The case for index-fund investing for Canadian investors

Vanguard research

May 2013

Executive summary. Indexing refers to an investment methodology that attempts to track a specific market index (either broadly or narrowly focused) as closely as possible after accounting for all expenses incurred to implement the strategy. As a result of this objective, investors should expect an index fund to underperform its targeted benchmark by the amount of its expenses. This objective differs substantially from that of traditional investment managers, whose objective is to outperform their targeted benchmark even after accounting for all expenses. Indeed, an oft-cited benefit of actively managed investments is the opportunity for outperformance.

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 examine the performance of a range of funds available to Canadian investors. We first compare the records of actively managed

Authors
Christopher B. Philips, CFA
Francis M. Kinniry Jr., CFA
Todd Schlanger

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, Philips et al. (2011) and Thomas and Bennyhoff (2012).

funds with those of various unmanaged benchmarks. We demonstrate that, after costs: (1) the average actively managed fund has underperformed various benchmarks; (2) reported performance statistics can deteriorate markedly once "survivorship bias" is accounted for (that is, once the results of funds that were removed from the public record are included); and (3) persistence of performance among past winners is no more predictable than a flip of a coin.

We then compare the performance of actively managed funds with passive—or indexed—funds. We demonstrate that low-cost index funds have displayed a greater probability of outperforming higher-cost actively managed funds, even though index funds generally underperform their targeted benchmarks. We conclude that indexing can be a viable strategy for investors across a range of asset classes and markets.

Notes about risk and performance data: Investments are subject to market risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. Bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments. Investments in stocks issued by non-Canadian companies are subject to risks including country/regional risk, which is the chance that political upheaval, financial troubles or natural disasters will adversely affect the value of securities issued by companies in foreign countries or regions; and currency risk, which is the chance that the value of a foreign investment, will decrease because of unfavourable changes in currency exchange rates. Stocks of companies based in emerging markets are subject to national and regional political and economic risks and to the risk of currency fluctuations. These risks are especially high in emerging markets.

Funds that concentrate on a relatively narrow market sector face the risk of higher unit price volatility. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. 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. 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.

Since its beginnings in the early 1970s in the U.S., indexing as an investment strategy has grown tremendously. For example according to data from Morningstar, assets in U.S.-domiciled index mutual funds and exchange-traded funds (ETFs) accounted for 34% of equity and 18% of fixed income investments as of year-end 2012. In Canada, indexed strategies accounted for 15% of equity and 16% of assets invested in mutual funds and ETFs. Looking forward, we expect growth to accelerate in most markets as awareness grows with respect to cost, performance and the ancillary benefits of an indexed strategy.

An indexed investment strategy—via a mutual fund or an ETF, for example—seeks to track the returns of a particular market or market segment after costs 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 (or passive) 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 positive 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. (See the accompanying box, "Beyond the active/passive label—considerations in selecting funds").

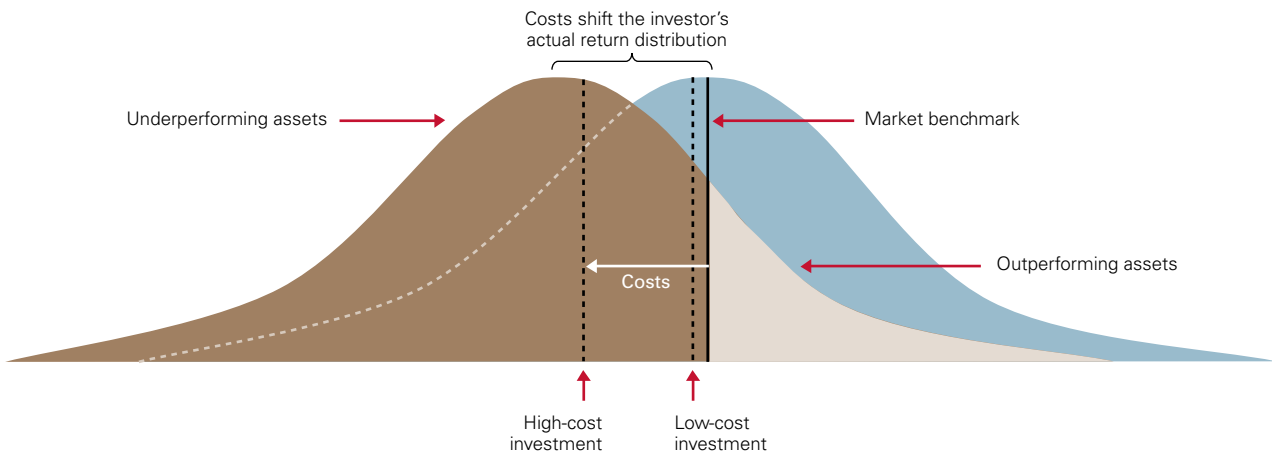
This paper explores indexing theory and evidence to support its use by investors. We first review the performance of actively managed funds across several broad categories. We note the important role of costs, as well as "survivorship bias," in any fund analysis or selection process. Next we compare the results of actively managed funds versus indexed strategies. Finally, we emphasize key characteristics of a well-managed index fund.

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 at 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.[2] 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), with the benchmark return as the mean. In the figure, the market is represented by the blue region, with the market return as the solid black vertical line.

2 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 costs on zero-sum game



Notes: For illustrative purposes only. This illustration does not represent the return on any particular investment.

Source: Vanguard.

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[3] 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 dark tan curve (see Figure 1). Although a portion of the after-cost dollar-weighted performance continues to lie to the right of the market return, represented by the light tan region in the figure, a much larger portion is now to the left of the market line, meaning that after costs, most of the dollar-weighted performance of investors falls short of the aggregate market return. By 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-capitalization or international equities (Waring and Siegel, 2005).

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 S&P TSX Index or the Barclays Global Aggregate Canadian Float Adjusted Bond Index, or the objective could be to generate a positive return in excess of government bills (that is, an absolute-return strategy), with the government bill as 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 favour, but over a reasonably long period—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.

3 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.

