The Active-Passive Debate Continues: Choose Your Risk

Through our collective experience in selecting investment managers and building portfolios, we are firm believers that there is no one-size-fits-all approach when it comes to active versus passive investing.

Over the last 20 years, investor interest in passive index funds has grown substantially as a simple, tax-efficient and often cost-efficient means to achieve market-like returns with lower risk. According to the Investment Company Institute, index funds (both mutual funds and exchange-traded funds) grew from 20% of total U.S. Fund Market net assets in 2011 to 43% in 2021, a staggering increase of about $10 trillion in 10 years.

As practitioners of constructing multi-asset class investment portfolios, we are often asked why we would choose active strategies over passive when implementing a prescribed asset allocation. Our steadfast approach to selecting investment strategies is simple: we seek the highest return potential for a given risk tolerance at the lowest possible cost. We follow this philosophy wherever it leads, be it active or passive. Additionally, we take a long-term view that is based on deep due diligence and does not rely on past performance.

Because markets continually evolve, investment opportunities change over time. Through our collective experience in selecting managers and building portfolios, we are firm believers that there is no one-size-fits-all approach when it comes to active versus passive investing. At a basic level, the decision is a function of an investor's goals and risk tolerance, combined with the available investment opportunities for a given market landscape. Both active and passive strategies can live in harmony in the same multi-asset class portfolio, serving different roles. While academia and fellow investment professionals have contributed vast amounts of information to the subject, we offer three simple observations to explain our point of view:

1. Certain asset classes or market environments lend themselves more to active or passive management.
2. It is possible to select skilled active managers in a way that does not rely on past performance.
3. In multi-asset class portfolios, one should not overlook the impact on risk, return expectations and other portfolio characteristics from combining investment managers, as the effect can be significant.

All asset classes are not created equal

Where has active management been most successful?

Many academics and investing luminaries have posited that certain corners of the market with less analyst coverage and fewer active managers often have a greater probability of market outperformance

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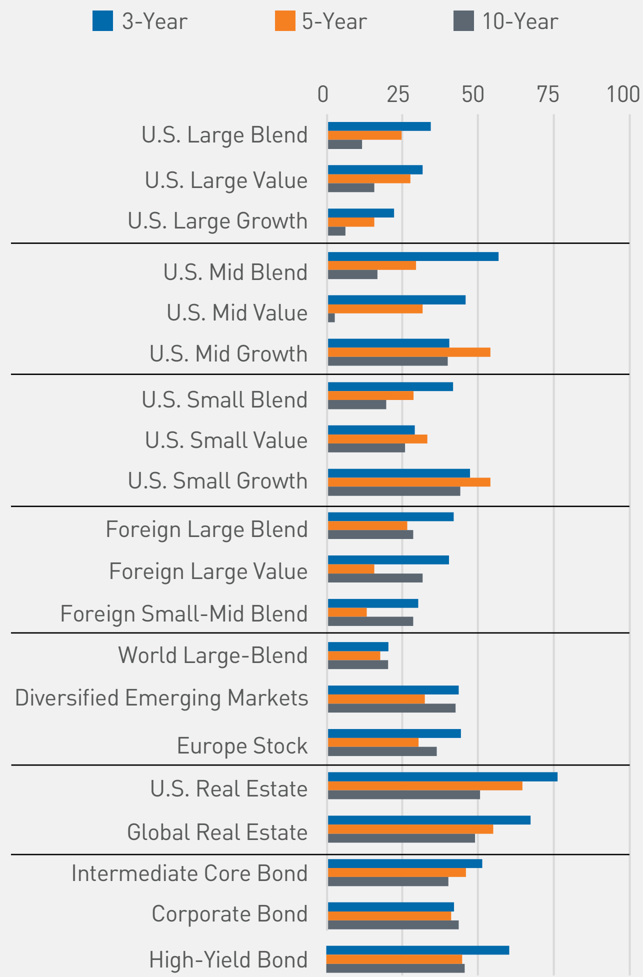
due to lower price efficiency. This is based on the efficient-market hypothesis, which states asset prices always reflect all relevant information. We believe markets are mostly efficient, but mispricing happens, leading to opportunities for savvy investors. Small-cap equity, for example, tends to be a less efficient asset class, while, at the other end of the spectrum, large-cap domestic equity typically has high liquidity, wide analyst coverage and broad ownership, leading it to be more efficient.

Figure 1, based on Morningstar's semiannual publication, the "U.S. Active/Passive Barometer," provides data to support this dynamic. It shows the percent of funds that outperformed a composite of passive funds in their Morningstar-assigned category over a given period. The analysis demonstrates there is a higher frequency of outperformance among active managers in smaller-capitalization, international (especially emerging markets), real estate and fixed income asset classes. Likewise, the analysis also demonstrates large-cap active management has struggled over the past five and 10-year periods. Large-cap active managers have performed somewhat better over the last year as valuations and interest rates normalized; however, overall success rates remain lower on a relative basis.

