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Considerations for index fund investing

- In this piece and its companion, *Considerations for Active Fund Investing*, we aim to provide foundational implementation considerations for investors to include in the decision to use index or active strategies in gaining exposure to a chosen market segment.
- Such foundational implementation considerations should be accounted for by both index and active fund investors, particularly given the ongoing convergence in the applications of both strategies.
- Incorporating considerations outlined in this paper into a sound and rigorous decision framework regarding the inclusion of index funds in your investment plan can strengthen your conviction in—and can increase—your chances of investment success.

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Index fund investing and active fund investing: Two sides of the same coin

Considerations for Index Fund Investing is an introductory piece for those considering investing in index funds.

The framework in this paper assumes that an investor seeks exposure to a specific market segment and aims to provide introductory concepts to consider when implementing the exposure with an index fund.[1] Investors can also use such concepts when implementing exposure to a market segment with an active fund.[2] The decision of how to incorporate index and active strategies in an investment plan should not be viewed as active versus index. We view the framework in this paper and the one in its companion paper, *Considerations for Active Fund Investing*, as two sides of the same coin.

This piece aims to provide a starting point to help investors assess the use of index funds to gain exposure to a market segment. It should be viewed as a foundation on which investors can build more advanced and detailed concepts, notably those related to portfolio construction.

To highlight this, we use a framework developed in *Vanguard's Principles for Investing Success* that details the benefits of incorporating goals, balance, cost, and discipline into investment planning.[3]

In that regard, successful index fund investing:

Focuses on the **goal** of relative performance predictability.

Provides **balance** of risk and return by diversifying across the entire market segment.

Minimizes **cost**, an enduring determinant of performance.

Encourages **discipline** that helps investors increase the likelihood of investment success.

1 Market segments can be defined as broadly, such as equities and bonds, or as narrowly, such as industries, as investors choose. This paper, for data availability and consistency purposes, focuses on equity and fixed income funds available for sale and invested domestically. However, the perspectives and results discussed here hold for nondomestic funds as well.

2 See the framework for incorporating both index and actively managed mutual funds in a portfolio containing multiple market segments in Vanguard's proprietary work by Aliaga-Díaz et al. (2019). Also see Plagge, Wang, and Rowley (2022) for a discussion of the increasingly similar application of index and active strategies in portfolio construction.

3 See Vanguard (2023).

Focusing on the goal of relative return predictability

We start with the assumption that an investor desires exposure to a specific market segment, such as domestic equity or fixed income markets. Index fund investing stems from a preference for relative return predictability.[4] This preference may be driven by investors' aversion to the uncertainty of relative performance in active funds or a lack of conviction in their ability to predict outperformance.[5]

When choosing index fund or active fund investing, the primary tradeoff is between relative return predictability and the opportunity for outperformance. To fully understand this tradeoff, it is important to understand the zero-sum game theory (Sharpe, 1991) and the critical role that costs plays in determining outcomes.

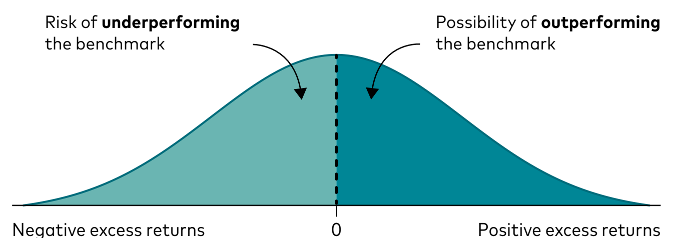
The zero-sum game theory states that at any given time, a market segment consists of the cumulative holdings of all market participants and that the aggregate return on the market segment is equal to the asset-weighted return of all market participants. Because the market return represents the average return of all invested dollars, for each dollar that outperforms the market segment, there must be one that underperforms by the same amount. Therefore, the excess return of all invested assets equals zero.

Before costs, this results in a bell curve of outcomes centered around zero (**Figure 1**). Accounting for costs will then pull outcomes to the left, such that a fund with zero excess returns before costs will have negative excess returns after costs. This relationship holds on average for any market segment across the sum of all invested assets over a given period.[6]

FIGURE 1

For every action, there is an equal and opposite reaction

Markets are a zero-sum game before costs



Notes: The bell curve consists of stylized data illustrating the theoretical distribution of the excess returns of all invested assets in a market segment. It is centered at zero because of the zero-sum game.

