



A framework for institutional portfolio construction

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- Institutional investors around the globe typically pursue one of four investment objectives: total return, absolute return, liability-driven investment (LDI), or principal protection.
- They also generally choose from among four investment approaches: market-capitalization-weighted exposures, static tilts, traditional active management,¹ and alternative investments. Together, market-cap-weighted exposures and static tilts create an investor's strategic asset allocation, the crucial driver of portfolio returns.
- This paper examines the investment objectives and approaches investors can use to build their portfolios. The right solution is the intersection of the organizational objective(s) and the appropriate approach given an investor's unique circumstances, expertise, resources, time horizon, and tolerance for different types of risks.

¹ We define traditional active management as public long-term-only active management.

Portfolio development is a three-step process. The first step is to set an investment objective commensurate with the organization's goals.² The second is to build a portfolio based on the principles of asset allocation, taking into consideration additional strategies such as static tilts, active management, and alternative investments if they align with the organization's risk tolerance and can be implemented effectively. The third step is to execute and maintain the portfolio with discipline and consideration for low cost. **Figure 1** illustrates this process.

Setting the objective

Institutional investors ranging from endowments and foundations to pensions, insurers, governmental entities, and corporations generally share the core goal of maximizing returns. But the risks this is weighted against can vary widely.

Prominent among these risks are the needs to minimize a certain type of risk, maintain liquidity, and achieve a specific spending requirement or fulfill financial

obligations. These potentially competing constraints usually lead institutional investors to pursue one of four objectives: total return, absolute return, liability-driven investment, or principal protection.

Total return. Investors adopting a total return objective are focused on maximizing the long-term value of their portfolio and are able to tolerate both near-term volatility and long-term value uncertainty. Their defining characteristics include:

- A focus on capital accumulation.
- A long investment horizon.
- A tolerance for short-term portfolio volatility.
- A tolerance for uncertainty regarding long-term portfolio value.

Ideally, these investors will not have rigid spending requirements or substantial near-term liquidity needs, conditions that may call for a liability-driven or principal protection objective.

Notes on risk and performance data: All investing is subject to risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index. There may be other material differences between products that must be considered prior to investing. Diversification does not ensure a profit or protect against a loss. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. 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 or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility.

IMPORTANT NOTE: The projections or other information generated by the Vanguard Capital Markets Model[®] regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results may vary with each use and over time. The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM.

More important, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

² In certain instances, a combination of objectives may be appropriate.

Figure 1. The portfolio construction process



Source: Vanguard.

Liability-driven. These investors are focused on maintaining the portfolio’s ability to meet specific future obligations. Their defining characteristics include:

- A focus on the portfolio’s “claims-paying” ability.
- A time horizon consistent with the nature of the investment obligation.
- A desire to manage portfolio performance relative to a liability benchmark.
- A degree of certainty about their portfolio liability’s amount and timing.

Principal protection. These investors usually are focused on maintaining the portfolio’s value over the short run and have little ability to tolerate portfolio declines. Their defining characteristics include:

- A focus on maintaining the value of the portfolio.
- A generally shorter-term investment horizon.
- A high need for liquidity.
- A return objective centered on incremental portfolio increases and a very low risk tolerance.

Return objectives are important, particularly for insurance companies to maintain profitability, but they cannot be targeted at the sacrifice of meeting the primary objectives of stability and liquidity.

The nature of the liability distinguishes a portfolio from one with an LDI goal. A liability-driven objective requires knowledge of the amount and timing of future payments. Principal protection can focus on the ability to make a payment of an uncertain dollar amount at any time.

Absolute return. These investors tend to be focused on earning a particular, stable return throughout time independent of any asset returns. Their defining attributes include:

- A focus on a specific return objective.
- A medium- to long-term investment horizon.
- An ability and willingness to sacrifice some expected return to increase stability.
- Comfort with derivatives, short-selling, and other complex non-asset-based return strategies.

An unrealistic absolute return objective may result in portfolios with unstable performance that look more like total return portfolios.

After determining the investment objective, the next step is to develop a suitable portfolio.

Determining the approach

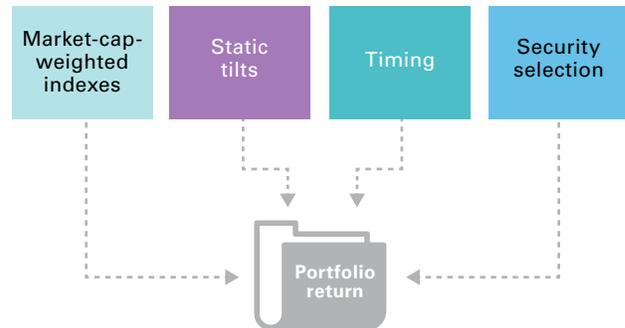
There are four primary elements to portfolio construction: market-capitalization weightings, static tilts, traditional active investing, and alternative investments. The resulting returns will be driven by some combination of market-cap exposures, static tilts, timing, and security selection (See **Figure 2**).

- Market-cap-weighted index vehicles give broad exposure to traditional asset classes.
- Static tilts are usually sub-asset exposures to portions of the global markets other than market-cap segments.
- Timing strategies seek to add value in the short-to-intermediate term by periodically shifting between different market exposures.
- Security selection attempts to improve results by including individual investments with weights that differ from available market-cap-weighted indexes.

These four elements are illustrated in **Figure 2**. Market-cap-weighted indexes provide the purest form of exposure, in which risk and return are driven purely by the market. Each of the other three sources of potential returns also depends, to varying degrees, on decisions made by the investor or by active managers hired by the investor.

Next, we will examine in further detail each of the four ways to approach adding value to a portfolio and how strategic asset allocation fits into this construct.

Figure 2. Sources of potential portfolio return



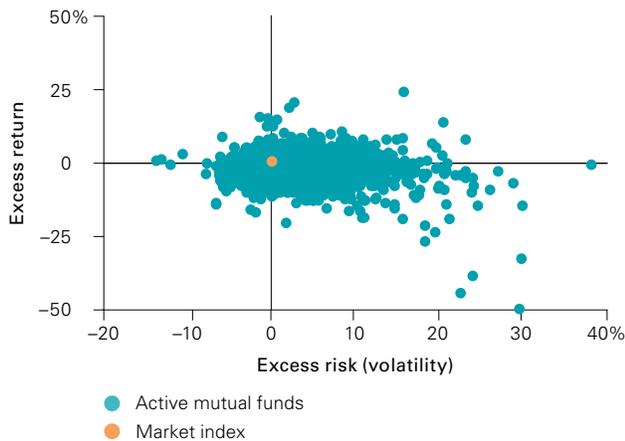
Source: Vanguard.