Our analysis of various manager databases largely supports Morningstar's findings. The exception is mid-cap value. The Active/Passive Barometer measures active managers against a composite of passive funds. In mid-cap value, this includes several ETFs that do not seek to mimic market-weighted indices. For example, it may include funds tracking dividend-oriented indices that only fall into the category due to style. Similarly, all-cap active funds may also be included in the category because the average of their large-, mid- and small-cap exposure is mid-cap. These anomalies will distort the success rates in mid-cap value. In our experience, the level of success from true mid-cap value managers on our platform has been closer to levels seen in mid-cap blend and growth.

Another important factor in the success of active managers over passive strategies is the impact of fees. The Morningstar analysis showed higher- cost active funds tended to have lower success rates, and the lowest-cost active funds fared better across all asset classes over the 10-year analysis period (Figure 2, page 3). This is an important consideration as we strive to provide our clients with access to the lowest cost share class among our mutual fund offerings.

Figure 1. Active Funds' Success Rate by Category %
Certain active fund categories tend to outperform



As of 12/31/2022. Source: Morningstar

ANOTHER IMPORTANT FACTOR IN THE SUCCESS OF ACTIVE MANAGERS OVER PASSIVE STRATEGIES IS THE IMPACT OF FEES.

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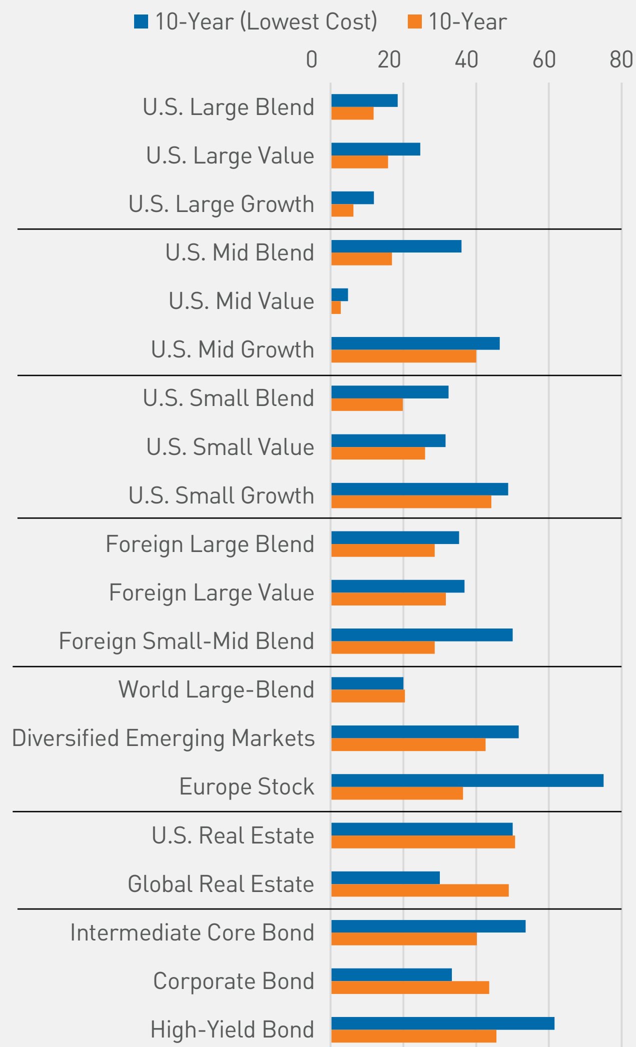
Other studies confirm Morningstar's findings. In 2018, AQR Capital Management published a brief white paper titled "Active and Passive Investing — The Long Run Evidence," which used a longer analysis period and a different dataset than Morningstar. The authors noted larger institutional investors had greater success than active mutual funds, which may reflect lower expense ratios, more concentrated portfolios and higher active share. Another key point was that success was greater for active managers in the "dusty corners" of the market — smaller capitalization, emerging markets, less-liquid fixed income markets and some private investments.

While we approach portfolio construction with a long-term horizon, short-term or tactical allocation decisions are a good opportunity to evaluate the tradeoff between active and passive. Again, more efficient asset classes are better candidates for a passive implementation of a shorter-term allocation. Our preference is to use passive exposure for tactical asset allocations with an expected duration of less than 12 months. For longer tactical allocations, we tend to evaluate both active and passive options.

It is important to note that a passive implementation is an active decision, as choices between different passive strategies can introduce implementation risk. For example, to achieve a passive exposure to U.S. small-cap equity through an index exchange-traded fund (ETF) there are several indices to choose from, including the S&P 600®, Russell 2000® and the CRSP U.S. Small Cap Index, each having different characteristics and underlying market exposures.