Source: Vanguard.

4 All investing is subject to risk. *Relative return predictability* refers to the ability and goal of an index fund to track a benchmark and thus be predictable with regard to the benchmark's expected return, not to the frequency or magnitude of positive or negative returns. This can be thought of as market (systematic risk). Active funds' goal of outperforming a stated benchmark implies greater variability of returns compared with those of the benchmark and results in active (idiosyncratic) risk, which can be thought of as additive with regard to market (systematic) risk.

5 For a broader consideration of risk preferences, see Patterson, Lawrence, and Ertl (2024). Also see Grinold (1989) for a discussion of the importance of conviction in the active management decision.

6 Investors holding these assets would include, but would not be limited to, open-end fund managers, from which the bulk of the data in this report are pulled; closed-end fund managers; individual investors; hedge funds; and other institutional investors that buy and sell assets included in the benchmark representing the market segment.

Because investors choose a fund to gain exposure to a market segment, index fund investing seeks to minimize variation from the benchmark of the market segment and lock in performance close to the center of the zero-sum distribution.

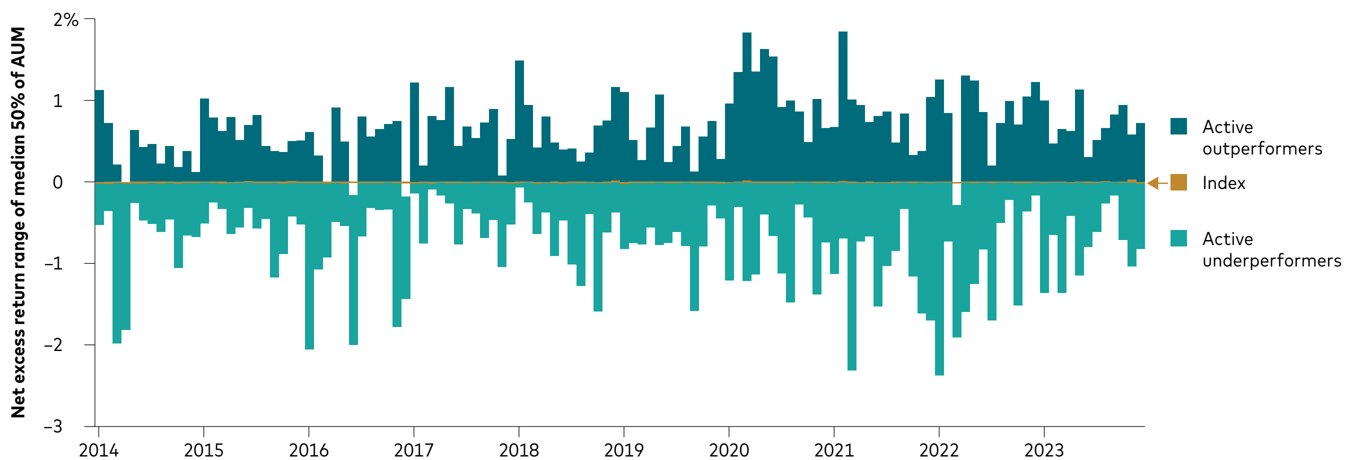
Figure 2 shows that index funds achieved greater relative performance predictability compared with active funds over a 10-year period. The range of outcomes experienced by investors in U.S. active equity funds is much wider than that of index funds. Although the fraction of actively managed assets outperforming the benchmark varies from month to month, the monthly performance is widely dispersed around the benchmark, with the average index and active fund slightly underperforming the benchmark after costs.

Index fund performance is concentrated in a narrow band around the benchmark. Therefore, an investor looking for relative performance predictability in a market segment can achieve that objective with minimal further oversight in an index fund.[7]

FIGURE 2

Index fund investing exhibits greater relative performance predictability

Active funds experience a wider range of outcomes



Notes: The chart displays the assets under management (AUM)-weighted interquartile range (25th to 75th percentile) of monthly net excess returns of active and index U.S. equity funds available for sale in the United States relative to their primary prospectus benchmark for the 10 years ended December 31, 2023. See the Appendix on page 13 for fund inclusion criteria.