Market-capitalization indexes

With a high degree of liquidity, transparency, and relative risk control, broad market-capital-weighted indexes can efficiently provide the weighted-average experience of owning all or virtually all available securities at the market-clearing price. These diversified investment pools with significant capacity are a valuable starting point for investors. The rationale for risk exposure control is illustrated in **Figure 3**, which shows the relationship between a broad market-cap-weighted index and active funds. Market-cap-weighted index funds provide a central point of return and volatility, whereas active management comes with a wider range of variability and less style consistency.

Figure 3. Market-cap-weighted indexes as the starting point for portfolio construction

Annual excess return and excess volatility for active funds



Notes: Active mutual funds use U.S. data and include all active funds, both surviving and extinct (i.e., merged or liquidated), in the following categories: small-cap growth, small-cap value, small-cap blend, mid-cap growth, mid-cap value, mid-cap blend, large-cap growth, large-cap value, and large-cap blend, for the period from January 1, 1998, to October 30, 2015. The market index is represented by the Dow Jones US Total Stock Market Float Adjusted Index through November 30, 2002, and the MSCI US Investable Market 2500 Index thereafter. *Past performance is no guarantee of future returns. 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, using data from Morningstar, Inc.

Static tilts

In addition to broad market-cap exposure, some investors may choose to maintain a long-term strategic tilt in their portfolio for either outperformance or risk control purposes. Home country bias is a prime example of a tilt used by many investors. Reasons for doing so include familiarity, estimated execution costs, foreign currency exposure limitations or preferences, tax considerations, regulatory constraints, or perceived opportunities for better returns.³

Factor investing

Factors are underlying exposures that explain and influence an investment's risk. Major factors include the market, value, size, momentum, and low volatility for equities, and term and credit for fixed income. Depending on their composition, they can sometimes be viewed as similar to sub-asset-class exposures and as such can be used to create static tilts.

Although factors offer little diversification benefit, some academic work, albeit no consensus, has suggested that some of them may provide a compensated or uncompensated risk/return benefit relative to broad market-cap exposure.⁴

Investors may also tilt their portfolios away from the global market cap because they have different risk priorities. A prime example of this is liability-driven investing, in which the greater consideration is claims-paying ability, not return maximization. The target bond duration of such a portfolio might well differ from that of a broad market-cap-weighted bond index.⁵ Or they may choose to take on a larger exposure to a portion of the market that they believe offers the opportunity to outperform over the long term.

Although portfolio tilts can take many forms, static-tilt decisions are often made at the sub-asset-class level. Equity tilts are often made by size, style, sector, or location, and fixed income tilts are frequently based on credit quality, duration, or location.

³ See Philips (2014) for further discussion.

⁴ See Pappas and Dickson (2015) for further discussion of factor-based approaches. Some consider smart beta products to be factor-based investments. Although a detailed discussion of this topic is beyond the scope of this paper, we suggest readers review *An Evaluation of Smart Beta and Other Rules-Based Active Strategies* (Philips et al. 2015).

⁵ See Stockton (2014), Stockton and Zahm (2015), and Bosse and Stockton (2015) for examples of when this might be appropriate. Some pension investors may prefer low or no exposure to foreign bonds because these bonds may reduce their ability to hedge liabilities in certain cases. For an example, see Bosse and Stockton (2015).

Strategic asset allocation

The cumulative effect of market-cap-weighted exposures and any static tilts built into a portfolio establish an investor's strategic asset allocation (SAA). Of the four primary ways to derive value from a portfolio, this combination has the most impact on the variability of returns.⁶

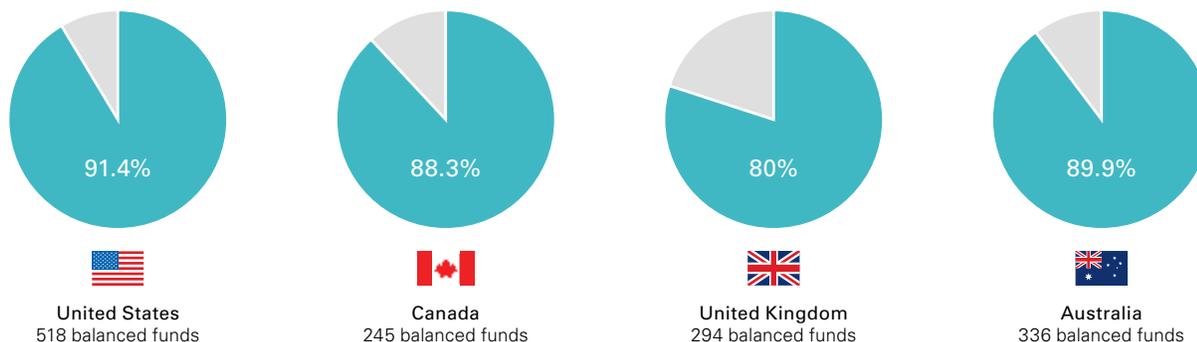
The seminal research on this point, *Determinants of Portfolio Performance* (Brinson, Hood, and Beebower, 1986), stated that target asset allocation explained the majority of a broadly diversified portfolio's return variability over time. Subsequent work expanded the original analysis and found that the premise held true using a wider range of data across four major global markets (Wallick et al., 2012). Figure 4 illustrates this principle.

Over at least a 20-year period, the results were similar for all available balanced funds in each of these markets. Between 80% and 92% of the variability of returns was explained by strategic asset allocation, not active timing or security selection. Thus, SAA is the key decision in portfolio construction.