Figure 2. Active Funds' Success Rate by Category %

The lowest cost active funds fared better over the 10-year period



As of 12/31/2022. Source: Morningstar

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Breaking down active risk

Active risk, also known as tracking error, is the standard deviation of the difference in returns between an investment (portfolio) and its benchmark. Active risk is often associated with active management, but that is not the only source of risk in portfolios. Generally, there are three main sources of risk that are particularly relevant in our portfolio construction process: asset allocation, implementation and active management risk.

Asset allocation risk

This represents the tracking error introduced into the portfolio by strategic (long-term) and tactical (short-term) asset allocation decisions. As asset classes fall in and out of favor, a portfolio's weight in an asset class can influence overall portfolio performance, regardless of the underlying investments in each allocation.

Implementation risk

When implementing a desired asset allocation, there are choices among investment vehicles and benchmarks that can result in material variations in portfolio characteristics and performance. This is particularly relevant for passive exposures as there are often several indices tracking the same segment of the market, but they may have substantially different characteristics, such as market cap distribution, sector composition and style tendencies.

Active manager risk

This form of risk is introduced as active managers deviate from their target benchmark, which can lead to higher tracking error.

When is passive a likely fit?

Depending on an investor's objective, a passive approach may be the preferred course of action for specific allocations.

Factors: If an investor is targeting a particular factor, such as quality, momentum or volatility, or a certain sector, industry or region, it is usually more efficient to implement through a passive vehicle. Passive funds designed to target certain characteristics are often the cheapest and most direct way to achieve these exposures. Exposures within actively managed strategies that have broader mandates could shift over time as a byproduct of unrelated portfolio changes.

Taxes: For some investors, passive vehicles can be used to maximize tax efficiencies within portfolios. For example, implementing a core equity exposure with a systematic tax-harvesting passive index strategy can be a cost-effective way to gain index exposure while also maximizing after-tax gains. Furthermore, passive funds are often more tax effective by nature because their turnover is generally far less than the average active manager. That said, we tend to target active managers with below-average turnover for our platform.

Cost control: Paying more for something that generates a similar return to a lower- cost option will negatively affect an investor's wealth over time.[1] Simply put, fees matter. Some academics have even suggested fees be measured as a percentage of risk-adjusted returns above the market, not as a percent of total returns. In essence, is the portfolio being properly compensated for this more expensive option?

Our thoughts

Although we believe in the value of active investing across asset classes, it may be sensible to favor passive in areas of the market where it has proven more difficult for even top-tier managers to generate significant excess return.

1 William F. Sharpe, "The Arithmetic of Investment Expenses," Financial Analysts Journal (March 2013). Sharpe demonstrates that seemingly small differences in fees compound to dramatic effect.

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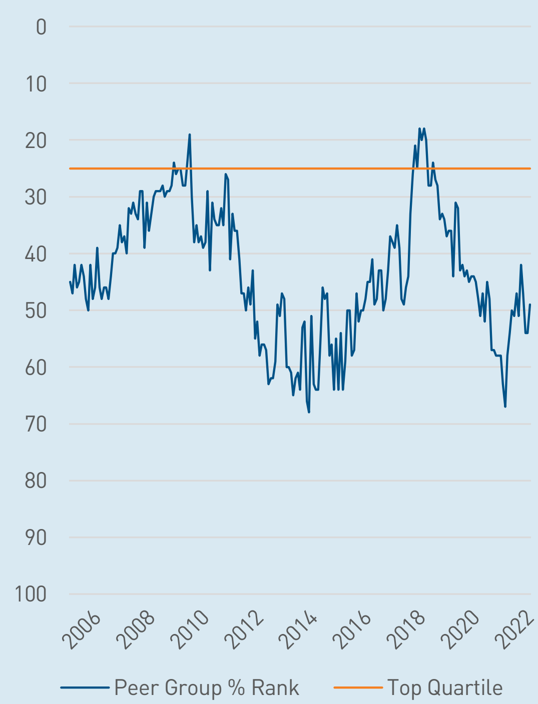
Why active + international works

International markets are heterogeneous, enabling active managers to potentially capitalize on shifting market conditions across different geographies. The developed international asset class, as defined by the MSCI World Ex USA Index, comprises 22 countries with various economic, political and financial market drivers. We believe the idiosyncratic exposures within the asset class can allow active investors to not only more readily identify potential opportunities but also manage risk more effectively. This quality is amplified in emerging international markets. Since 2003, on a rolling three-year basis, the MSCI EM Index ranked in the top quartile of the emerging market peer universe in only 6% of the observed periods.