Beyond the active/passive label—considerations in selecting funds

Investors have many considerations to sort through when evaluating a fund as an investment option. Identifying a successful active manager requires due diligence on the investor's part. But once identified, a very talented active manager with a proven philosophy, discipline and process, and at competitive costs, can provide an opportunity for outperformance. Topping the list of considerations in active management is the importance of finding a manager who can articulate, execute and adhere to prudent, rational strategies consistently; and then ensuring that the manager's strategy fits into your overall asset and sub-asset allocations. Discipline in maintaining low investment costs—that is, administrative and advisory expenses plus costs due to turnover, commissions and execution—is also essential to realizing any positive excess return. Another key factor is that of consistency—that is, keeping a good manager, once one is found, rather than rapidly turning over the portfolio. Maintaining the ability to filter out noise—especially short-term measures of performance versus either benchmarks or peers—is furthermore crucial.

Like active managers, investors who choose to index their investments via a passively managed fund or ETF should also realize that not all passive options are alike. An investor should first ensure that the index fund or ETF seeks to track a benchmark that truly represents the targeted objective. For example, if total exposure to U.S. stocks is the object, using an index fund or ETF based only on the 500 stocks in the Standard & Poor's 500 Index would be insufficient, since historically a significant percentage of the total U.S. market capitalization falls outside of the largest 500 names. When comparing similar index funds, investors should focus first on the expense ratio, since cost is the largest factor driving tracking error or deviations relative to the target index. Wide tracking error may also be a potential warning sign of inefficient management. Other factors can be considered too, such as the degree to which a fund engages in securities lending, or whether the fund attempts to match the benchmark through a sampling technique versus full replication.

Data

To examine how successful active managers have been in achieving these aims, we begin by examining the performance of a range of funds available to Canadian investors, focusing on a few broad investment categories: Canadian and non-Canadian equities as well as Canadian fixed income. For all of our comparisons, we use the open-end fund universe provided by Morningstar. Fund classifications are provided by Morningstar, as are the expense ratios, assets under management, inception dates and termination dates (if relevant). Fund returns are reported net of cost; however, front- or back-end loads and taxes are unaccounted for.

We excluded sector funds and specialist funds from our analysis. For our evaluation of index funds, we excluded ETFs because of the lack of adequately long back-runs of data. However, we would expect the conclusions of our results using index funds to extend to index ETFs because index ETFs operate with a similar objective to index funds. We used all classes of funds to capture the broadest perspective on investor performance, and thus also the influence of differential costs on returns of otherwise identical funds. Even so, we ran the risk of overweighting particular investment strategies. To check the robustness of our findings, we therefore also present, in a later section, our results in terms of asset-weighted performance. When evaluating fixed income, long-term government and long-term corporate funds were excluded because of their small sample size and consistent duration mismatch versus the available long-bond benchmarks.

Figure 2. The performance of actively managed mutual funds versus their prospectus

10 years

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	74%	79%	-2.26%
	Medium	53%	60%	-2.85%
	Small	24%	36%	0.31%
Non-Canadian equity	International equity	80%	82%	-1.37%
	U.S. equity	59%	67%	-1.15%
Fixed income	Intermediate	76%	80%	-1.07%
	Short	74%	77%	-1.16%

5 years

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	57%	65%	-1.65%
	Medium	34%	56%	0.16%
	Small	24%	41%	-0.09%
Non-Canadian equity	International equity	68%	73%	-1.58%
	U.S. equity	65%	75%	-2.80%
Fixed income	Intermediate	70%	75%	-0.80%
	Short	67%	73%	-1.15%

3 years

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	66%	70%	-1.89%
	Medium	27%	47%	0.98%
	Small	21%	30%	1.34%
Non-Canadian equity	International equity	58%	61%	-0.70%
	U.S. equity	64%	71%	-2.97%
Fixed income	Intermediate	77%	78%	-1.08%
	Short	57%	62%	-0.91%

1 year

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	31%	35%	0.25%
	Medium	21%	33%	3.06%
	Small	21%	24%	-0.08%
Non-Canadian equity	International equity	33%	35%	0.53%
	U.S. equity	53%	57%	-3.31%
Fixed income	Intermediate	31%	33%	0.11%
	Short	37%	40%	-0.48%

Notes: Because Morningstar does not report an excess return versus the prospectus benchmark for every fund in the database (due to the fund not reporting its benchmark to Morningstar or Morningstar not having access to the performance history), some funds with adequate performance history to calculate a return for the period are excluded from the analysis. Additionally, because it is unknown how many of the starting funds that did not survive the full period would have had adequate data to calculate an excess return versus the prospectus benchmark, it is possible that the survivorship adjusted percent underperforming numbers could be modestly inflated. Further, it's possible and even likely that much of these reporting discrepancies lessen over time if funds report their characteristics and statistics to Morningstar on a lag.

Sources: Vanguard calculations, using data from Morningstar, Inc and Thomson Reuters Datastream. Fund classifications provided by Morningstar; Benchmarks reflect those identified in each fund's prospectus. Data as of December 31, 2012.

The results show: Active managers underperformed their benchmarks

Figure 2 shows the relative performance of actively managed mutual funds when evaluated against the funds' benchmarks (as identified in each firm's fund prospectus) over the 1, 3, 5 and 10 years through December 31, 2012. For each period we show three results:

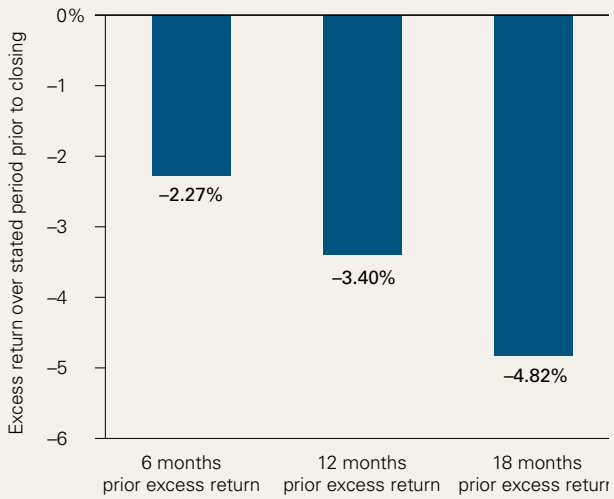
1. The percentage of funds in each category that survived the time period but underperformed their benchmarks and were unadjusted for "survivorship bias" (that is, the results do not reflect those funds that dropped out over time).
2. The percentage of funds in each category that started the given period but either underperformed or dropped out of the sample (thereby accounting for so-called survivorship bias—that is, the practice

Beyond the active/passive label—considerations in selecting funds

Schlanger and Philips (2013) discussed the importance of accounting for dead funds when evaluating the performance of various fund categories. The study found that: Surviving funds generally outperformed funds that were liquidated or merged; a significant majority of liquidated funds underperformed before closure; a significant majority of funds that were eventually merged underperformed before the merger; and a fund merger generally led to better relative performance compared with periods before the event, but the merged funds' performance still lagged their unmanaged benchmarks.