It is worth noting that effective SAA is built on forward-looking expectations. Although history can be a useful guide, we know that the risk premia strategic investors demand for various market segments change, and future economic conditions (e.g., inflation levels) evolve. An effective strategic asset allocation process begins with establishing reasonable expectations for each asset class—its expected returns, volatility, and relationship to other asset classes. Such an assessment should include

Figure 4. The importance of strategic asset allocation

Percentages of return variation explained by asset allocation policy



Notes: For each fund in our sample, a calculated adjusted R² represents the percentage of actual-return variation explained by policy-return variation. Percentages represent the median observation from the distribution of percentage of return variation explained by asset allocation for balanced funds. For the United States, the sample covered the period January 1962–December 2011; for Canada, January 1990–December 2011; for the United Kingdom, January 1990–December 2011; and for Australia, January 1990–December 2011. Calculations were based on monthly net returns, and policy allocations were derived from a fund's actual performance compared with a benchmark using returns-based style analysis (as developed by William F. Sharpe) on a 36-month rolling basis. Funds were selected from Morningstar's multi-sector balanced category. Only funds with at least 48 months of return history were considered, and each fund had to have a greater-than-20% long-run domestic and international equity exposure (based on the average of all the 36-month rolling periods) and a greater-than-20% domestic and international bond allocation over its lifetime. The policy portfolio was assumed to have a U.S. expense ratio of 1.5 basis points per month (18 bps annually, or 0.18%) and a non-U.S. expense ratio of 2.0 bps per month (24 bps annually, or 0.24%).

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

⁶ We assume the portfolio is broadly diversified. SAA would not be the dominant driver of returns under two conditions. If an investor were invested in only a very limited number of securities, the portfolio results would be driven by security selection. And if an investor traded a vast majority of its portfolio nearly constantly, timing would likely be the dominant determinant of returns.

both qualitative judgment and quantitative analysis. A financial simulation model (such as Vanguard's Capital Markets Model) can generate a distribution of forward-looking long-term returns, volatilities, and correlations and help determine the trade-offs of a wide array of allocations.⁷

Timing

To some investors, the inconsistency of asset-class returns signals an opportunity that can be exploited. Indeed, all else being equal, a portfolio would benefit if an investor were able to overweight undervalued assets and underweight or avoid overvalued assets in the near term. Hence the continued interest by some in tactical asset allocation (TAA)—a dynamic strategy used to actively adjust a portfolio's strategic asset allocation based on short-term market forecasts.

Tactical asset allocation

TAA strategies use financial and/or economic variables to attempt to predict performance and adjust asset- and/or sub-asset-class weightings over the short term. The most basic version is likely to include signals for a single country's stocks, bonds, and cash, but they can include a wide range of other investments and metrics as well. The expectation is that the investments purchased will outperform those that are sold.⁸

Despite TAA's intuitive appeal, studies have shown that regardless of the type of manager—professional timers, pension funds, or mutual funds—the strategy has been difficult to successfully execute.⁹

A recent Vanguard analysis evaluated tactical allocation funds in the United States over a ten-year period. It found that the median fund underperformed its stated benchmark by –2.1% per year and the overall range of relative fund results spanned from 2.0% to –5.0%.¹⁰ The outcomes were similar for U.S.-based “go-anywhere funds.” A Vanguard study of the period from January 1, 1998, to June 30, 2013, observed that the median go-anywhere fund underperformed its stated benchmark by –0.04% on a monthly basis (Shtekhman, Stockton, and Wimmer, 2014).

Dynamic asset allocation

In light of the limited success TAA has demonstrated, some investors have considered using stronger, less frequent signals to improve the performance of timing strategies. This approach is sometimes labeled dynamic asset allocation (DAA).

To add value through timing, an investor must rely on four elements: signal, size, term, and trade. To start, the investor must determine a meaningful signal or signals from which it will be willing to make a significant investment. This trade must be held through the expected price reversion period and funded from an asset that will underperform the new purchase net of the cost to execute.

⁷ See Davis et al. (2014) for further discussion. Also see Davis, Aliaga-Díaz, and Thomas (2012) for a more in-depth analysis of forecasting equity results. An investor using or considering using private alternative investments should conduct modeling with caution (Wallick et al., 2015c).

⁸ There is no universal consensus on which time periods are most appropriate for timing strategies. Even the phrase “short-term” can be defined differently depending on the investor; some regard it as a period of 12 months or less. As a result, the periods over which TAA strategies are measured will vary. Further discussion can be found in Stockton and Shtekhman (2010).

⁹ See *Vanguard's Principles for Investment Success* (The Vanguard Group, 2014) for a summary of nine academic studies on market timing.

¹⁰ Tactical allocation funds, as defined by Morningstar, Inc., were evaluated on a monthly basis for the ten-year period ending April 30, 2015. Because the funds' allocation was dynamic, it was difficult to determine accurate benchmarks. Our analysis found that when compared with those of their prospectus benchmarks, the funds' median annualized ten-year excess return was significantly negative (–2.1%). When compared with a 60/40 global portfolio, the funds' excess return was slightly positive (0.1%). Because only funds with 120 months of data were included, the analysis reviewed 18 funds with \$39 billion in cumulative net assets.

Figure 5 illustrates a hypothetical example of DAA comparing U.S. high-yield bonds and U.S. aggregate bonds. To benefit from adding high-yield bonds when they were trading at historically high spread levels, an investor would have had to hold the trade for more than two years and funded it only from equities and not investment-grade bonds. Funding the purchase from investment-grade bonds would have resulted in a cumulative loss of -3.9%, whereas funding it from equities would have led to a gain of 48.3%.¹¹ Thus, even strong signal-based DAA strategies do not guarantee success.

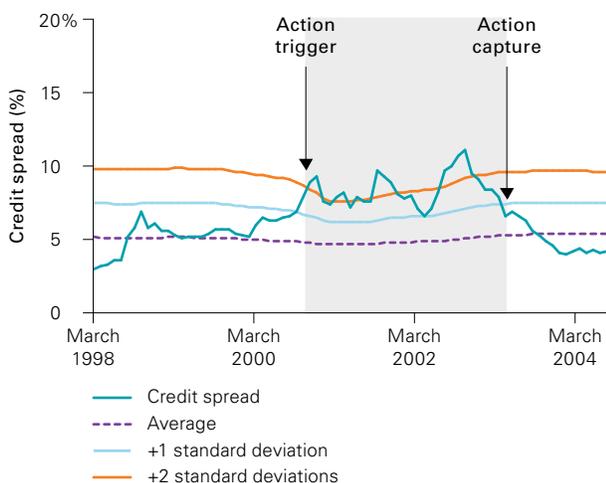
In summary, although intuition might lead some to consider timing a viable investment strategy, the evidence suggests otherwise. Although various valuation signals may appear to be attractive at times, markets are unpredictable enough that assessing with certainty whether and when values might revert to an anticipated equilibrium has proven repeatedly elusive.

