. As a result, the actual survivorship-adjusted percentage is likely between the two percentages in Figure 1.
as significant as one who underperforms by 10%. Here again, 15 of the 18 categories showed the median fund trailing its benchmark.

These results offer several important takeaways. First, the relative underperformance of actively managed funds has been consistent across asset classes (both equity and fixed income). Second, within each asset class we again observed consistency with respect to relative underperformance across the Morningstar style boxes (for example, as in capitalization and size within equities). Finally, and of particular interest, a significant majority of actively managed funds in so-called inefficient sectors such as mid- and small-cap stocks, high-yield bonds, and emerging market stocks underperformed their benchmark. It is a commonly held myth that actively managed funds have a leg up in market segments perceived as inefficient. Clearly, funds invested in these inefficient areas have not delivered on the promise of outperformance.

Impact of survivorship bias on performance results

Although the objective of active managers is outperformance, we have demonstrated that a majority of active managers may not deliver on that objective. An additional risk facing investors is that despite periods when a majority of actively managed funds outperform (for instance, large-cap value funds in Figure 1), an investor must still select, in advance, one of those outperforming funds and hold it for the entire period. Only in hindsight can an investor determine if he or she were correct or not, and even within the large-cap value area, an investor stood a 1 in 4 chance of selecting a fund that failed to outperform (see the figure). And this 25% chance overlooks the possibility that the fund selected by the investor underperforms enough that it is closed down.

To test the assumption that closed funds underperformed, we evaluated the performance of all the funds identified by Morningstar as either being liquidated or merged into another fund. For this analysis we looked at returns starting in January 1989, to provide a large enough sample to evaluate. We measured the closed funds’ excess returns versus a style-box benchmark for the 6, 12, and 18 months previous to the funds’ date of closure. Figure 2 presents the results. Clearly, a possible factor leading to the closure of these funds was relative underperformance. As a result, investors

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5 The 25% probability assumes that the investor bought the fund at the start of the evaluation period and held that fund for the full 15 years.

6 These results corroborate previous studies on the impact of survivorship bias. Brown and Goetzmann (1995) showed that funds tend to disappear owing to poor performance. In addition, Carhart et al. (2002) showed that the performance impact of dead funds increases as the sample period increases.
selecting active management not only have to be concerned with underperformance and potentially higher volatility but underperformance that may lead to a fund’s closing, and the possibility that a new manager search may result in the selection of another poorly performing fund.

Implications for investors

One outcome of the median excess returns shown in Figure 1 is that an investor who constructs a portfolio of actively managed funds stood at least a 50% chance of selecting an underperforming fund (because the median fund underperformed in most of the categories we evaluated). Underperformance may not be the only negative outcome, however. For example, Figure 3 reveals what the average return and volatility of a market-proportional portfolio of the median actively managed funds from Figure 1 would look like. For comparison purposes, we also plotted the returns and volatilities of three unmanaged market indexes: the Dow Jones U.S. Total Stock Market Index, the Barclays Capital U.S. Aggregate Bond Index, and the MSCI All Country World ex USA Index.

In each portfolio, the median actively managed funds registered higher volatility than the market benchmark (although the median bond portfolio was within 10 basis points of the market benchmark). In other words, not only was performance poor for both U.S. fixed income and U.S. equities, but investors experienced more risk to achieve that poor performance. Digging a bit deeper into the results, we noted that only 34% of U.S. equity funds, 32% of foreign equity funds, and 9% of U.S. bond funds registered both higher returns and lower volatility than their style benchmark—not tremendous odds for investors looking to improve their risk-adjusted returns.

Although the median fund and portfolio generally underperformed their indexes, investors do have the opportunity to select a fund that ranks in the upper half of all managers. Indeed, Figure 1 shows that even over a relatively long period (15 years), some actively managed funds survived and outperformed their benchmark. Including such outperformers in a portfolio is the primary objective of investors who use actively managed funds. And if we were to recreate Figure 3 using top-quartile funds, both U.S. equity and

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Notes: This illustration of hypothetical portfolios does not represent the returns on any particular investment. Portfolio weights approximate the relative allocations within each market as of December 31, 2011. The median active bond portfolio was allocated as follows: 64% to the median government bond fund and 36% to the median corporate bond fund. The median active U.S. equity portfolio was allocated as follows: 70% to the median large-cap fund, 20% allocated to the median mid-cap fund, and 10% allocated to the median small-cap fund. The median active international equity portfolio was allocated as follows: 78% to the median developed markets fund and 22% to the median emerging markets fund. Returns and volatility cover the 15 years ended December 31, 2011. The U.S. bond market is represented by the Barclays Capital U.S. Aggregate Bond Index; the U.S. stock market is represented by the Dow Jones U.S. Total Stock Market Index from 1997 through May 2005 and the MSCI US Broad Market Index thereafter; and the international stock market is represented by the MSCI All Country World ex USA Index.