Sources: Vanguard calculations, based on data from Morningstar, Inc.

7 Investors or fund managers cannot invest directly in a benchmark. An index fund possesses implementation costs and frictions such as expense ratios and transaction costs, which are reflected by the narrow, nonzero bars for index funds in Figure 2.

Providing balance by diversifying across the entire market segment

Increased relative return predictability is a natural consequence of index fund strategies that increase the number of holdings to maximize exposure to individual stock opportunities within a market segment.

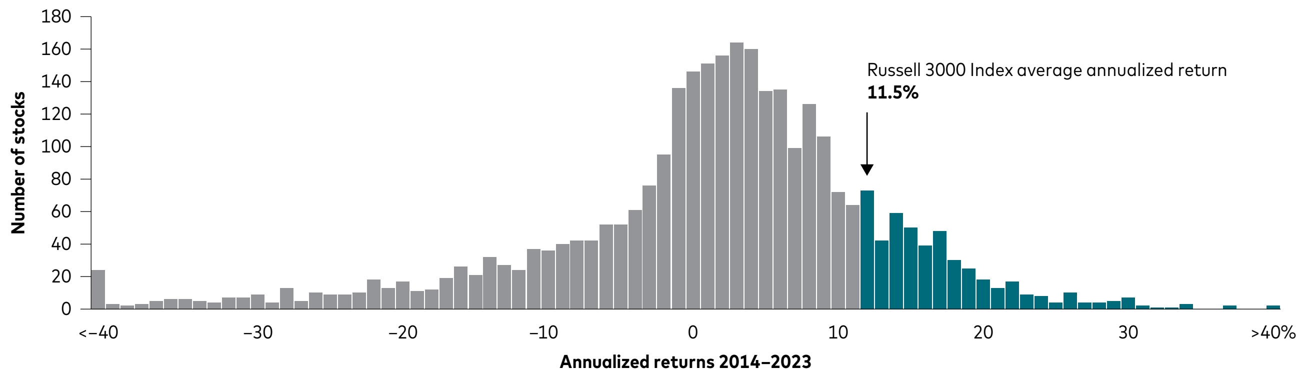
If an investor's goal is to replicate rather than outperform the returns of a market segment, the best way to achieve this is by investing in the broadest cap-weighted strategy that most closely resembles the overall market segment—typically a broad-market index fund.[8]

The importance of broad diversification is further underscored by comparing the long-term performance of securities in a benchmark index against the aggregate index performance. **Figure 3** shows the performance of constituent stocks in the Russell 3000 Index from 2014 to 2023; only a small fraction (17%) outperform the benchmark. During this period, the Russell 3000 Index returned 11.5%, which beat both the mean (+1.8%) and median (+3.2%) return of individual stocks in the index. Unless investors have high conviction for a well-performing actively managed strategy, beating the index return with a subset of stocks is challenging. By owning a broad-based index fund that holds as many securities in a market segment as possible, investors capture the full exposure to that segment.

FIGURE 3

A minority of stocks outperform their benchmarks over the last decade

Broad-market index investing diversifies opportunities



Notes: The chart shows the distribution of annualized returns for stock constituents of the Russell 3000 Index in U.S. dollars as of January 31, 2014. Performance shown is for January 1, 2014, through December 31, 2023, with reinvestment of all dividends. Overlaid is the index's total return performance for the same period. **Past performance is no guarantee of future results. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.**

Sources: Vanguard calculations, based on data from Rimes.

8 See Markowitz (1952).

Minimizing costs: An enduring determinant of performance

Investors are subject to costs that include but are not limited to expense ratios, transaction costs, and, where applicable, taxes—all of which can be a significant drag on net returns over time.[9] Costs shift the distribution of the theoretical zero-sum game, as well as those distributions in **Figure 4**, to the left for both index and active funds. Figure 4a and Figure 4b show that the distribution of monthly net-of-cost performance of all assets invested in U.S. equity and fixed income funds over the 10 years ended December 31, 2023, is indeed centered roughly near zero for both index and active funds. For equity funds, asset-weighted mean returns are −5.9 basis points (bps) for active funds and −0.6 bps for index funds. (A basis point is one-hundredth of a percentage point.) For fixed income funds, asset-weighted mean returns are 0.9 bps for active funds and −0.9 bps for index funds.