Traditional active management

The appeal of active management is strong for some investors because even a modest amount of outperformance can compound into a significant benefit. An

Figure 5. The challenges of market timing

High-yield credit spread



The outcome is dependent on the funding source

Time period	High-yield return	Equity return	U.S. aggregate bond return
December 2000– April 2003	20.6%	-27.7%	24.5%
High-yield position funded from equity = 48.3%			
High-yield position funded from bonds = (3.9%)			

Notes: The trade illustrated on the left assumes the investor purchased the Barclays U.S. High-Yield Bond Index on December 1, 2000, when the difference between the then-current spread and the trailing ten-year-average spread was at a two-standard-deviation level. It further assumes the investor held the purchase until the spread returned below a one-standard-deviation level in April 2003. The chart on the right shows the effects on net return of funding this trade from either equity (in the form of the S&P 500 Index) or bonds (in the form of the Barclays U.S. Aggregate Bond Index).

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

¹¹ This spread opportunity actually presented itself to investors in 2008. In that instance, the results were reversed—an equity-funded trade would have led to a loss, and funding with investment-grade bonds would have ended in a gain.

investor who believes the market is not perfectly efficient could expect to find opportunities to improve results by being contrarian relative to the broad market. However, powerful academic theory and many practical results have shown that, on average, active management is a losing proposition. Can it be successful, and if so, how?

Theory and results

Sharpe (1991) suggests that active management is a zero-sum game in which every winner is offset by a loser. And the probability of success is reduced further when active management costs more than market-cap-index-weighting management. The author concludes that the average actively managed dollar will underperform the average passively managed dollar.

A recent Vanguard study, *The Case for Index Fund Investing* (Philips et al., 2015), had similar results. Over a 15-year period, a significant percentage of U.S.-based actively managed funds underperformed their respective benchmarks. Additional analysis of markets in the United States, the United Kingdom, Australia, and Switzerland found that the probability of an individual manager beating its stated benchmark was less than 25%.¹² Moreover, even the funds that outperformed showed little evidence of persistence.¹³

Drivers of success

Although the average active manager has underperformed its stated benchmark, active management has shown some evidence of success. Indeed, Vanguard active equity funds have a long track record of achievement. No single fund will produce excess return every day, week, or year, but over the past three decades, these 37 funds have, on average, outperformed their costless benchmarks over the long term by 0.45% per year on an asset-weighted basis.¹⁴

A study of Vanguard active funds found that outperformance was driven by three key attributes: talent, cost, and patience. An active manager must have talent to add value over the long term. Ex-ante talent identification is a highly qualitative process, not a quantitative one. Finding talented managers is a rigorous yet subjective undertaking that, in its best form, includes a thorough evaluation of a firm's people, philosophy, and process.

These talented managers must be obtained at a reasonable cost. It may sound paradoxical that the two would coexist; presumably, the best managers would command higher fees. Yet Vanguard has been able to do this. As of December 31, 2014, the average Vanguard U.S. active fund had costs of 0.37%, less than 99% of other active funds and 75% of available index funds, according to Morningstar data.¹⁵ A recent analysis showed that ex-ante low cost was the only identifiable statistically significant element that corresponded to the future success of public active fund managers (Wallick et al., 2015b). Low costs bring many benefits, the most significant of which is compounded savings over time.

¹² Vanguard found that the probability of a manager surviving and outperforming a benchmark was 23% in the United Kingdom, 24% in the United States, 19% in Australia, and 21% in Switzerland for the 15 years ending December 31, 2014.

¹³ See Philips et al. (2015a) and Wimmer, Wallick, and Pakula (2014) for more details on active fund persistence.

¹⁴ See Wallick, Wimmer, and Balsamo (2015a).

¹⁵ See Wallick, Wimmer, and Balsamo (2015a).

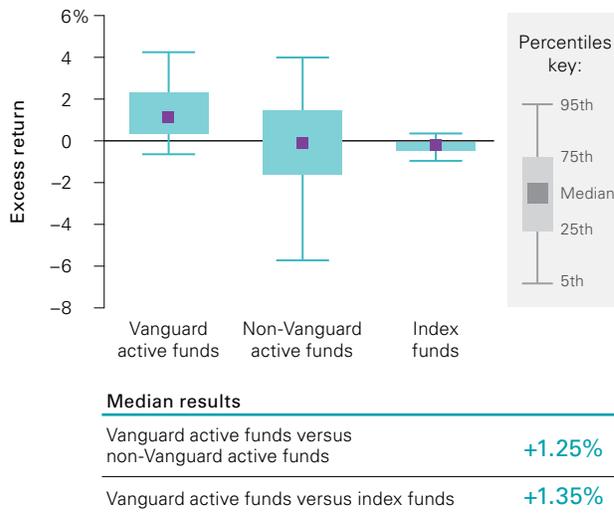
Finally, investors must be patient and stay with their low-cost, talented managers over time.¹⁶ The only way to capture the potential benefits of actively managed funds is to hold them through their inconsistent results.¹⁷ The distribution of Vanguard returns relative to other active managers and index funds is shown in Figure 6.

Alternative investments

The two broad categories of alternative investments are nontraditional asset classes (real estate and commodities) and private investments (private equity, hedge funds, and private real assets). Stocks, bonds, and cash are generally regarded as traditional asset classes.

The relationship between these investment types is illustrated in Figure 7. Five asset classes are illustrated at the top of the figure, traditional—equity, fixed income, and cash—on the left, and alternative—real estate and commodities—on the right. Traditional market-cap-weighted asset classes are available to investors through direct index-based investment vehicles.¹⁸ Alternative asset classes are also available in public form to investors, but only through the use of proxy indexed vehicles.¹⁹

Figure 6. The historical success of Vanguard active managed funds



The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at vanguard.com/performance. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index. There may be other material differences between products that must be considered prior to investing.