Sources: Vanguard calculations, using data from Morningstar.

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As we noted previously, the higher returns for the median active international stock portfolio are possibly a result of the inclusion of emerging market equities in the global equity portion of the portfolio. For investors, this would mean that their actual allocation to emerging market equities would be in excess of the market weight, signifying a bet on their relative outperformance going forward. This may or may not be acceptable, but investors should be aware of such deviations.
international equity portfolios would outperform the market benchmark, while the U.S. bond and U.S. equity portfolios would have realized lower average volatility than the market benchmark.

Two critical questions for investors therefore are: “Am I able to pick a winning portfolio in advance?” and “Will the winning portfolio continue to be a winning portfolio for the entire life of my portfolio?” In other words, would an investor be able to select a winner from the past and expect that fund to persistently outperform in the future? For years, academics have studied whether past performance has predictive power in terms of future performance. More than 40 years ago, Sharpe (1966) and Jensen (1968) found limited to no persistence. Three decades later, Carhart (1997) reported no evidence of persistence in fund outperformance after adjusting for the well-known Fama-French three-factor model (that is, the influence of the equity market, size, and style, as delineated by Eugene Fama and Kenneth French in 1993) as well as for momentum. Carhart’s study reinforced the importance of fund costs and highlighted how not accounting for survivorship bias can skew results of active/passive studies in favor of active managers. More recently, Fama and French (2010) reported results of a separate 22-year study suggesting that it is extremely difficult for an actively managed investment fund to regularly outperform its benchmark.

To analyze consistency within the actively managed fund space, we ranked all U.S. equity funds in terms of risk-adjusted return for the five years ended 2006. We then selected the top 20% of funds and tracked their risk-adjusted returns over the next five years (through December 31, 2011) to see how consistently they performed. If those top funds displayed consistently superior risk-adjusted returns, we would expect a significant majority to remain in the top 20%. A random outcome, however, would result in approximately 17% of returns dispersed evenly across the six categories for the subsequent five-year period (if we assume that the possibility of a fund closing down is just as probable as any other outcome). Figure 4 displays the results.

It is interesting that Figure 4’s results do not appear to be significantly different from random, aside from the bottom quintile. Taking this analysis to its logical next step, one might rightly assume that funds that fall to the bottom quintile might be the next to fall into the liquidated/merged bin. Indeed, when we replicated Figure 4 for funds that fell into the bottom quintile as of December 31, 2006, we found that fully 50% were liquidated or closed by year-end 2011, and that 10% remained in the bottom quintile, while only 21% managed to “right the ship” and rebound to either of the top two quintiles.

Although more than 15% of the top funds in Figure 4 (154 of 1,000) remained in the top 20% of all funds over the subsequent five-year period, it’s clear that
even risk-adjusted performance is more random than commonly believed. Indeed, an investor selecting a fund from the top 20% of all funds in 2006 stood a 52% chance of falling into the bottom 40% of all funds or seeing his or her fund disappear along the way. Stated another way, of the 4,934 total funds available to invest in 2006, only 154 (3.12%) achieved top-quintile risk-adjusted returns over the five-year periods ended both 2006 and 2011.

This high turnover with respect to outperformance and market leadership is one reason why changing managers as a result of poor performance can lead to further disappointment. For example, in a well-reported study, Goyal and Wahal (2008) found that the process of replacing underperforming managers with outperforming managers within U.S. institutional pension plans resulted in performance results far different than expected. For example, the authors evaluated the performance of both hired and fired managers before and after the decision date. They found that following termination, the fired managers actually outperformed the managers hired to replace them by 49 basis points in the first year, 88 basis points over the first two years, and 103 basis points over the first three years.

### Impact of market cycles on results of actively managed funds

Over time and various time periods, the percentage of funds underperforming a particular index will vary. Much of this variation is due to the cyclical nature of the financial markets. To supplement Figure 1’s analysis, Figure 5 shows five-year evaluation...
windows for the U.S. equity style boxes. These shorter time windows reveal the presence of significant volatility. For example, the percentage of large-cap value funds that underperformed the large-cap value benchmark ranged from 94% for the five years ended 1999 to just 31% for the five years ended 2004.