To test the assumption that closed funds underperformed over the time period evaluated in this paper, we analyzed the performance of all the funds identified by Morningstar as either being liquidated or merged into another fund. 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 3** presents the results. Clearly, a possible factor leading to the closure of these funds was relative underperformance.[4]

Figure 3. Impact of survivorship bias on performance results



Notes: Data reflect periods ended December 31, 2012. Excess returns are versus the style benchmarks noted in Figure 4. We show here the average excess return across any fund that was eliminated from the database for any reason.

Sources: Vanguard calculations, using data from Morningstar, Inc and Thomson Reuters Datastream.

of removing "dead" funds from a performance database—see the box "Impact of survivorship bias on performance results," for more on the importance of accounting for dead funds).

3. The annualized excess return for the median surviving fund.

Figure 2's major finding is that active fund managers as a group have underperformed their stated benchmarks across most of the fund categories and time periods considered. To take one example, 74% of Canadian large-cap equity funds underperformed their benchmarks over the ten years ended December 31, 2012. The case for indexing has been strong over shorter horizons, too, although shorter sample periods have tended to produce slightly more erratic results. We also show median annualized excess returns because to evaluate managers using solely the percentage underperforming assumes that a manager who underperforms by –10% has achieved a result as meaningful as one who underperforms by just –0.01%. Using again the example of Canadian large-cap equity funds at the ten-year horizon, the median surviving fund returned an annualized –2.26% less than the targeted benchmark. In fact, the median fund trailed its benchmark in the majority of fund categories and time horizons we examined.

4 These results corroborate previous studies on the impact of survivorship bias. Brown and Goetzmann (1995), for example, 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.

Figure 4. The performance of actively managed mutual funds versus a representative 'style benchmark'

10 years

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	87%	89%	-2.01%
	Medium	97%	98%	-5.92%
	Small	50%	58%	0.35%
Non-Canadian equity	International equity	86%	87%	-1.65%
	U.S. equity	72%	78%	-1.85%
Fixed income	Intermediate	91%	92%	-1.06%
	Short	97%	97%	-1.32%

5 years

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	54%	63%	-0.22%
	Medium	85%	90%	-3.89%
	Small	65%	72%	-2.38%
Non-Canadian equity	International equity	79%	82%	-1.77%
	U.S. equity	83%	88%	-3.18%
Fixed income	Intermediate	75%	79%	-0.58%
	Short	93%	94%	-1.05%

3 years

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	43%	49%	0.31%
	Medium	67%	75%	-1.53%
	Small	57%	62%	-1.25%
Non-Canadian equity	International equity	72%	74%	-1.05%
	U.S. equity	87%	89%	-3.29%
Fixed income	Intermediate	93%	93%	-1.03%
	Short	89%	90%	-0.95%

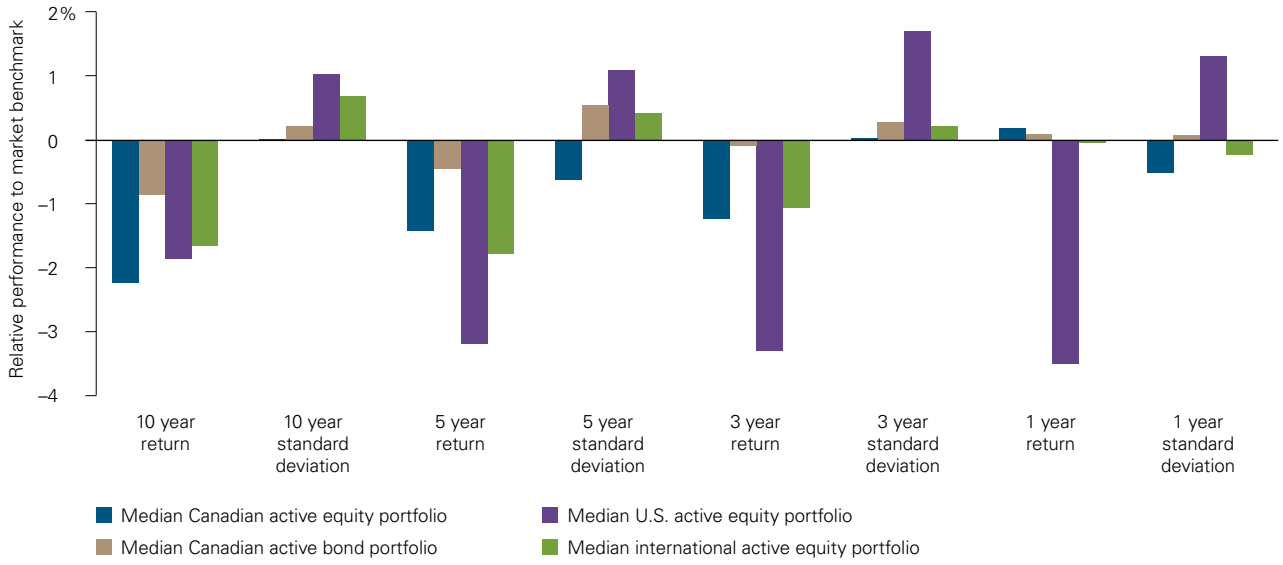
1 year

		Percentage underperforming		Median surviving fund excess return
		Unadjusted	Adjusted	
Canadian equity	Large	56%	59%	-0.38%
	Medium	35%	44%	3.42%
	Small	38%	40%	2.61%
Non-Canadian equity	International equity	50%	52%	-0.04%
	U.S. equity	82%	84%	-3.50%
Fixed income	Intermediate	38%	40%	0.30%
	Short	74%	75%	-0.46%

Notes: Data reflect periods ended December 31, 2012.
Sources: Vanguard calculations, using data from Morningstar, Inc. and Thomson Reuters Datastream. Equity benchmarks represented by the following indexes: Large —MSCI Canada Large-Cap Index; mid — MSCI Canada Mid-Cap Index; small — MSCI Canada Small-Cap Index. Non-Canadian equity benchmarks represented by the following indexes: International equity—MSCI EAFE Index; U.S. equity—MSCI USA Investable Market Index. Bond benchmarks represented by the following Barclays indexes: Intermediate — Barclays Global Aggregate Canadian Float Adjusted Bond Index; short — Barclays Global Aggregate Canadian Gov/Credit 1–5 year Float Adjusted Bond Index.