Notes: This analysis used data for 17 Vanguard active equity funds, 1,984 non-Vanguard active equity funds, and 135 index funds alive during a 15-year period and for which Morningstar data were available. U.S. and international equity (excluding sector/specialty) funds were equal-weighted as of December 31, 2014. Load fees were not considered (Vanguard does not charge load fees, but some other firms do). Net excess returns were the median annualized fund returns (net of management/operating expenses) of active equity funds versus their prospectus benchmarks.

For a further discussion of this topic, see *Keys to Improving the Odds of Active Management Success* (Wallick, Wimmer, and Balsamo, 2015a) and *Shopping for Alpha: You Get What You Don't Pay For* (Wallick, Wimmer, and Balsamo, 2015b).

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

¹⁶ See Wimmer, Chhabra, and Wallick (2013) for more discussion on the inconsistent return patterns of active managers who have outperformed their benchmarks in the past. A well-reported study by Goyal and Wahal (2008) found that when sponsors of U.S. institutional pension plans replaced underperforming managers with outperforming managers, the results over the next three years, on average, turned out to be worse than if the plan sponsors had stayed with the original managers. The authors evaluated the performance of both hired and fired managers before and after the decision date. They found that after termination, the fired managers actually outperformed their replacements 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.

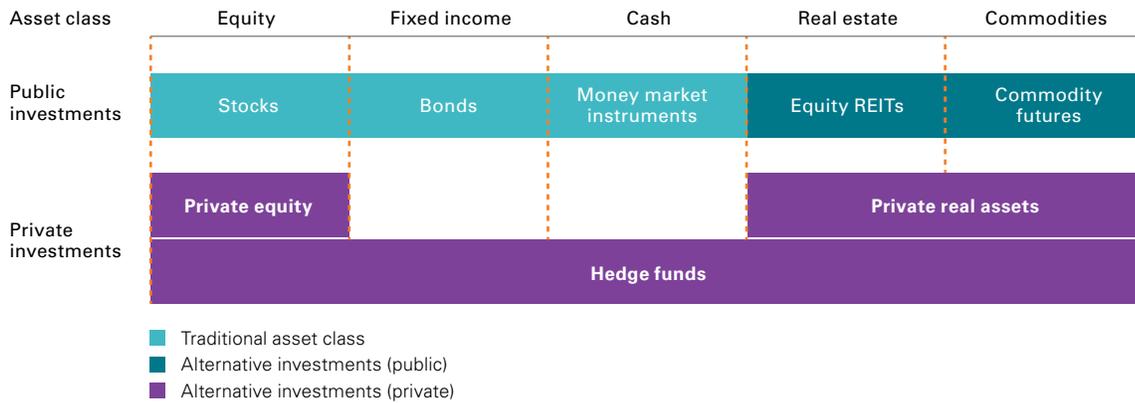
¹⁷ Active management always presents a selection challenge. Although talent identification, cost control, and patience are key to improving the odds of success, they do not guarantee it. Results such as those cited in the analysis above regarding the success of Vanguard active funds are still subject to the ex-ante selection hurdle.

¹⁸ Cash is the one exception to this rule. Although it is not available in a pure market-cap-weighted index vehicle for valid reasons, money market funds do provide investors with a highly diversified exposure to the asset class.

¹⁹ Real estate is available to investors in a broad-based form through Real Estate Investment Trusts (REITs) or Real Estate Operating Companies (REOCs), indexes that use public equity to provide exposure to commercial real estate (Philips, Walker, and Zilbering, 2011). Academic research has shown that over the long run, public index-based REIT investments provide investors with a result similar to that of holding private real estate directly. In the short run, however, REITs behave more like other equity investments than like real estate (Wallick et al., 2015c). Commodities are similar: Investable public indexes are available using futures to provide a proxy for holding the asset class (Bhardwaj, 2010). As with real estate, this approach provides investors with a broad exposure to the asset class through an indirect vehicle rather than through direct holdings.

Figure 7. Defining “alternative investments”

The relationships between asset classes and alternative investments



Source: Vanguard.

Private investments, shown at the bottom of Figure 7, are not additional asset classes but rather active investments, typically made up of assets from one of the five major classes. Private equity, for instance, is simply a different form of equity (Shanahan, Marshall, and Shtekhman, 2010). Private real assets are generally investments that would be categorized as either real estate or commodities and, again, are not a separate asset class. Hedge funds are a legal structure much like mutual funds, but with more relaxed implementation guidelines (Phillips, 2006). They too are not a separate asset class but might hold any of the five major asset classes. In general, they are designed to deliver positive results independent of what is occurring in the public equity and fixed income markets.

We compared private equity funds and hedge funds to their public market equivalents and found, on average, that they underperformed and had a much wider dispersion of active manager results.²⁰ They also face more challenges regarding liquidity, transparency, attribution, legal standing, and fees. Finally, because they are a more complex form of active management, their use requires a thorough bottom-up manager-selection-driven process as opposed to a traditional top-down asset-allocation-driven process (Wallick et al., 2015c).

²⁰ See Wallick et al. (2015c) for more details on alternative investment performance.

Recap

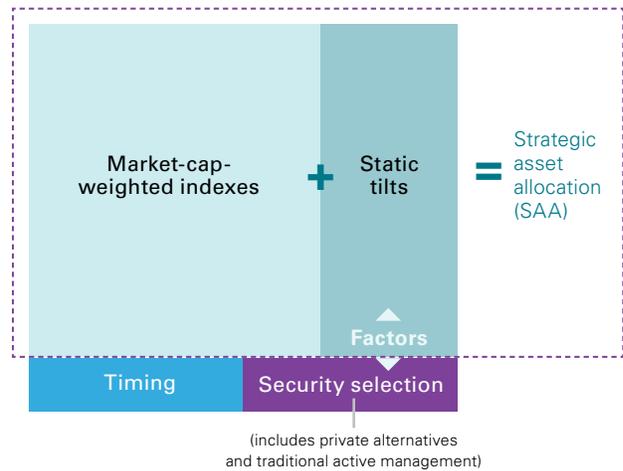
Market-cap-weighted investments are a valuable starting point for building a portfolio. Some institutions may also choose to statically tilt their assets for either risk control or return generation. Together, market-cap exposure and static tilts represent an investor's strategic asset allocation, which research estimates is responsible for 80% to 92% of a portfolio's variability. The SAA process relies on an assessment of the probabilistic expectations of correlations, volatility, and returns, along with professional judgment. **Figure 8** weighs the four elements that affect returns based on reasonable estimates of their historical impact. It also shows how other strategies such as private alternative investments fit within this framework.²¹

Traditional active management has generally proved challenging; most managers underperform their benchmarks. However, Vanguard has compiled a successful track record by combining low-cost, talented managers with patience during inevitable periods of underperformance.