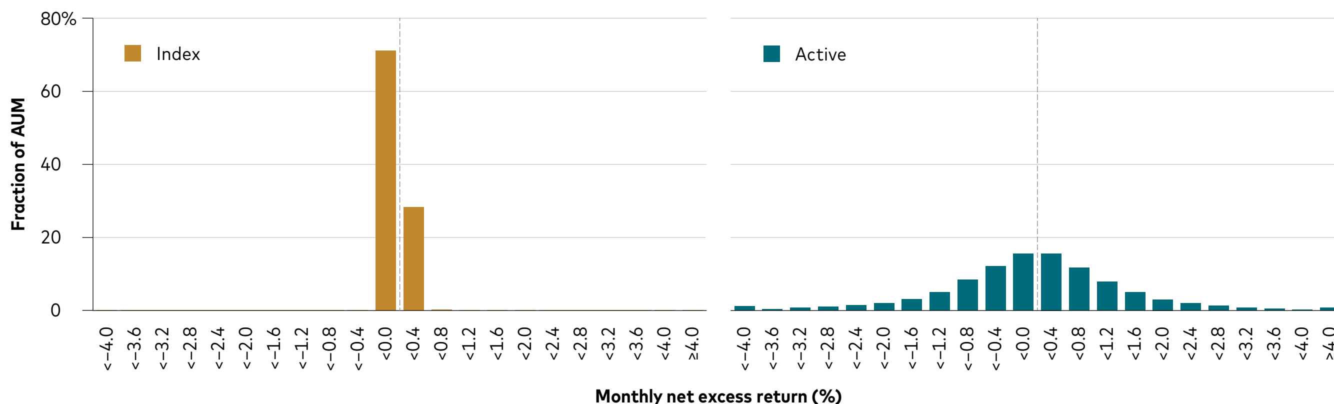
After expense ratios are deducted, actively managed dollars exhibit a bell curve of returns spread over a wider range of performance. This highlights the higher relative performance predictability of index funds as well as the opportunity for outperformance and risk of underperformance associated with active funds that we addressed in Figure 2. Equity excess returns have a wider distribution than fixed income excess returns, given their reliance on capital appreciation rather than income.

9 *Net* refers to performance after costs are considered. All figures in this paper refer to net performance unless otherwise noted.

FIGURE 4

Costs represent a persistent hurdle in winning the zero-sum game

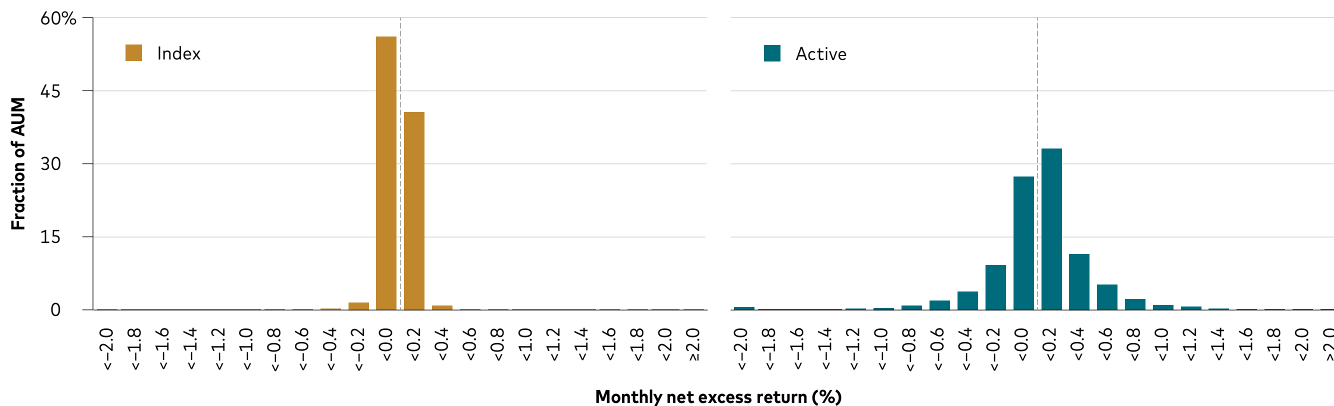
a. Equity fund performance follows the zero-sum game