We attempted to account for survivorship bias in Figure 2 by identifying those funds that were alive at the start of each period but dropped out of the database at some point along the way. (See the box on page 7, and **Figure 3**.) If underperforming funds drop out of the database, this tends to exaggerate the proportion of active managers who outperform their chosen index—and is exactly what the empirical results seem to suggest. For example, in the case of Canadian large-cap equity funds, at the ten-year horizon, the adjustment for survivorship bias increases the proportion underperforming from 74% to 79%. Indeed, after accounting for this survivorship bias, the degree of underperformance is increased across all categories.

Figure 5. Portfolios of actively managed funds can lead to increased volatility



Notes: This illustration of hypothetical portfolios does not represent the returns on any particular investment. The Canadian equity portfolio was constructed by dividing the stock allocation into large-cap (75%), mid-cap (15%) and small-cap (10%), approximating the historical weights for the Canadian stock market (since 2001). The Canadian stock market is represented by the S&P/TSX Composite Index. The U.S. equity portfolio was compared to the MSCI USA IMI. The international equity portfolio was compared to the MSCI EAFE Index.The fixed income portfolio was constructed by dividing the Canadian bond market into short-term (25%), intermediate-term (45%) and long-term (30%) sectors. The Canadian bond market was represented by the Barclays Global Aggregate Canadian Float Adjusted Bond Index. All returns are in Canadian dollars.

Sources: Vanguard calculations, using data from Morningstar and Thomson Reuters Datastream.

Importance of benchmark selection

Comparing a fund's results with those of its designated benchmark provides perspective on how the fund has fared relative to its stated objective. However, this may not be so informative for investors interested in a fund from a particular market segment. This is because managers may in fact be using benchmarks that do not align with their fund's investment style. For example, a global manager may be comparing a fund to the S&P 500—a U.S. large-cap index—when an index that includes a global sampling of countries would be a more appropriate match. **Figure 4**, on page 8, assigns an appropriate "style benchmark" to each fund based on the fund's Morningstar category. For example, funds categorized by Morningstar as "large-cap" were compared against a large-capitalization Canada index and so on. In most cases, the perception of how the average manager performed differs from that conveyed by Figure 2.

These results highlighted several important findings. First, the relative underperformance of actively managed funds versus their style benchmarks 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, style and size within equities). Finally, and of particular interest, a majority of actively managed funds in so-called inefficient sectors such as small-cap stocks or international

Assessing investors' performance

Another way to evaluate the relative success of investors is to view performance results in terms of asset-weighted performance. In such a computation, larger funds account for a larger share of the results because they reflect a greater proportion of investors' assets. Relative to "equal weighting" or using a category's median fund, which may be large or small, asset weighting provides a clearer sense of how investors collectively performed. One caveat to such an approach, however, is that not all funds report asset values on a regular basis. To be included in our analysis, a fund had to have both monthly assets and monthly returns. As a result, the funds represented in **Figure 6** may not be the same as those shown in Figures 2 and 3. They still provided, however, a reasonable sample of funds across time periods and investment categories.

Figure 6. Asset-weighted performance gives additional perspective on how investors performed

	10 Year	5 Year	3 Year	1 Year
Canadian				
Large	-2.57%	-0.07%	-0.15%	-1.12%
Medium	-5.70%	-4.19%	-1.55%	3.51%
Small	-0.51%	-1.20%	-0.05%	7.01%
Non-Canadian equity				
International equity	-1.86%	-1.76%	-1.31%	-1.80%
U.S. equity	-2.23%	-3.28%	-2.84%	-3.69%
Fixed income				
Intermediate	-1.16%	-0.90%	-1.14%	0.03%
Short	-1.27%	-1.26%	-0.99%	-0.52%

Notes: See Figure 4 for performance benchmarks used. Data reflect periods as of December 31, 2012.
Sources: Vanguard calculations, using data from Morningstar, Inc. and Thomson Reuters Datastream.

stocks underperformed their benchmark, particularly when accounting for those funds that were closed. As mentioned earlier, a common myth is that actively managed funds have a leg up in market segments perceived as inefficient.

Implications for investors

While we have demonstrated the challenges of investing in actively managed funds with respect to outperformance, investors building portfolios of active funds may also be subject to higher volatility than a given benchmark. For example, **Figure 5**, on page 9, shows the median excess return and median excess volatility for portfolios of actively managed funds from Figure 4 relative to the market benchmark. In many cases the active portfolio had both lower returns and higher volatility than the market benchmark.

Although the median portfolio generally underperformed its indexes, investors do have the opportunity to select funds that rank in the upper half of all managers. Indeed, our analysis has so far shown that even over a relatively long period, some actively managed funds survived and outperformed their benchmarks. Including such outperformers in a portfolio is the primary objective of investors who use actively managed funds. And if we were to recreate Figure 5 using top-quartile-performing funds, the results would surely shift.

Can investors consistently pick winning funds?