Factor-based investing can be a component of a static tilt or a part of timing and security selection approaches, depending on the investor's strategy.

Timing is difficult in either a TAA program or a (less frequently used) DAA program. To be successful, an investor would need to identify a meaningful signal or set of signals and be willing to temporarily reallocate a significant amount of assets. The organization would then trade an asset that is expected to underperform

Figure 8. Weighted sources of portfolio variation



Note: The boxes are variously sized for illustrative purposes only and not based on a strict mathematical formula.

Source: Vanguard.

the new purchase and have the discipline to hold that trade as long as necessary. Although timing may seem appealing, its track record has been weak.

The two major types of alternative investments are nontraditional asset classes and private investments. Real estate and commodities are alternative asset classes and can be accessed through public market proxies in broad market forms. Private investments—private equity, hedge funds, and private real assets—are another form of active management in which manager selection, not asset allocation, is the key driver of success.

²¹ Some institutional investors may employ overlay strategies in addition to the framework described above. Although the details are beyond the scope of this paper, these could include a fund- or portfolio-level currency hedging strategy, leveraging, or a custom risk-budgeting program to manage portfolio risk exposures.

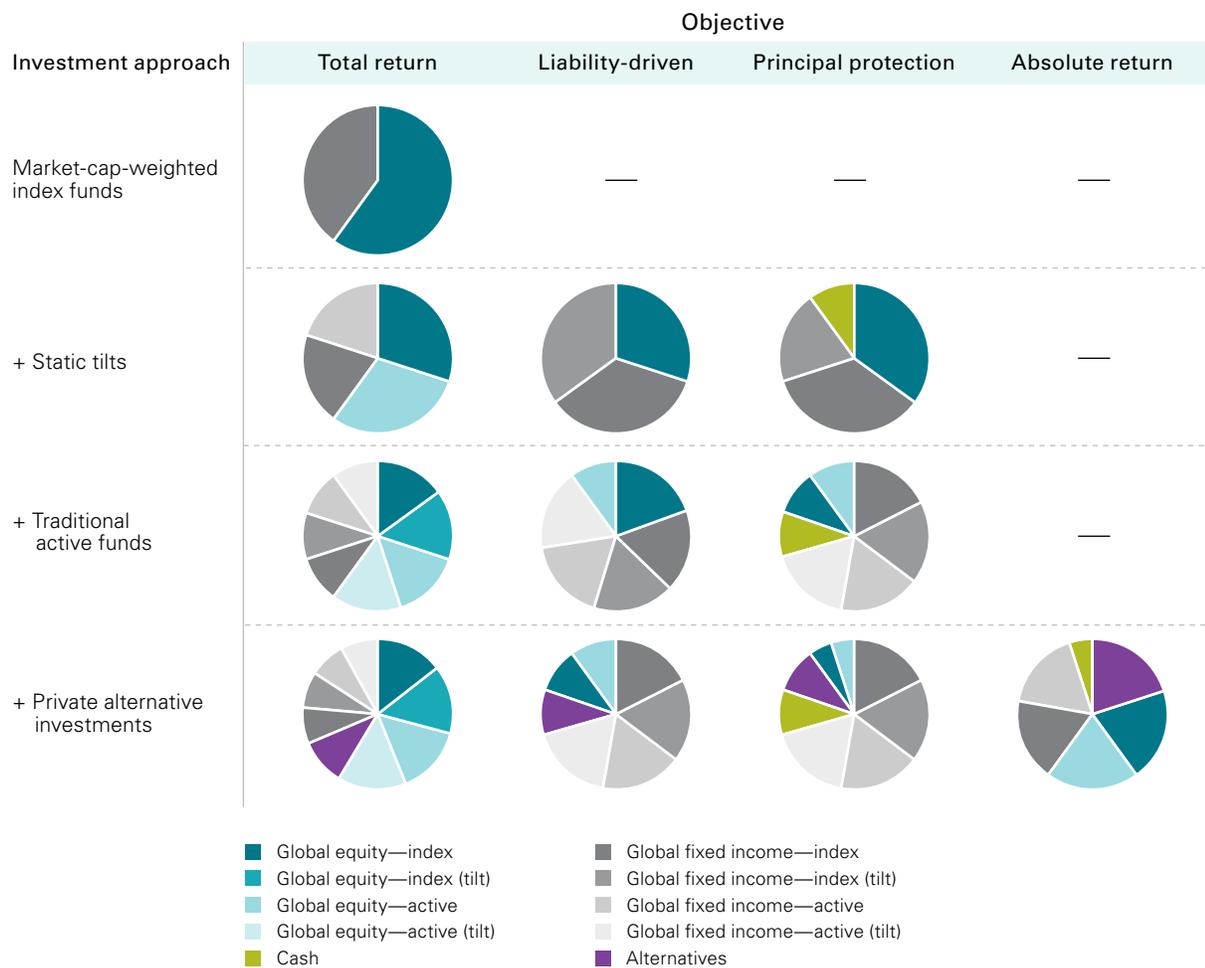
Constructing the portfolio

This framework helps institutional investors determine the correct portfolio for their objective(s) and investment approach. **Figure 9** identifies the key portfolio options, listing objectives by column and approaches by row.²² The portfolio at the top of each column is a reasonable default for the stated objective. The option at the top left,

balanced, market-cap-weighted total return, is a reasonable starting point. Other solutions may better suit an institution with a different objective or a willingness to take on the attributes of other investment approaches. After starting at the top of their chosen column, investors can add all, none, or some of the other possible strategies depending on their circumstances and preferences.

Figure 9. Institutional portfolios solution matrix

The intersection of objectives and investment approaches



Notes: The allocations in each pie chart are for illustrative purposes only and are not intended as specific recommendations. Any actual portfolio recommendations would be determined using investor-specific criteria.

Source: Vanguard.