MSCI EM Index 3-Year Rolling Peer Percentile Rank



As of 12/31/2022. Source: Morningstar

Finding a diamond in the rough

Selecting skilled managers is possible

We believe skilled active equity managers can be identified as they often share certain identifiable traits. This is not just our opinion, rather it has roots in numerous academic studies that sought to identify common characteristics and processes exhibited by outperforming managers (Figure 3, page 6). The results of these studies show managers that outperformed were truly active, meaning the composition of their strategies was materially different from the benchmark.

Conviction to look different than an index, as measured by active share, is a tangible characteristic that aids our manager selection process. We use active share to narrow the pool of potential managers to those we believe are more likely to outperform.

While we may increase our odds of success by focusing on funds with high active share, it is important to remember this is not a measure of skill. Rather, it simply quantifies a strategy's degree of difference versus an index, which can strongly influence relative performance. Thus, these metrics are merely a helpful starting point for a robust equity manager selection process.

The story is similar in fixed income, as we believe certain structural advantages confer benefits to active managers within the asset class, although we do not use active share as the quantifying metric. For example, among multisector fixed income managers, often referred to as "core" or "core plus," we focus on managers with scale and experience in off-benchmark sectors and securities. Scale is important since the economics of trading costs and retaining top talent favor large asset bases. Off-benchmark experience enables skilled managers to access areas within fixed income that are off the beaten path, which could enhance diversification.

IN FIXED INCOME, WE FOCUS ON MANAGERS WITH SCALE AND EXPERIENCE WITH OFF-BENCHMARK SECTORS AND SECURITIES

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Figure 3. Notable Findings from Working Papers

Author (s)	Notable Findings
Brands/Brown/Gallagher (2004)	Documents a positive relationship between performance and portfolio concentration. Focused managers outperform.
Baks/Busse/Green (2006)	Focused (concentrated) managers outperform more broadly diversified counterparts. Investors may enhance performance by diversifying across focused managers rather than by investing in highly diversified funds.
Kosowski (2006)	The average manager underperforms in expansionary periods but outperforms in recessionary periods when investors' "marginal utility of wealth is high" (that is, when performance matters most to investors).
Khorana/Servaes/Wedge (2007)	Managers who invest in their own funds tend to outperform.
Cremers/Petajisto (2009)	Introduced Active Share, which "represents the share of portfolio holdings that differ from their benchmarks, both before and after expenses, and they exhibit strong performance persistence."
Massa/Zhang (2009)	Organizational structure affects performance, and flat structures tend to lead to outperformance. More vertical structures are characterized by worse performance.
Petajisto (2010)	The most active stock pickers have outperformed their benchmark indices, even after fees and transaction costs.
Jian/Verbeek/Wang (2011)	Stocks heavily overweighted by active funds outperform. Active mutual funds invest in only a small portion of fund assets in high alpha stocks. Fund managers' high-conviction ideas outperform.
Amihud/Goyenko (2012)	More "active" funds, measured by lower R2 to their benchmark, tend to outperform.
Ding/Wermers (2012)	Governance structure matters: having more independent directors on a mutual fund board is a characteristic of outperforming funds.
Wei/Wermers/Tong (2012)	Contrarian fund managers tend to outperform.
Cremers (2016)	Funds with high active share and long holding duration outperform.

Source: Hotchkis & Wiley, PNC

Across asset classes, we are confident skilled active managers exist and can be identified. However, it requires a rigorous, consistent and holistic assessment of the manager and strategy to determine the future probability of outperformance and that the proper risk controls are in place. The key areas we assess are:

- **Organization:** Is the manager stable with a culture and incentives aligned with investors?
- **Investment philosophy:** What is the market inefficiency the manager seeks to exploit?
- **Investment process:** How does the manager exploit the market inefficiency, and is it repeatable?
- **Investment team:** Does the team have the appropriate knowledge and structure?
- **Portfolio and risk management:** How is the process implemented and risk managed?
- **Performance:** Has the manager been successful in the context of expectations and historical market environments?

A core component of our investment process is to know what we own and why we own it. Our process for selecting active managers, both quantitative and qualitative, involves identifying truly active managers with a clearly articulated investment philosophy and process, which we believe helps lead to a differentiated portfolio. We believe this focus increases the likelihood of finding managers whose past success is repeatable and is the product of skill, rather than fortuitous timing. A deep understanding of the factors contributing to manager success, which go well beyond portfolio metrics, is critical to investing with an active manager program. In our view, this not only helps us identify the managers most likely to outperform, but it also allows us to be patient and reap the benefits from investing with an active manager rather than reacting to short-term performance.

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During times of stress, we evaluate performance through the lens of our expectations for the strategy. We establish our performance expectations for the strategy across various scenarios, striving to evaluate them over a complete market cycle, as part of our initial due diligence process. Doing so helps prevent emotional bias and making decisions based on performance, which could ultimately lead to poor investment outcomes.