Two critical questions for investors, therefore, are: "Do I have the ability to pick a winning fund in advance?" and "Will the winning fund continue to be so for the entire life of my portfolio?" In other words, can an investor expect to select a winner from the past that will then persistently outperform in the future? Academics have long studied whether past

Figure 7. Analyzing persistence of ranking in actively managed Canadian funds

Excess return rank 5-year ending December 2007	Quintile rank in subsequent non-overlapping 5-year period (% of funds) ending December 2012						
	Highest quintile	High	Medium	Low	Lowest quintile	Closed/ merged	Total
Highest quintile (1)	4%	15%	11%	24%	24%	24%	100%
High (2)	28%	19%	19%	15%	13%	7%	100%
Medium (3)	35%	15%	16%	11%	16%	7%	100%
Low (4)	9%	30%	38%	8%	9%	6%	100%
Lowest quintile (5)	23%	17%	11%	17%	17%	15%	100%

Notes: The first columns rank all active Canadian equity funds within each of the Morningstar-style categories based on their excess returns relative to their stated benchmarks during the period cited. The columns to the right, show how the funds in each quintile performed over the next five years.
Sources: Vanguard and Morningstar, Inc.

performance can accurately predict 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 both the well-known Fama-French three-factor model (that is, the influence of the equity market, fund size and fund 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 favour 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. (By the same token, see also our upcoming analysis in this paper of persistence among previously losing funds).

To analyze consistency among actively managed funds, we ranked all Canadian equity funds in terms of excess return versus their stated benchmarks over the five years ended 2007. We then divided the funds into quintiles, separating out the top 20% of funds, the next best performing 20% of funds, and so on. We then tracked their excess returns over the following five years (through December 2012) to check their performance consistency. If the funds in the top quintile displayed consistently superior excess returns, we would expect a significant majority to remain in the top 20%. A random outcome would result in about 20% of funds dispersed evenly across the five subsequent buckets (that is, if we ignore the possibility of a fund closing down).

Figure 7 shows the results for Canadian investors in Canadian equity funds. Shockingly, only 4% of the top funds (2 of 55) remained in the top 20% of all funds over the subsequent five-year period. Meanwhile an investor selecting a fund from the top 20% of all funds in 2007 stood a 72% chance of falling into the bottom 40% of all funds or seeing his or her fund disappear along the way. Indeed, we found that the percentage of highest-quintile active funds falling to the lowest quintile (24%) exceeded the probability that the funds would remain in the top quintile (4%) by a wide margin. Stated another way, of the 270 funds available to invest in 2007, only 2 (0.70%) achieved top-quintile excess returns over both the five years ended 2007 and the five years ended 2012.

Figure 8. Relative performance can be volatile over time and in shorter evaluation windows

Percent of funds underperforming benchmark over 5-year periods ended...

	2006	2007	2008	2009	2010	2011	2012
Large	80%	92%	88%	89%	77%	69%	54%
Mid	87%	91%	99%	100%	96%	94%	85%
Small	43%	60%	24%	57%	92%	74%	65%

Notes: See Figure 4, for benchmarks used for each Morningstar style box. Data reflect periods through December 31, 2012.
Sources: Vanguard calculations, using data from Morningstar and Thomson Reuters Datastream.

It is also interesting to examine the subsequent performance of those funds that were in the bottom quintile in 2007; interestingly only 15% liquidated or closed by 2012 while 17% remained in the bottom quintile. On the other hand, a surprising 40% managed to rebound to either of the top two quintiles. Indeed, performance was stronger for past losers than winners, although the probability of rebounding was still less than 50%.

This high turnover with respect to outperformance and market leadership is one reason the temptation to change managers because of poor performance can simply lead to more disappointment. For example, Goyal and Wahal (2008), in a well-reported study, found that when sponsors of U.S. institutional pension plans replaced underperforming managers with outperforming managers, the results were 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 over specific 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. **Figure 8** shows five-year evaluation windows for the Canadian equity style boxes. These shorter time windows reveal the presence of significant volatility. For example, the percentage of large-cap funds that underperformed the large-cap benchmark ranged from 92% for the five years ended 2007 to just 54% for the five years ended 2012.

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 small cap outperforms large cap by 300 basis points, and small cap stocks constitute 20% of a large cap manager's portfolio, the large cap manager would realize 60 basis points of excess return relative to the large cap benchmark, which could result in that manager outperforming the large cap benchmark. For a more in-depth analysis of the cyclicality of indexing, see the references at the end of this report, Philips and Kinniry (2009).

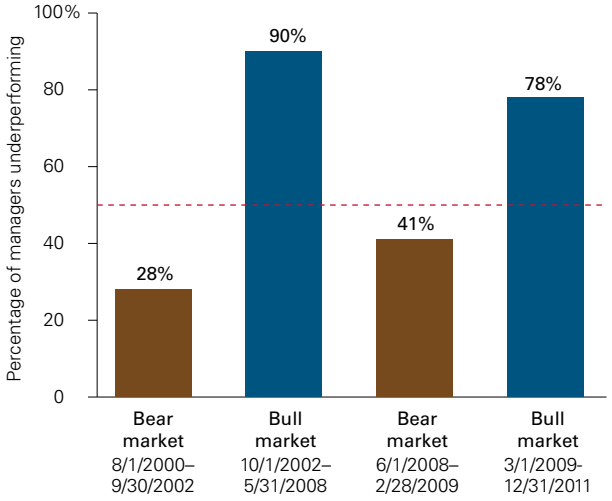
A second perspective with respect to market cycles is the performance of actively managed funds during bear markets. The common perception is that actively managed funds will outperform their benchmark in a bear market because, in theory, active managers can move into cash or rotate into defensive securities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

Among Canadian funds, the data suggests that a majority of active managers did indeed adjust their portfolios to avoid a portion of the two observed bear markets. However, the cost of this success was significant underperformance during the subsequent bull markets. The bull markets were much longer in duration than the bear markets, meaning that over full market cycles, the average actively managed fund underperformed despite their periodic success. Again, the inconsistency of results was apparent, underscoring that we should not assume that, compared with an "active" investor, an index investor is at an immediate disadvantage during a bear market, despite the opportunity for the active manager to add value. 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 previous figures in this paper demonstrates the challenges for long-term investors when choosing active management. For more on the challenges of outperforming during bear markets, see the references at the end of this report, Philips (2009) and Davis and Philips (2007).