²² Because of its weak track record, timing is not included in this set of options.

Total return portfolio options

Market-cap-weighted indexes are a valuable starting point. Their low costs, daily liquidity, transparency, and exposure to the complete market make them the cornerstone of the strategic asset allocation decision that will determine most of a portfolio's variability.

An investor that believes a portion of the market may provide better performance over the long run than the aggregate might add a static tilt. An institution seeking risk control could add a static tilt such as home bias relative to the global market cap in a particular asset class.

An investor in search of market outperformance and willing to take on attributes that could potentially lead to success might consider traditional active management. The decision ultimately comes down to determining how much tracking error or fund performance variability an institution is comfortable with relative to its degree of confidence in a manager's future outperformance.

Investors choosing private alternatives can be organized into two major types—those that seek outperformance and those that seek returns independent of market conditions. Because manager selection is the crucial driver of success, the investor needs to weigh the promised goal of an investment against confidence in the manager and the expected pattern of returns. Liquidity needs and all-in costs may be additional considerations.

Liability-driven portfolio options

For organizations such as defined benefit pension plans and life insurance firms, this solution is a cash-flow-matching exercise.

The time-specific liability of LDI portfolios changes the nature of their risks from that of a total return approach. Total return portfolios often use bonds to dampen equity volatility over the long term. However, a liability-driven approach uses them to reduce the mark-to-market differences between portfolio assets and liability movements, so their appropriate duration can change significantly. Because this type of volatility is often best managed through long-dated bonds, an LDI portfolio can benefit from a static tilt in that direction.

As in a total return approach, the need for the promised result must be weighed against confidence in the manager's execution and the expected pattern of returns. When deciding whether to use traditional active management or what type to employ in the equity portion

of the portfolio, a liability-driven investor should determine whether future improvements in the plan's funded status may shorten the time horizon of that exposure.²³ These investors might also consider selecting equity funds that seek to minimize volatility, particularly if they face regulatory requirements that mandate contributions if funding levels fall below certain thresholds.

Such regulatory issues can also complicate the use of alternative investments for many LDI users. Private alternatives' limited liquidity and potential lack of full price disclosure can make valuation difficult. Public alternatives are more likely to be liquid and have full price disclosure, but potential investors must determine the reliability of their expected results and the path to achieve them.

In addition, the diversification benefit of certain alternative investment vehicles can have limited application because of how some pension investors may define risk. For example, funding an alternative investment with bonds would likely reduce the liability-hedging percentage in the portfolio. Funding certain types of alternative investments from equities could offer an advantage but still might not be the right choice because of the implementation hurdles previously discussed (Bosse, 2012).

Principal protection portfolio options

To maintain their value over the short run, many principal protection portfolios begin with a tilt to shorter-duration bonds relative to market-cap exposure.

As it is for the other options, traditional active management is feasible when the promised result is balanced with confidence in the manager and the expected pattern of returns. This type of portfolio can also benefit from exposure to equity funds that seek to minimize volatility.

Because of their sensitivity to liquidity and need for relatively consistent returns, these investors should be selective in their use of alternative vehicles. Private investments can pose difficulties. However, certain risk-controlled public alternative strategies may be worth considering, again balanced against other criteria.

Absolute return portfolio options

The objective of this portfolio, consistent returns rather than an asset/risk trade-off, can only be pursued in its purest form through extensive use of alternative investments, specifically those that seek to neutralize market beta (and its inherent volatility) through the use of short-selling,

²³ For more information on pension derisking, see Sparling (2014).

derivatives, and other nonpassive techniques. If liquidity is an important consideration, public structures, as opposed to private investment vehicles, may be preferable.

The role of active risk budgeting

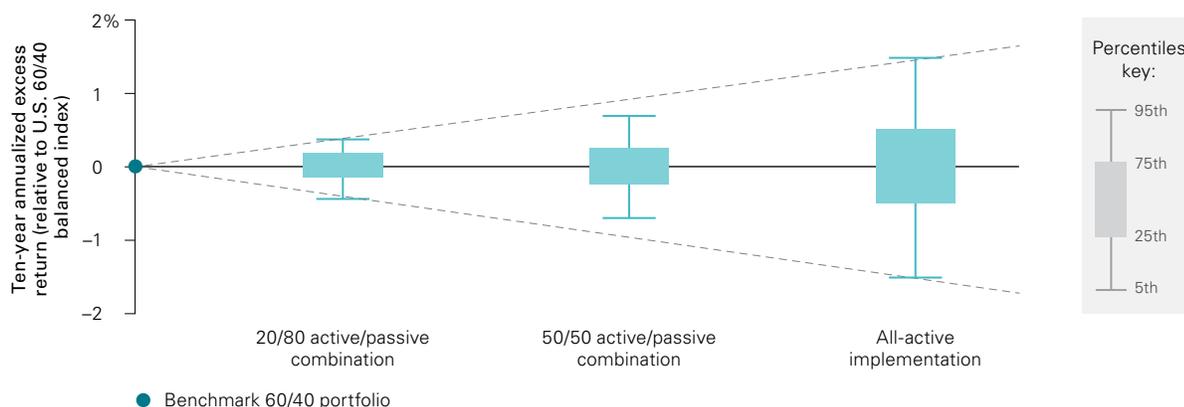
Both quantitative calculations and qualitative assessments are needed to develop portfolio solutions. The process starts with establishing quantitative expectations of asset classes, including their probabilistic range of expected return, volatility, and correlation to each other. These attributes can be effectively simulated using a combination of historical data and judgment.

Forecast modeling can be extended to include sub-asset-class portions of the market if an investor is confident in a forecast that includes the critical return, volatility, and correlation characteristics of the investment. This allows investors to model combinations of the broad market and static tilts in an efficient frontier framework.²⁴ Such a framework calculates every possible combination of investments to identify those portfolios that produce the highest levels of expected return per unit of risk.²⁵

The introduction of active management, whether traditional or through alternative investments, gives modeling a higher degree of unpredictability. The decision to use active management is based on the investor’s confidence in its ability to select talented active managers and the amount of active risk the investor is willing to tolerate to potentially achieve long-term outperformance.