An additional key consideration is weighing the cost — literally and figuratively — of fees. We believe fees should be viewed in the context of a manager's ability to outperform the benchmark. We are willing to pay more to invest with managers with greater ability. In addition, we review the fees across our investment platform by performing a platform fee analysis across all investment vehicles on a quarterly basis. In our most recent report, 63% of our active mutual funds are in the lowest fee quartile and 23% in the second lowest quartile (Figure 4).

In practice, PNC has dedicated significant resources toward manager selection and ongoing monitoring. We believe our process has added value for our clients as our selected managers have demonstrated a higher success rate than that of the broader universe of active managers over the past seven years (Figure 5, page 8).

Figure 4. Investment Platform Pricing Analysis

63%
are in the least expensive quartile of fees
relative to peers

86%
have less expensive fees
than peer group medians

4%
are in the most expensive quartile of fees
relative to peers

96%
have less expensive fees
than the most expensive quartile of peers

As of 12/31/2022. Source: Morningstar Direct, PNC

Past performance does not equal future success

While it is widely understood that past performance does not guarantee future success, many investors often gravitate toward managers with the best three- or five-year trailing performance. This approach, in our view, fails to evaluate the drivers of those returns or the context of the market environment. Picking a manager based on past performance is not a winning long-term strategy, and a performance review of various active manager universes confirms this. To illustrate this concept, Figure 6 (page 8) analyzes the results of the domestic small-cap active manager universe. On the left-hand side of the chart, we took the top quartile (25%) of U.S. small-cap managers in the eVestment universe for the five-year period ended September 30, 2017 and tracked how they performed over the following five years.

The subsequent performance of these managers was nearly evenly distributed among quartiles of the surviving universe over the successive five years. Additionally, 18% of the funds that had been top quartile performers from September 2012 until September 2017 were not in the eVestment Small Cap universe by September 2022.

On the right-hand side, we reversed the exercise. In this case, we looked at the top quartile of funds for the five-year period ended September 30, 2022, to see how they performed in the prior five years. Again, top-performing funds in the second five-year period were nearly equally likely to come from any quartile in the first five-year period, with 19% of top quartile funds having incepted less than five years prior to the test period. Simply put, limiting a manager search to top quartile performers over the past five years offers nearly no advantage in selecting an active manager. Picking a manager at random from the entire universe of managers would be essentially no worse than looking solely at top quartile performers!

Patience is the best strategy, as even the great stumble

We believe the best way to take advantage of top-tier active managers is to be a long-term investor. Consequently, we go to great lengths to understand why we own the managers we do, when they are likely to perform well or poorly, and what persistent characteristics they have that may

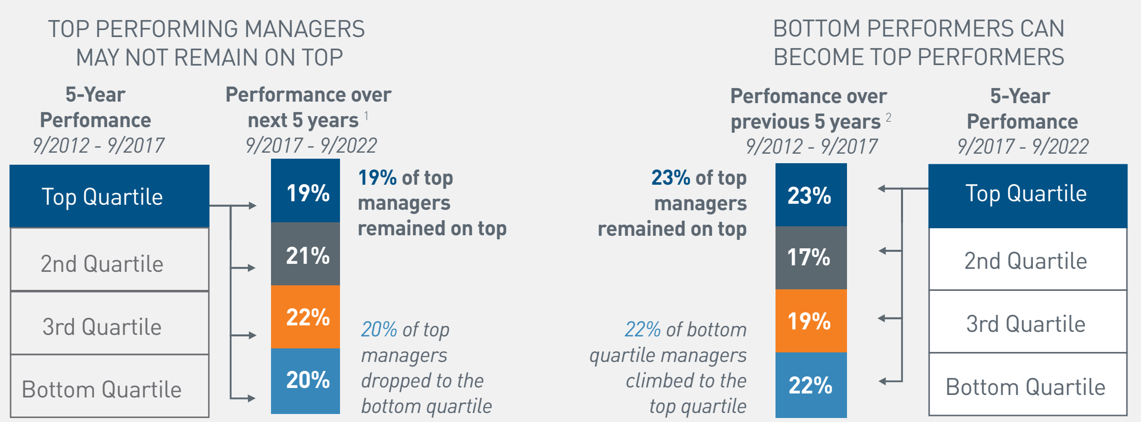
Figure 5. 7-yr Annualized Performance Comparison

A greater percentage of PNC's managers outperformed versus the market average

	Equity		Taxable Credit		Tax-Exempt Credit	
	Outperformance	% Outperforming	Outperformance	% Outperforming	Outperformance	% Outperforming
PNC Platform	0.45%	67%	0.22%	77%	(0.20%)	25%
Market Average	(0.28%)	41%	(0.14%)	41%	(0.25%)	25%
Difference	+0.73%	+26%	+0.36%	+36%	+0.05%	-