Comparing performance of index and active funds

The results presented so far showing the average underperformance of actively managed funds would seem to be consistent with the theory of the zero-sum game explained earlier. Before costs, for every invested dollar that outperforms the market, there has to be a dollar that underperforms. But once costs are taken into account, more funds will inevitably undershoot their desired benchmark than overshoot. Moreover, the evidence shows that the population of actively managed funds that we have examined is unable to outperform the rest of the population of investors. Our earlier theoretical discussion also suggested that passive funds ought to be able to outperform actively managed funds if: (1) active funds are unable, on average, to outperform their chosen benchmarks after costs, and (2) passive funds have lower average costs. Having demonstrated the first thesis, we now turn to the second.

Figure 9. Percentage of managers underperforming market during bull and bear cycles



Sources: Vanguard calculations, using data from Morningstar, Inc., and Thomson Reuters Datastream.

Considerable evidence already exists that the odds of achieving a return that outperforms a majority of similar investors are increased if investors simply aim to seek 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.[5] 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 known in advance.

5 Alpha refers to a portfolio's risk-adjusted excess return versus its effective benchmark. Beta is 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).

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

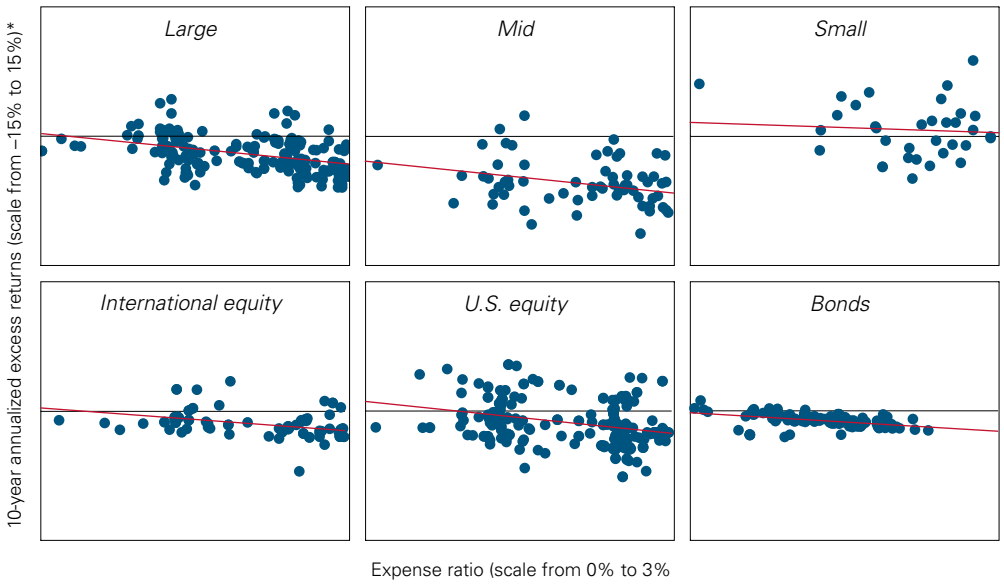
	Active funds	Index funds	ETFs
Canadian equity	2.22	0.85	0.21
International equity	2.07	1.10	0.53
U.S. equity	2.22	0.84	0.36
Fixed income	1.37	0.75	0.32

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

Figure 10, shows the average dollar-weighted expense ratios for actively managed equity and bond funds. As of December 31, 2012, investors in actively managed equity mutual funds were paying an average of approximately 2.22% annually, and those in actively managed bond funds were paying 1.37% annually, versus 0.85% and 0.75% for the respective index funds.

Figure 11 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

Figure 11. Inverse relationship between expenses and excess returns for all funds

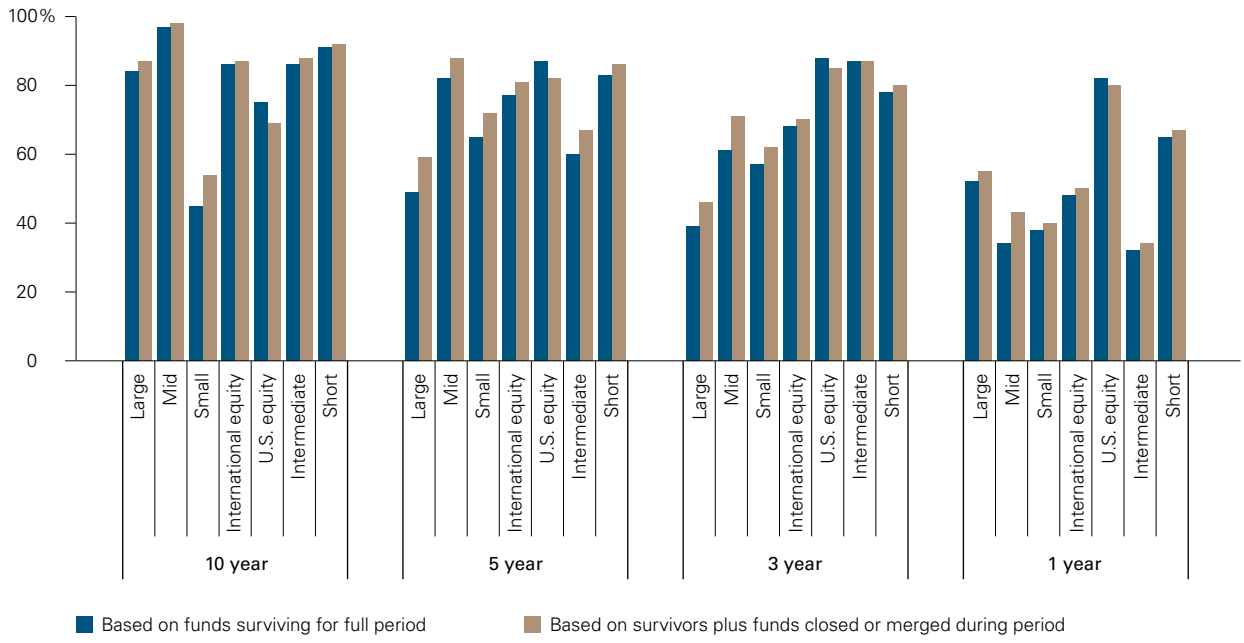


* Scales were standardized to show the relationship in the slopes relative to each other. Some funds' expense ratios and returns may plot beyond the scales; however, they remain influential on the trendline.

Notes: Each plotted point represents a fund within the specific size 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 Morningstar, Inc. and Thomson Reuters Datastream.