Notes: The chart displays the AUM-weighted distribution of the monthly net excess returns of active and index equity funds relative to their primary prospectus benchmark in U.S. dollars for the 10 years ended December 31, 2023. AUM weights are updated for each month during the 10-year period based on live funds at the start of the month. See the Appendix for fund inclusion criteria. **Past performance is no guarantee of future results.**

Sources: Vanguard calculations, based on data from Morningstar, Inc.

b. Fixed income fund performance (almost) follows the zero-sum game



Notes: The chart displays the AUM-weighted distribution of the monthly net excess returns of active and index fixed income funds relative to their primary prospectus benchmark in U.S. dollars for the 10 years ended December 31, 2023. AUM weights are updated for each month during the 10-year period based on live funds at the start of the month. See the Appendix for fund inclusion criteria. **Past performance is no guarantee of future results.**

Sources: Vanguard calculations, based on data from Morningstar, Inc.

Index funds have a much narrower range of relative performance than active funds—centered close to zero. The relative performance predictability because of the funds' close tracking of the benchmark index, along with their lower costs, results in performance close to that of the target benchmark index. These results show that the zero-sum game holds for funds investing in U.S. equities; however, the pattern of fund returns centered near zero holds true across other market segments, such as small-cap, global, and emerging markets equities.

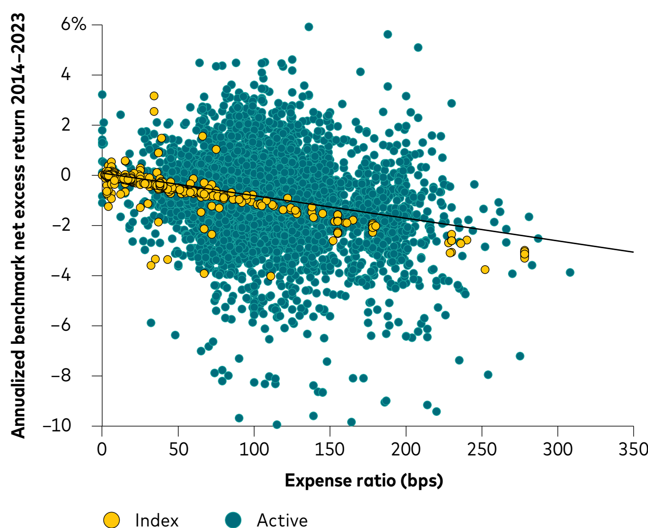
The consistent performance of index funds allows investors to simplify their goal setting by focusing on an asset allocation mix that aligns with the overall return expectations of their investment objectives.

Not only are costs responsible for the average underperformance of funds, but higher costs also exhibit an association with fund underperformance. **Figure 5** shows the negative relationship between expenses and performance for U.S. equity and fixed income funds. For both index and active funds, higher costs do not result in higher excess returns.

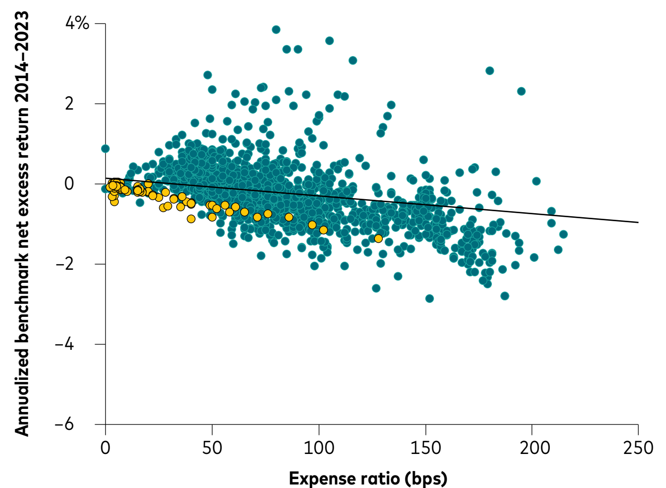
FIGURE 5

Higher costs are associated with diminished fund performance

Equity funds



Fixed income funds



Notes: The chart displays the distribution of the expense ratio (as of year-end 2023) and net returns in excess of a fund's prospectus benchmark in U.S. dollars for active and index equity and fixed income funds within the inclusion criteria specified in the Appendix over the period January 1, 2014, through December 31, 2023. The trend line results from a regression of excess returns on expense ratios, weighting the observations using net assets as of December 31, 2013. Basis points (bps) are one-hundredth of a percentage point. **Past performance is no guarantee of future results.**

Sources: Vanguard calculations, based on data from Morningstar, Inc.