As of 12/31/2022. Source: Morningstar Direct, PNC

Figure 6. Comparison of U.S. Small-Cap Equity Manager Quintile Performance



[1] *18% of top quartile managers closed-up their strategies or no longer reported to eVestment universe.*

[2] *19% of top quartile funds had been incepted less than five years prior to the test period.*

As of 9/30/2022. Source: eVestment, PNC

aid outperformance over time. Having strong and enduring conviction in a manager's strategy is often required to ultimately reap the benefits of that manager's particular market advantage. For example, in a study ending December 2014, 92% of top-quartile mutual funds over a 10-year period were unable to avoid at least one three-year period in the bottom half of their peer group. [2]

How many investors would tolerate three years of underperformance? The key is to understand a manager's strategy, to fully grasp the exposures embedded within that strategy and to come to terms with the fact that not all environments will lend themselves to outperformance. However, a manager that meets the preconditions of skill and having a durable edge should add value over time.

A Case Study in Long-Term Active Investing

When we think about the long-term benefits of active management, we understand that it is not simply about selecting good managers with concise goals and high conviction, but also about the ability to remain resolute in the face of unfriendly market environments that cause clients, advisors and even institutions to make poorly timed changes. We believe looking to the past as a guide helps illuminate both the benefits of remaining committed as well as the risks of rash decision making.

To drive home the concept of patience in investing, consider our experience as a long-term investor in the Principal MidCap Fund (Principal), which we added to our investment platform in September 2012. Over

2 Dimeo Schneider & Associates, L.L.C., The Next Chapter of the Active vs. Passive Debate (October 2015).

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the 10-year period ended December 31, 2022, Principal was among the top performing U.S. mid-cap core funds, beating 99% of its peers in the Morningstar mid-cap core universe (Figure 7). Fewer than 15% of the funds in its peer group managed to outperform the Russell Midcap® over that time, and less than 10% of the group managed to outperform the Russell Midcap® Growth as well — Principal did both by nearly 100 basis points (bps) on an annualized basis. This high level of success is even more impressive given the challenging market environment for mid-cap equity over this period.

To enjoy that success, however, an investor would have had to withstand several periods of notable underperformance as well as stretches of unremarkably average performance. For the calendar years of 2013, 2014 and 2016, Principal underperformed the Russell Midcap and ranked in the bottom half of peers in 2013 and 2016. In 2016, the fund ranked in the bottom quartile of peers and trailed the index by 373 bps.

Why did we stick with the fund after several difficult years? Given our commitment to remaining patient and taking a long-term view, in instances like these, it is important to evaluate performance in the context of our initial expectations alongside a review of the fund's investment team, philosophy, process and execution, as these are the primary drivers of sustainable performance.

Our due diligence process is rooted in understanding a manager's philosophy, process, and what market environments we expect them to perform well in. As part of our initial due diligence, we established our expectations for Principal as such:

> *The Principal MidCap Core strategy's quality attributes, valuation premium and sector preferences (notably overweight Financials and underweight Health Care) generally serve as the main drivers of returns. Stock selection also shapes performance given the team's bottom-up, fundamental approach. We generally expect the strategy to outperform during volatile markets when investors seek safety in higher-quality assets. On the other hand, we would expect the strategy to lag during pronounced risk-on environments. The portfolio's proclivity for higher valuation stocks should serve as a tailwind when growth outperforms value and vice versa. Its higher market-cap posture may also play a role when larger-cap stocks and smaller-cap stocks diverge.*

Reflecting on the market environment in 2013, market performance was ebullient, led by lower quality stocks. That year, the Russell Midcap returned 34.8%, while Principal returned 33.6%, landing in the third quartile of the peer group. It was not an environment in which we would expect the strategy do well. The next year proved difficult for active mid cap managers given increased volatility in the second half of the year. Likewise, Principal struggled, but we remained patient. In 2016, value styles outperformed growth as economically sensitive sectors rallied following the presidential election. As such, the bulk of Principal's underperformance came in the fourth quarter. While these years of underperformance were disappointing, Principal's results generally tracked our initial expectations, allowing us to remain patient.

While we firmly believe in the opportunity to generate excess returns by investing with active managers, the path to achieving those returns is never linear, and it requires patience and a refined awareness of risk tolerance. Even with well-reasoned expectations, it is impossible to precisely predict when specific active managers will outperform or underperform. Therefore, significant work is required to develop the conviction to endure inevitable periods of underperformance. One way we mitigate expected poor performance is by combining managers that we expect to outperform and/or underperform in different market environments.

Figure 7. Principal (PMAQX) Return Comparison
Principal outperformed 99% of peers over the trailing 10-year period

	Return	Peer Group Percentile
Principal MidCap R-6 (PMAQX)	12.33	1
Russell Midcap	10.96	14
S&P MidCap	10.78	19
Russell Midcap Growth	11.41	7
S&P MidCap 400 Growth	10.39	34

Peer group Morningstar category: Mid-Cap Blend.
As of 12/31/2022. Source: Morningstar.