Style-box cyclicality is influenced by the relative performance of one style benchmark versus another. First, because many managers have holdings that fall within other boxes, when there are significant differences in returns between 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. For a more in-depth analysis on the cyclicality of indexing, see Philips and Kinniry (2009).

A second perspective with respect to market cycles is the performance of actively managed funds during bear markets. The common perception is that actively managed funds will outperform their benchmark in a bear market because, in theory, active managers can move into cash or rotate into defensive securities to avoid the worst of a given bear market.

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 6 illustrates how hard it has been for active fund managers to 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 did not outperform the index. When considering the implications of these results, it’s important to note that to win over time a manager must not only accurately time the start and end of the bear market but select winning stocks during each period. Combining these results with those from Figure 1 demonstrates the challenges for long-term investors when choosing
active management. For more on the challenges of outperforming during bear markets, see Philips (2009) and Davis and Philips (2007).

**Importance of zero-sum game to the case for indexing**

The zero-sum game is a theoretical concept underpinning why indexing can serve as an attractive investment strategy. The concept of a zero-sum game starts with the understanding that every moment, 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. 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 7), with the benchmark return as the mean. In the figure, the market is represented by the light tan region, with the market return as the black vertical line.

At every moment, the dollar-weighted positive excess 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, and, where applicable, taxes—all of which combine to reduce investors’ realized returns over time. The aggregate result of these costs shifts the investors' curve to the left. We represent the adjustment for costs 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 green region, a much larger portion is new 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 minimizing costs, therefore, investors can provide the opportunity to outperform those investors who incur higher costs. This concept is just as relevant in markets often thought to be less “efficient,” such as small-cap or international equities (Waring and Siegel, 2005).

The zero-sum framework refers to all investors’ assets in a given market but may be applied to mutual fund investors. Figure 8 shows five return distributions covering different portions of the equity and fixed income markets. For this analysis we were limited in our evaluations by the existence of both index and active funds with ten-year returns in each market. As a result, we focused on large-cap blend stocks (represented by the S&P 500 Index), small-cap blend stocks (the Russell 2000 Index), foreign developed markets stocks (the MSCI EAFE Index), emerging markets stocks (the MSCI Emerging Markets Index), and U.S. diversified bonds (the Barclays Capital U.S. Aggregate Bond Index).

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8 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.

9 In this context, market impact refers to the effect of a market participant’s actions—that is, buying or selling—on a security’s price.
Figure 8. Distribution of mutual fund performance versus target benchmarks

a. Distribution of excess returns among large blend funds: Ten years ended December 31, 2011

b. Distribution of excess returns among small blend funds: Ten years ended December 31, 2011

c. Distribution of excess returns among foreign large blend funds: Ten years ended December 31, 2011

d. Distribution of excess returns among emerging market funds: Ten years ended December 31, 2011

e. Distribution of excess returns among intermediate-term government and corporate funds: Ten years ended December 31, 2011

Sources: Vanguard calculations, using data from Morningstar, S&P, MSCI, and Barclays Capital.
In keeping with the zero-sum theory, a majority of actively managed funds underperformed the costless benchmark (large-cap blend: 71%, small-cap blend: 57%, international developed: 76%, international emerging: 77%, and diversified fixed income: 81%). These results are also in line with the conclusions of McGuigan (2006), who found that the probability of selecting the “wrong” active fund in terms of the magnitude of possible underperformance relative to a benchmark was always greater than the probability of selecting actively managed large- and mid-cap funds that would outperform by the same amount for the 20 years ended 2003. Equally important is that a significant percentage of index funds underperformed (as would be expected). However, as might also be expected, the range of underperformance for the indexed strategies was much closer to the index’s returns than for the actively managed strategies.

Finally, as we discuss later, not all index funds are created equal, and the record of out or underperformance for an actively managed strategy depends not only on the active fund selected but also on the index fund. For example, if an investor compares an actively managed large-cap blend fund from the first bucket of underperformers in Figure 8 (returning –1% to 0%) versus an S&P 500 Index...
fund with an expense ratio of 1.0% (thus likely falling into the –2% to –1% bucket), it could appear that the actively managed fund outperformed the index fund. Of course, the perception of outperformance could flip, if a lower-cost index fund were selected.