With index funds consistently presenting lower expense ratios than active funds (6 bps versus 65 bps for the median dollar invested in equity funds; 4 bps versus 40 bps for the median dollar invested in fixed income funds), indexing lowers the magnitude of underperformance.

It is also important to understand how turnover and taxes can affect the cost of ownership.[10] Investors subject to capital gains taxes need to pay close attention to fund activity and the risk that realized gains in the portfolio reduce the retained after-tax return. Asset turnover in a portfolio is a big source of capital gains, as shown in **Figure 6**. Index funds, by construction, are typically lower turnover, allowing for retention of a significantly larger fraction of pre-tax returns.[11]

FIGURE 6

High turnover erodes after-tax performance

Index funds have lower turnover, resulting in greater after-tax return retention

Notes: The chart shows the relationship between fund-level turnover ratios on a logarithmic scale and fund-level asset-weighted after-tax retention ratios for index and active U.S. equity mutual funds. Turnover ratio is the median five-year annual turnover. Asset-weighted after-tax retention ratios are trailing five-year annualized after-tax retention ratios for each fund, weighted by the proportion of the average monthly AUM of each share class over the five-year period relative to the total fund-level average AUM over the same period. Data cover December 31, 2018, through December 31, 2023. The dependent variable is the five-year annualized after-tax retention ratio, which we define as ([1 + trailing five-year annualized post-tax return] / [1 + trailing five-year annualized pre-tax return]) and represents the annual percentage of pre-tax assets—that is, end-of-period wealth—that an investor retains after paying taxes on fund distributions during the given period. Post-tax returns assume the U.S. highest federal income tax bracket at the time of each distribution of income or capital gains. State and local income taxes are not reflected in the calculations. Post-tax distributions are assumed to be reinvested, and post-tax returns are adjusted for loads and fees, including deferred loads or redemption fees. We use portfolio turnover ratio as the independent variable, which is calculated by taking the lesser of purchases or sales and dividing it by average monthly net assets. See the Appendix for fund inclusion criteria. **Past performance is no guarantee of future results.**

Sources: Vanguard, based on data from Morningstar, Inc.

10 See Dickson (2024) for a discussion of the impact of taxes specifically and costs generally. The implementation of strategies, whether index or active, also results in transaction costs, which are not directly factored into the expense ratio for a fund but which do affect fund performance. An example would be bid/ask spreads. One of the skills associated with index and active fund managers is the ability to minimize the impact of such costs on performance.

11 A small subset of funds shown in Figure 6 have turnover significantly in excess of 100% per annum. While identified as index funds, these funds either have a mandate to track a benchmark that requires significant turnover to follow or leverage derivatives to reduce tracking error. In these instances, increased turnover can lead to increased capital gains, which are typically taxable. We include these funds for completeness.

Encouraging discipline to help investors drive investment success

For investors who have identified a suitable index or active fund strategy, the final principle for investing success is *discipline*. If an investor has identified a low-cost index fund that closely tracks the desired market segment, the fund can be held long term (or until there is a change in goals). This simplicity naturally encourages sound investing discipline.