Active risk can be thought of in two primary ways: 1) Tracking error—how much short- to intermediate-term variation around a policy benchmark is an investor willing to deal with over time in pursuit of potential alpha? and 2) Selection risk—how different from the benchmark might the long-term outcome be, and what is the confidence level that it will be a positive result?²⁶ Figure 10 shows how selection risk in traditional asset classes can affect long-term returns relative to a benchmark.²⁷ Different combinations of passive and active investments will affect the expected range of returns, as shown by the three blue boxes.

Figure 10. Active manager uncertainty in active/passive combinations



Notes: This analysis simulates a distribution of active and index portfolio excess returns by randomly selecting U.S. mutual funds from the database that Morningstar has benchmarked to indexes representing characteristics of broad U.S. market stock and bond funds. From a universe of 1,301 active funds and 36 index funds, we formed a sample of 60%/40% stock and bond portfolios using three active/index weighting schemes. Balanced portfolios were created by applying the 60/40 weighting scheme to one randomly selected equity fund and one randomly selected bond fund in the active and index weight combinations. The 60/40 benchmark index consists of the MSCI US Investable Market 2500 Index and the Barclays Aggregate Bond Index. To isolate the dispersion, each cross-section of returns has been adjusted so that the median is located at point zero. Only funds with a full ten-year return history are included, and all funds are equally weighted in each category.

Sources: Vanguard calculations as of September 30, 2015, using data from Morningstar, Inc.

²⁴ Effective forecasting eschews overly precise expectations and instead uses a long-term, distributional methodology.

²⁵ The types of risk considered will vary depending on specific investor objectives and risk preferences.

²⁶ The formal definition of tracking error is the annualized standard deviation of excess return versus a benchmark. For more information, see Schlanger, Philips, and LaBarge (2012) and Ambrosio (2007). This is a very popular risk metric for active risk budgeting and can be applied at the fund, asset-class, or portfolio level depending on the investor’s preference.

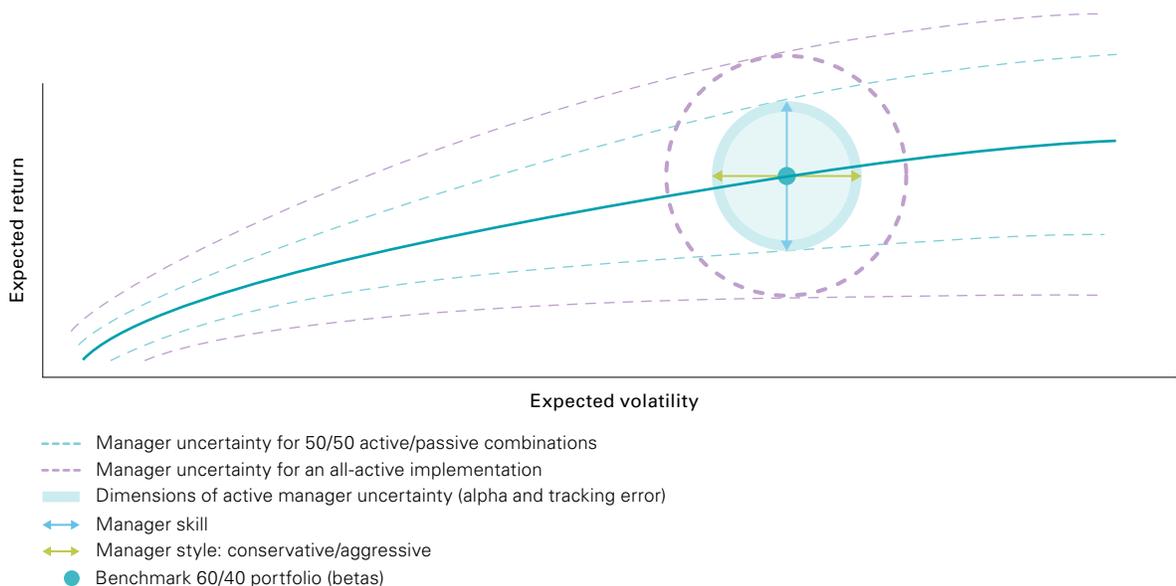
²⁷ To compare this to selection risk with private alternative investments, see Wallick et al. (2015c).

To use active management, an investor must have the risk capacity to tolerate performance deviations from the benchmark through time. An efficient frontier calculation that considers the potential effects of “beta” decisions (i.e., strategic asset allocation) and active manager decisions will also account for manager uncertainty. **Figure 11** illustrates this type of calculation for a hypothetical 60/40 benchmark portfolio along the frontier.

Risk budgeting is a multistep process that starts with developing a beta-based efficient frontier of portfolio options. A baseline portfolio is then selected, anchored on expected return, volatility, or a combination of both, as indicated by the small circle on the solid blue line. If active management is considered, a degree of uncertainty is introduced reflecting the tracking error and manager selection decisions. This is represented by the blue and purple circles around the portfolio and can vary widely depending on the mix of active and passive investments.²⁸

Figure 11. Manager uncertainty and “beta” efficient frontier

Efficient frontier with active risk bands



Note: This illustration is hypothetical and does not represent any particular investment.

Source: Vanguard.

²⁸ An in-depth discussion of the practical application of active risk budgeting is beyond the scope of this paper. For more information on this topic, see, for example, Waring et al. (2000), Waring and Siegel (2003), Berkelaar, Kobar, and Tsumagari (2006), Siegel and Scanlan (2014), Gilkeson and Michelson (2005), and Alford, Jones, and Winkelmann (2003).

Conclusion

Institutional investors often ask for our thoughts on the best ways to construct a portfolio. The answer depends on two critical factors—the investors' objectives and the investment approaches they are willing and able to pursue. Regardless of the strategy, the odds of success increase when costs are low and discipline is high.

Successful execution of any investment strategy requires discipline. Investors face many behavioral challenges when confronted with the unpredictable nature of financial markets and the desire for certainty. Much work in the field of behavioral finance has documented investors' desire for action when faced with challenges, despite the limits of their control. Having the discipline to stay with a plan over the long run, to rebalance when necessary, and to adjust strategies only infrequently is crucial to long-term achievement.

Vanguard's investment philosophy highlights the importance of establishing a goal, developing a balanced portfolio, and executing the desired strategy using low-cost investments while maintaining long-term discipline in the face of informational and behavioral hurdles. We believe these principles serve all investors well.

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