Cost: The critical performance metric

How can investors increase their odds of achieving a return that outperforms a majority of similar investors? The answer could be as simple as seeking the lowest possible cost for a given strategy. For example, Financial Research Corporation (2002) evaluated the predictive value of different fund metrics, including a fund’s past performance, Morningstar rating, alpha, and beta. 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. Similar research conducted at Vanguard by Wallick et al. (2011) evaluated a fund’s size, age, turnover, and expense ratio, and concluded that the expense ratio was the only significant factor in determining future alpha. In addition, Philips and Kinniry (2010) showed that using a fund’s Morningstar star rating as a guide to future performance was less reliable than using the fund’s expense ratio. Practically speaking, a fund’s expense ratio is a valuable guide (although not a sure thing), because the expense ratio is one of the few characteristics that are known in advance.

Figure 9 provides evidence for the inverse relationship between investment performance and cost across multiple categories of funds including both indexed and active mandates. Specifically, the figure shows the ten-year annualized excess return of each fund relative to its style benchmark and the way in which those excess returns relate to the fund’s expenses. The red line in each style box represents the simple regression line and signifies the trend across all funds for each style box. Generally speaking, the results show that higher costs are associated with lower excess returns. For investors, the clear implication is that by focusing on low-cost funds (both active and passive), the probability of outperforming higher cost portfolios increased.

Taken together, Figures 7, 8, and 9 suggest that indexed strategies have actually given investors the opportunity to outperform higher-cost active managers. This is because index funds generally operate with lower costs than actively managed funds. The higher expenses for actively managed funds often result from both the research process required to identify potential outperformers and the generally higher turnover associated with the attempt to best a benchmark.

10 Alpha, refers to 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 movement of the overall market (or appropriate market index).

11 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 being equal, the impact of these costs would reduce total returns realized by the investors in the fund.

### Figure 10. Asset-weighted expense ratios of active and passive investments

<table>
<thead>
<tr>
<th>Fund Category</th>
<th>Actively managed funds (%)</th>
<th>Index funds (%)</th>
<th>ETFs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large-cap U.S.</td>
<td>0.87</td>
<td>0.17</td>
<td>0.15</td>
</tr>
<tr>
<td>Mid-cap U.S.</td>
<td>1.02</td>
<td>0.34</td>
<td>0.27</td>
</tr>
<tr>
<td>Small-cap U.S.</td>
<td>1.12</td>
<td>0.39</td>
<td>0.25</td>
</tr>
<tr>
<td>U.S. sector</td>
<td>1.00</td>
<td>0.87</td>
<td>0.34</td>
</tr>
<tr>
<td>U.S. real estate</td>
<td>1.05</td>
<td>0.26</td>
<td>0.25</td>
</tr>
<tr>
<td>International developed</td>
<td>0.97</td>
<td>0.24</td>
<td>0.38</td>
</tr>
<tr>
<td>International emerging</td>
<td>1.22</td>
<td>0.35</td>
<td>0.45</td>
</tr>
<tr>
<td>U.S. corporate bond</td>
<td>0.55</td>
<td>0.20</td>
<td>0.23</td>
</tr>
<tr>
<td>U.S. government bond</td>
<td>0.52</td>
<td>0.21</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Sources: Vanguard calculations, using data from Morningstar. Discrepancies due to rounding. Data as of December 31, 2011.
Figure 10, on page 13, shows the average dollar-weighted expense ratios for actively managed equity and bond mutual funds. As of December 31, 2011, investors in actively managed large-cap equity mutual funds were paying an average of approximately 0.87% annually, and those in actively managed government bond funds were paying 0.52% annually, versus 0.17% and 0.21% for the respective index funds and 0.15% for ETFs.

Although on the surface the theory and application of indexing seem straightforward, it’s not just about picking any index fund. To track the returns of a specific market or market segment, indexing strategies use quantitative risk-control techniques that seek to replicate the benchmark’s return with minimal expected deviations (and, by extension, with no expected alpha, or excess return versus the benchmark). However, because the targeted benchmark incurs no expenses, inefficiencies, or implementation costs, the return an investor receives in an index fund will reflect those implementation costs (transaction costs and other operational or trading frictions) and, therefore, should provide investors with the best proxy for the achievable or investable index return. Any investor seeking to capture the performance of a specific benchmark must therefore identify and then invest in an appropriate product that seeks to track that index, while acknowledging that not all indexed investment strategies are created equal.