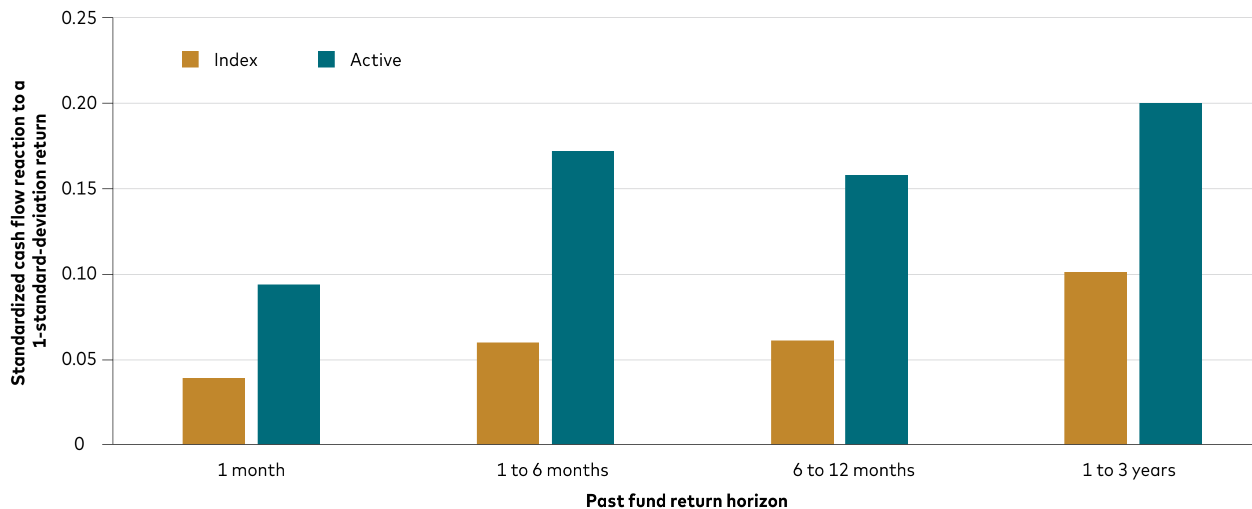
Building discipline into an investment plan is important because many investors react to past fund performance. **Figure 7** highlights investors' reaction, as measured through their cash flows, to the past performance of funds, with outflows following negative returns and inflows following positive returns. This reactive behavior is more than twice as strong in active fund investors than it is in index fund investors over multiple short-term horizons.

The desire to make changes can be particularly problematic for active fund investors. Tidmore and Hon (2021) estimate that more than half of funds outperforming over a 10-year period experienced a drawdown lasting up to four years. Based on the above analysis, many investors lack the necessary patience to thrive in an active fund, making the simplicity of indexing more appealing.

FIGURE 7

Reactions to short-term returns can undermine an investment strategy

Index fund investors are less likely than active fund investors to trade based on past fund performance



Notes: The chart shows the coefficients from a regression of monthly normalized cash flows on fund returns over the previous 1 month, 1 to 6 months, 6 to 12 months, and 1 to 3 years for U.S. equity index and active mutual funds from January 1, 2003, through December 31, 2022. A coefficient of 1 represents a single standard deviation move in the normalized cash flows of investors in a fund based on a 1-standard-deviation move in the underlying return. All coefficients are significant at the 1% level. Regression controls for the fund's investment style, age, expense ratio, and tracking error, as well as the overall volatility and the previous month's performance of the Standard & Poor's 500 Index. **Past performance is no guarantee of future results.**

Sources: Vanguard calculations, based on data from Morningstar, Inc.

Index fund investing does require that investors stick with the discipline of their investment strategy. Timing exposure to an index fund with the hope of outperforming the market segment is a tempting deviation from investment goals that often leads to underperformance, as shown in **Figure 8**. Investors who sell their exposure to the Russell 3000 Index the day after a 5%, 10%, or 20% drawdown experience a significant drag on long-term performance.[12] Investors cannot get into or out of positions at the exact time the return crosses a drawdown threshold; the resulting slippage can significantly curtail cumulative performance over the course of an investment life cycle.