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Better together: The power of combining managers

Academic research, as well as our own experience, has shown the managers most likely to outperform are also likely to have performance that diverges dramatically from their benchmarks over time. This deviation in performance can cause investors substantial anguish, particularly during periods of high volatility or underperformance. Fortunately, a complete investment portfolio typically comprises more than one manager.

Our process leverages the impact of diversification to help build a portfolio of managers with high tracking error that, when combined, are expected to deviate less from the portfolio benchmark than each individually. We seek to pair managers that outperform and underperform at different times, enabling a smoother ride for investors over the long run.

We expect informed manager combinations to not only improve a portfolio's return profile, but we also expect benefits from a risk perspective as well. For example, one manager may have a goal of generating competitive returns while preserving capital during periods of market stress. Such managers will often underperform during periods of strong benchmark performance, which could lead to difficult decisions for investors. However, by combining more than one unique manager with different styles and limiting extreme factor tilts, we believe a portfolio is poised to outperform in a variety of market environments and could potentially generate strong returns with less risk over the long term.

To illustrate these risk-return dynamics, consider a hypothetical emerging market (EM) equity portfolio composed of three managers with different style orientations — one value (Pzena Emerging Markets Value), one core (Seafarer Overseas Growth and Income) and one growth (Touchstone Sands Capital Emerging Markets Growth). The past seven years have been a turbulent period in EM, with volatile equity performance, as measured by the MSCI Emerging Markets Index. However, as Figure 8 shows, the effect of combining these three funds would have led to outperformance versus the index while also reducing risk relative to each individual manager and produced a smaller max drawdown. Furthermore, Figure 9 (page 11) shows that while at least one fund underperformed the index in each calendar year, the combination only underperformed in two of those periods, both of which were relatively strong periods for EM.

Note, the volatility of the manager combination is only slightly higher than that of the lowest volatility fund, and the return is higher than both Sands and Seafarer individually. We can see the effect of the diversification in the maximum drawdown, as the combination not only declined less than the index, but it also declined significantly less than Pzena or Sands alone. Most importantly, the combination's tracking error is lower than any individual fund despite all three having considerable variations in return from the index.

Figure 8. Emerging Markets Manager Risk and Return Comparison (1/1/2016-12/31/2022)*
Combining managers would have led to higher return and lower risk over the period

Group/ Investment	Return	Standard Deviation	Excess Return	Max Drawdown	Tracking Error
Touchstone Sands Capital Emerging Markets Growth	4.89	19.54	-0.27	-48.62	9.59
Seafarer Overseas Growth and Income	5.63	16.37	0.46	-27.82	6.62
Pzena Emerging Markets Value	8.08	19.23	2.91	-37.94	7.10
Pzena-Seafarer-Sands**	6.34	17.14	1.17	-31.84	4.62
MSCI EM	5.17	17.62	0.00	-35.98	0.00

** Return, standard deviation, excess return and tracking error annualized.** Combination weights = Sands Capital (30%), Seafarer (40%), Pzena (30%). As of 12/31/2022. Source: Morningstar, PNC*

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Figure 9. Annual Returns Comparison %

EM style leadership varies from year to year

As of 12/31/2022. Source: Morningstar

There is no perfect solution to prevent underperformance, but we believe it can be mitigated by combining active managers with complementary strategies. By bringing together active managers with differing approaches and low correlations across an entire multi-asset class portfolio, we believe investors can reduce the likelihood of long periods of material underperformance overall. In turn, this should also help bolster investors' confidence in holding a portfolio of active managers over the long term in order to accrue the potential return and risk benefits of this approach versus a fully passive implementation.

Passive investing is an active decision

When constructing multi-asset class portfolios using a strategic asset allocation plan, investors have choices about how to capture each allocation. If one chooses to use a passive index strategy to fulfill an allocation, investors must know that the various indices used to track an asset class are not interchangeable, leading to potentially material differences. The same would hold true for the corresponding index ETFs. Therefore, this aspect of passive index investing can paradoxically become an active decision when it comes to portfolio construction. Even when using passive strategies, we believe it is necessary to understand the embedded exposures and how they contribute to portfolio composition and risk. For example, three small-cap equity indices — S&P 600, Russell 2000 and CRSP Small Cap Index —are very different from an exposure standpoint. Simply looking at the distribution of capitalization exposure within the indices, as measured by ETFs that track them, makes this clear (Figure 10, page 12). Furthermore, from a style perspective, all three indices track differently, particularly CRSP Small Cap, as measured by Vanguard Small-Cap ETF (Figure 11, page 12). There are notable sector differences as well. These various index constructions may have a material impact on performance depending on the prevailing market environment. Additionally, performance can deviate dramatically between indices over shorter time frames (Figure 12 and 13, page 12).