Because the objective of an indexed strategy is to mimic a given benchmark as tightly as possible, any significant deviations from a benchmark’s return over time can potentially indicate inefficient
management. For index funds, a key driver of potential deviations is the expense incurred along the way to manage the portfolio. Figure 11 performs a similar analysis as that in Figure 9, but focuses solely on those indexed strategies seeking to track the S&P 500 Index. The strength of the relationship is notable. Investors interested in the S&P 500 Index as a beta for large-cap stocks should consider investing in an index fund or ETF with the lowest possible expenses.

Beyond expense ratio, other factors that might contribute to the effectiveness of mimicking a targeted benchmark include portfolio size, the number of securities in the benchmark, the liquidity of the targeted market (resulting in larger or smaller bid-ask spreads), the nature and size of the portfolio’s cash flow profile, and the index strategy provider’s portfolio and risk-management processes. The net result of the factors discussed is that an ideal index fund or ETF would have low expenses, economies of scale, and an efficient and risk-controlled portfolio-management process. Together, these factors would permit an index fund or ETF to deliver returns very close to, if not identical to, the targeted benchmark consistently over time.

Other benefits of indexed strategies

Indexed investments can provide several benefits to investors. First and foremost, indexed strategies benchmarked to broad-market indexes can provide greater control of the risk exposures in a portfolio. For example, filling a recommended equity allocation with an actively managed fund can result in meaningfully different risk and return characteristics than the broad market (see Figure 3, for instance). This could expose the investor to greater (or less) risk than he or she targeted by way of the asset allocation decision.

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.

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 seeks to track that market is expecting to receive 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.

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 often realize and distribute capital gains less frequently than actively managed funds. That said, it’s important to note that the tax efficiency of index funds and ETFs can vary tremendously, depending on the index the fund is attempting to track (all else equal, narrower indexes may require greater turnover) as well as the management process of the fund (all else equal, a full replication strategy would likely lead to less turnover than an optimization strategy). A 2010 study from Lipper (Thomson Reuters) reported that over the 16 years ended 2009, the highest portfolio turnover ratio for the average S&P 500 Index fund was 19.00% (in 1994), while the lowest was 6.54% (in 2004). This is because selling occurs only when the composition of the market index changes.

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12 Tracking error results from numerous causes, some of which are tied to government regulations. For example, in very narrow indexes such as those focusing on a specific stock market sector or an individual country, the SEC (or a foreign government) may establish limits on how much of any one security can be represented in a portfolio. As such, the index fund or ETF cannot replicate the targeted benchmark, even given the desire to do so. This leads to unavoidable tracking error, but may not be indicative of a poorly managed strategy, since the strategy may still reflect the most efficient investable vehicle available.
Because turnover is much lower in an index fund, there is less opportunity to distribute capital gains. For example, the same study reported that index funds or index-based funds posted the top returns, both on a before- and after-tax return basis, in 7 of 11 classification groups over the ten years ended 2009.

Of course, the actual impact of taxes, as well as the relative results between indexed strategies and active strategies, can and does change over time, depending on how markets perform and how the tax code may change. For example, in the same study, Lipper (Thomson Reuters, 2010) reported that U.S. diversified equity funds reported an average one-year tax drag of 2.75% from 1996 through 2000, but only 0.68% from 2001 through 2009. And in 2009, actively managed equity funds showed a lower tax burden than passively managed funds.  

**Conclusion**

Since its start in the early 1970s, indexing has grown rapidly because the strategy can provide a low-cost option to gain investment exposure to a wide variety of market benchmarks. Of course, index funds are not all created equal, and an investor cannot assume that all index funds will perform similarly. In addition, investors should not expect indexed strategies to always outperform over time or to outperform 100% of actively managed funds in a particular period. However, as a result of the zero-sum game, costs, and the general efficiency of the financial markets, consistent outperformance of any one active manager is highly unlikely. The challenge facing investors is to correctly identify those managers who they believe may outperform in advance and stick with them through good times and bad. Finally, when deciding between an indexed or actively managed strategy, investors should not overlook the advantages in portfolio construction that well-managed indexed strategies bring to bear.

13 Underscoring the difficulty of evaluating performance data, poorly performing funds that do not pass through capital gains or income distributions can appear to be tax-efficient.
References


For more information about Vanguard funds, visit vanguard.com, or call 1-800-662-2739, to obtain a prospectus. Investment objectives, risks, charges, expenses, and other important information about a fund are contained in the prospectus; read and consider it carefully before investing.

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