Figure 12. Percentage of active funds underperforming the average return of low-cost index funds



Notes: The actively managed funds are those listed in the respective Morningstar categories. Index funds are represented by funds with expense ratios of 20 basis points or less as of December 31, 2012. All returns used were for the investor class. Data reflect periods ended December 31, 2012.

Sources: Vanguard and Morningstar, Inc. Illustration is based on U.S. fund performance because the number of index funds in Canada was insufficient for a meaningful comparison.

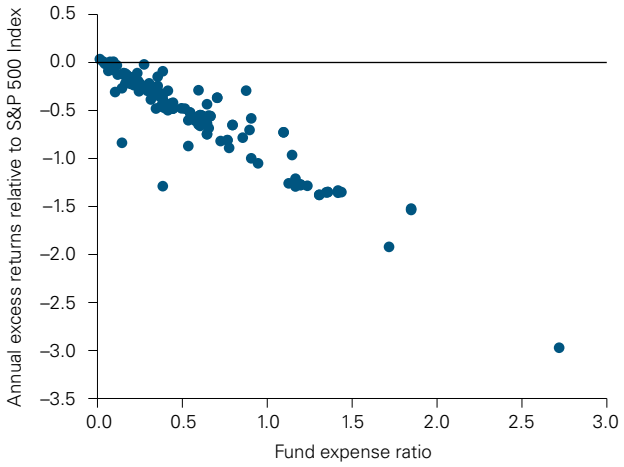
in which those excess returns relate to the fund's expenses. The red line in each style box represents the simple regression line and signifies the trend across all funds for each style box. Generally speaking, the results show that higher costs are associated with lower excess returns. For investors, 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 10 and 11 suggest that indexed strategies can provide 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[6] associated with the attempt to best a benchmark.

Figure 12 demonstrates the relative success of low-cost indexed strategies when compared to their higher-cost actively managed counterparts. For this analysis we were limited in our evaluations by the existence of both indexed and active funds within each market. Unfortunately, the record of indexed funds and ETFs is not as extensive in Canada as in the U.S. market. As a result, we utilized data from the U.S. market to illustrate the impact of investing in low cost index funds across several investment categories.

6 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 13. Relationship between expense ratio and excess returns for S&P 500 Index funds



Notes: Dataset represents index funds (all classes) with an objective of replicating the S&P 500 Index. Data cover ten years ended December 31, 2012.

Sources: Vanguard, using data from Morningstar, Inc.

In keeping with the zero-sum theory, a majority of actively managed funds underperformed the average low-cost index fund across investment categories and time periods. 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 degree 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.

It is important to note that we compared actively managed funds to low-cost indexed funds because when it comes to passive fund management, 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). 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 an indexed strategy's objective is to mimic a given benchmark as tightly as possible, we stated earlier that any significant deviations from a benchmark's return over time can potentially indicate inefficient management.[7] For index funds, a key driver of potential deviations is the expense incurred along the way to manage the portfolio. **Figure 13** performs a similar analysis as that in Figure 11, but focuses solely on those indexed strategies seeking to track the S&P 500 Index (again using U.S. fund data due to the lack of historical Canadian data). 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

7 Tracking error results from numerous causes, some of which may be 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.

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 4, 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.

Because turnover is much lower in an index fund, there is less opportunity to distribute capital gains. For example, the same 2010 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, the Lipper study (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.[8]

8 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.

Conclusion

Since its start in the U.S. in the early 1970s, indexing has grown rapidly in many countries 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 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 has been very rare. 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.

References

Barber, Brad M., and Terrance Odean, 1999. The Courage of Misguided Convictions: The Trading Behavior of Individual Investors. Financial Analysts Journal 55(6): 41–55.

Baron, Jonathan, 2000. *Thinking and Deciding*. New York: Cambridge University Press.

Brown, Stephen J., and William N. Goetzmann, 1995. Performance Persistence. *Journal of Finance* 50: 679–98.

Carhart, Mark M., 1997. On Persistence in Mutual Fund Performance. *Journal of Finance* 52(1): 57–82.

Carhart, Mark M., Jennifer N. Carpenter, Anthony W. Lynch, and David K. Musto, 2002. Mutual Fund Survivorship. *Review of Financial Studies* 15(5): 1439–63.

Davis, Joseph H., and Christopher B. Philips, 2007. *Defensive Equity Investing: Appealing Theory, Disappointing Reality*. Valley Forge, Pa.: The Vanguard Group.

Ennis, Richard M., and Michael D. Sebastian, 2002. The Small-Cap Alpha Myth. *Journal of Portfolio Management* 28(3): 11–16.

Evans, Richard E., and Burton G. Malkiel, 1999. *Earn More (Sleep Better): The Index Fund Solution*. New York: Simon & Schuster.

Fama, Eugene F., and Kenneth R. French, 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics* 33(1): 3–56.

Fama, Eugene F., and Kenneth R. French, 2010. Luck Versus Skill in the Cross-Section of Mutual Fund Returns. *Journal of Finance* 65(5): 1915–47.

Financial Research Corporation, 2002. *Predicting Mutual Fund Performance II: After the Bear*. Boston: Financial Research Corporation.

Goyal, Amit, and Sunil Wahal, 2008. The Selection and Termination of Investment Management Firms by Plan Sponsors. *Journal of Finance* 63(4): 1841, Table 10.

Investment Company Institute, 2001. *Frequently Asked Questions About Shareholder Response to Market Volatility*. Washington, D.C.: Investment Company Institute, Sept. 18; available at www.ici.org.

Investment Company Institute, 2010. *2010 Investment Company Factbook*, 50th ed. Washington, D.C.: Investment Company Institute.

Jensen, Michael C., 1968. The Performance of Mutual Funds in the Period 1945–1964. Papers and Proceedings of the Twenty-Sixth Annual Meeting of the American Finance Association. Washington, D.C., 28–30 December 1967. Also *Journal of Finance* 23(2): 389–416.

McGuigan, Thomas P., 2006. The Difficulty of Selecting Superior Mutual Fund Performance. *Journal of Financial Planning* 19(2): n.p.

Malkiel, Burton G., 1995. Returns From Investing in Equity Mutual Funds, 1971 to 1991. *Journal of Finance* 50 (2, June): 549–72.