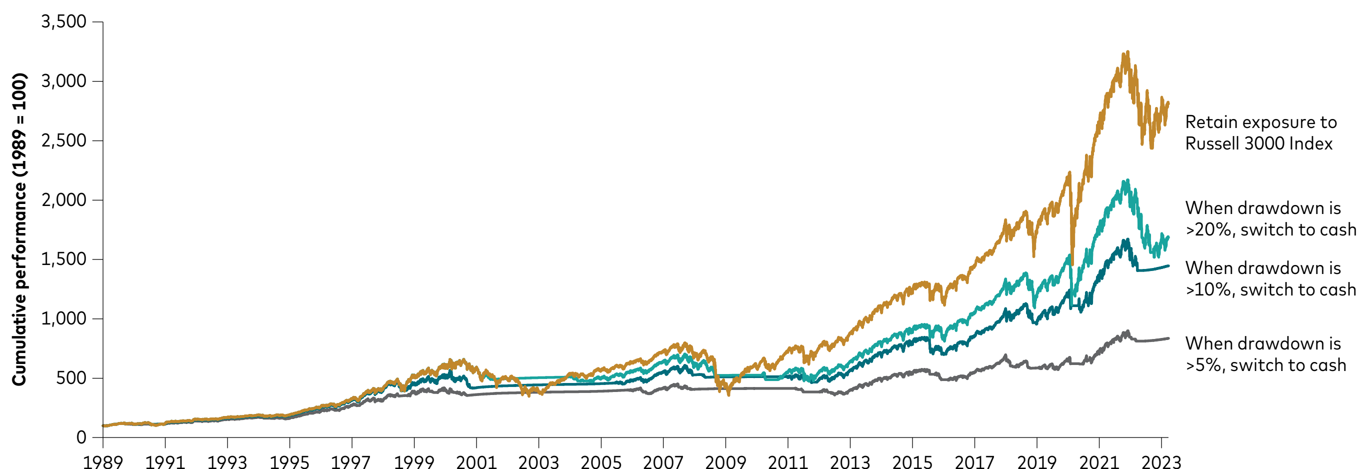
We believe that investors' discipline to stick with their decisions is a product of the rigor of the decision process itself and the conviction that it generates in their ability to successfully navigate market environments over their investment horizon.[13] The path to investment success is bumpy and can be paved with deep and prolonged periods of negative returns. But for investors with conviction in their investment plan and a willingness to endure the associated risks, index fund investing plays an important role in a well-designed investment plan.

We hope that the reflections shared in this paper and its companion, *Considerations for Active Fund Investing*, provide a solid base on which investors can build a sound and rigorous decision framework for strategically selecting funds to provide exposure to a desired market segment. Areas of our future research may include perspectives on the impact of asset location, metrics that measure and decompose portfolio performance, the ongoing review of an investment plan, and the impact of investor-specific goals and investment horizons on the active or index investment decision.

FIGURE 8

Poor timing can undermine a virtuoso performance

The slippage that comes from trying to limit drawdowns can erode performance



Notes: The chart shows the performance of the Russell 3000 Index and various market-timing strategies based on the index from January 1, 1989, through December 31, 2023. Timing strategies track drawdowns from the previous peak and remain in cash as long as the cumulative drawdown is below a threshold. Timing of entry and exit is assumed to occur at the close of the following business day. Cash is represented by the Bloomberg U.S. Treasury 1–3 Month Treasury Bill Index. Returns are in nominal terms. **Past performance is no guarantee of future results. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.**

Sources: Vanguard calculations, based on data from Rimes.

12 We define a drawdown as the cumulative underperformance from the previous peak value of the index.

13 For further discussion of the incorporation of conviction in investment and portfolio decisions, see Black and Litterman (1992).

Conclusion: Achieving investing success with index funds

Index fund investing provides a straightforward alignment with investment goals, especially for those who seek to maximize relative performance predictability or those who might benefit from the simple discipline of staying the course.

Investing in low-cost index funds that track a market segment provides a framework that can help investors achieve their goals. Index funds focus on the goal of relative performance predictability, diversify across the entire market segment, minimize costs, and make it easier to instill discipline into the investment process.

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Appendix

Fund inclusion criteria

For analyses discussed in this paper and conducted at the fund level, funds are included if they are available for sale in the United States, report sufficient data, and are categorized by Morningstar in the following categories:

U.S. equity fund categories

- Large Blend
- Large Growth
- Large Value
- Mid-Cap Blend
- Mid-Cap Growth
- Mid-Cap Value
- Small Blend
- Small Growth
- Small Value

U.S. fixed income fund categories

- Long Government
- Short Government
- High-Yield Bond
- Intermediate Core Bond
- Intermediate Core-Plus Bond
- Intermediate Government
- Long-Term Bond
- Short-Term Bond

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