Malkiel, Burton G., 2004. Can Predictable Patterns in Market Returns Be Exploited Using Real Money? *Journal of Portfolio Management* (30th Anniversary Issue): 131– 41.

Malkiel, Burton G., and Aleksander Radisich, 2001. The Growth of Index Funds and the Pricing of Equity Securities. *Journal of Portfolio Management* 27(2): 9–21.

Philips, Christopher B., 2009. *The Active-Passive Debate: Bear Market Performance*. Valley Forge, Pa.: The Vanguard Group.

Philips, Christopher B., 2010. *The Case for Indexing: European and Offshore-Domiciled Funds*. Valley Forge, Pa.: The Vanguard Group.

Philips, Christopher B., and Francis M. Kinniry Jr., 2009. *The Active-Passive Debate: Market Cyclicality and Leadership Volatility*. Valley Forge, Pa.: The Vanguard Group.

Philips, Christopher B., and Francis M. Kinniry Jr., 2010. *Mutual Fund Ratings and Future Performance*. Valley Forge, Pa.: The Vanguard Group.

Philips, Christopher B. and Francis M. Kinniry Jr., 2012. *Determining the Appropriate Benchmark: A Review of Major Market Indexes*. Valley Forge, Pa.: The Vanguard Group.

Philips, Christopher B., Francis M. Kinniry Jr., David J. Walker, and Charles J. Thomas, 2011. *A Review of Alternative Approaches to Equity Indexing*. Valley Forge, Pa.: The Vanguard Group.

Sauter, Gus, 2002. Index Rex: The Ideal Index Construction. *Journal of Indexes*, 2d. quarter; available at www.journalofindexes.com/contents.php?id=12.

Schlanger, Todd, and Christopher B. Philips, 2013. *The Mutual Fund Graveyard: An Analysis of Dead Funds*. Valley Forge, Pa.: The Vanguard Group.

Sharpe, William F., 1966. Mutual Fund Performance. *Journal of Business* 39 (1, Part 2: Supplement on Security Prices): 119–38.

Sharpe, William F., 1991. The Arithmetic of Active Management. *Financial Analysts Journal* 47(1): 7–9.

Thomas, Charles J., and Donald G. Bennyhoff, 2012. *A Review of Alternative Approaches to Fixed Income Indexing*. Valley Forge, Pa.: The Vanguard Group.

Thomson Reuters, 2010. *Taxes in the Mutual Fund Industry—2010*. Lipper Research Study, by Tom Rosen. Denver: Thomson Reuters Co.

Wallick, Daniel W., Neeraj Bhatia, Andrew S. Clarke, and Raphael A. Stern, 2011. *Shopping for Alpha: You Get What You Don't Pay For*. Valley Forge, Pa.: The Vanguard Group.

Waring, M. Barton, and Laurence B. Siegel, 2005. Debunking Some Myths of Active Management. *Journal of Investing* (Summer): 20–28.

To Canadian resident investors: Vanguard Investments Canada Inc. issues this report for informational and educational purposes only. Vanguard Investments Canada Inc. accepts responsibility for the contents subject to the terms and conditions stated herein. All references in this report to "Vanguard" are to our parent company The Vanguard Group, Inc. This report does not necessarily represent any product or service by Vanguard Investments Canada Inc. It should be noted that certain information is written in the context of the U.S. market and contain data and analysis specific to the U.S. This report was originally published by The Vanguard Group, Inc. in May 2013. The first date of use by Vanguard Investments Canada Inc. is May 6, 2013.

Commissions, management fees and expenses all may be associated with the Vanguard ETFs™. This offering is only made by prospectus. Copies are available from Vanguard Investments Canada Inc. at www.vanguardcanada.ca. Investment objectives, risks, fees, expenses, and other important information are contained in the prospectus; read it before investing. ETFs are not guaranteed, their values change frequently, and past performance may not be repeated.

Vanguard ETFs are managed by Vanguard Investments Canada Inc., an indirect wholly-owned subsidiary of The Vanguard Group, Inc. Vanguard ETFs are available across Canada. Vanguard ETFs are traded on TSX and individual investors must buy or sell Vanguard ETFs in the secondary market with the assistance of a registered investment dealer. When buying or selling an ETF, individual investors will pay or receive the current market price, which may be more or less than net asset value.

The views and opinions of the individual strategists are as of the original publication date, are subject to change and may not necessarily represent the views of The Vanguard Group Inc.'s portfolio management teams and/or Vanguard Investments Canada Inc. The individual strategists may not necessarily update or supplement their views and opinions whether as a result of new information, changing circumstances, future events or otherwise. No implied or express recommendation, offer, or solicitation to buy or sell any ETFs or to adopt any particular investment or portfolio strategy is made in this material. This report is not investment and/or tax advice and it is not tailored to the needs or circumstances of individual investors.

The studies and examples in this report are designed for illustrative purposes only. These hypothetical case studies and examples do not depict actual performance, are calculated with the benefit of hindsight and reflect the reinvestment of distributions and dividends, but do not reflect sales fees, redemption fees, distribution expenses, optional charges or income taxes which would have reduced returns. The performance of an index or fund-group average is not an exact representation of any particular investment as you cannot invest directly in an index or fund group average. The index returns do not reflect the deduction of any management fees or brokerage fees which would have reduced total returns. No representation is made regarding the advisability of investing in third-party products that utilize the indices mentioned herein.

This information has been compiled from proprietary and non-proprietary sources believed to be reliable, but no representation or warranty, express or implied, is made by The Vanguard Group, Inc., its subsidiaries or affiliates, or any other person (collectively "The Vanguard Group") as to its accuracy, completeness, timeliness or reliability. The Vanguard Group takes no responsibility for any errors and omissions contained herein and accepts no liability whatsoever for any loss arising from any use of, or reliance on, this report.

The information contained in this publication does not constitute an offer or solicitation and may not be treated as an offer or solicitation in any jurisdiction where such an offer or solicitation is against the law, or to anyone to whom it is unlawful to make such an offer or solicitation, or if the person making the offer or solicitation is not qualified to do so.

CFA® is a trademark owned by CFA Institute.

ICRCFIC 052013