We believe this underscores a key point often thought to be the sole preserve of active investing: investors must understand the exposures present in a portfolio and develop an understanding of how those exposures are likely to behave in various market environments. Remember, the dividing line between active and passive is not always as simple as it may seem — how low does tracking error to a stated index need to be before a vehicle qualifies as passive?

Our thoughts

Even a passive investment can introduce active risk into a portfolio. Implementing an allocation with passive funds in an active way in a portfolio should be considered a form of active investing.

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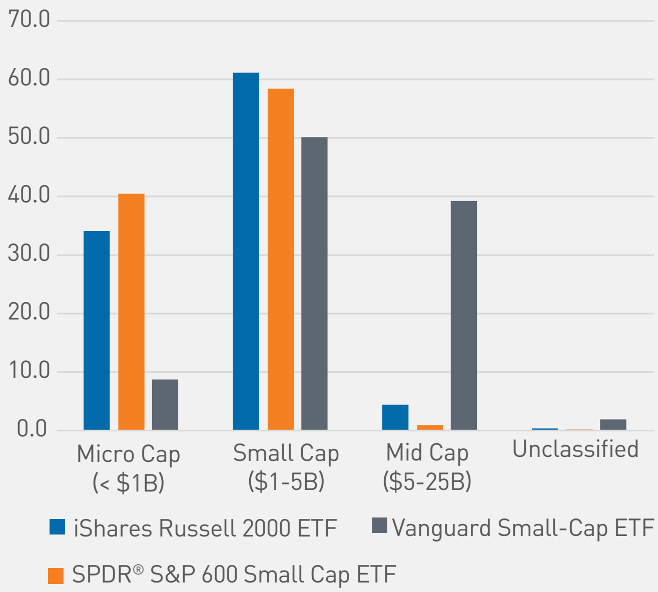
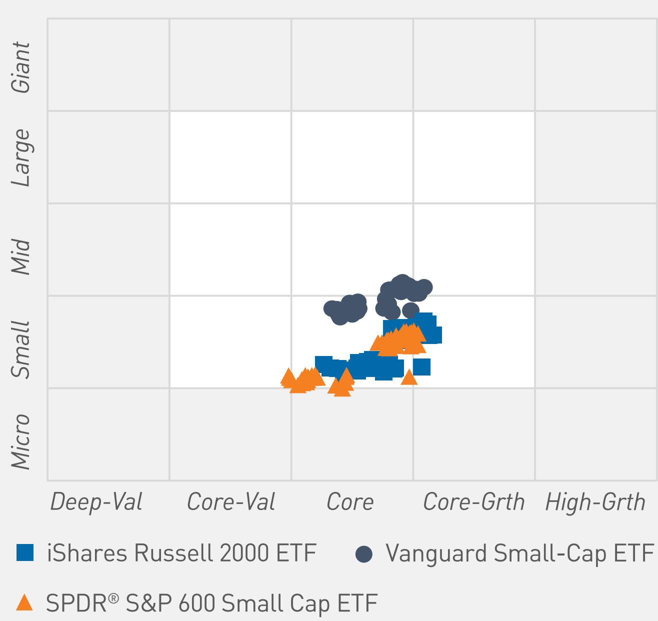
Figure 10. Portfolio Weight by Market Capitalization %
Small-cap indices vary widely by market cap distribution



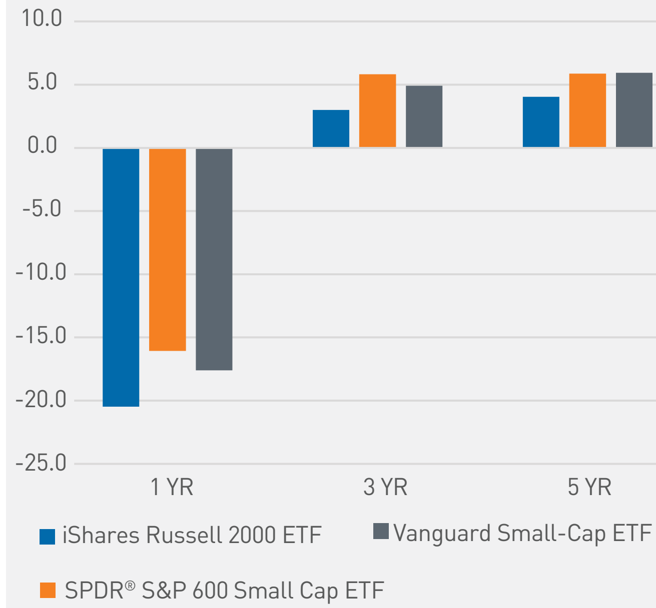
As of 12/31/2022. Source: Morningstar

Figure 11. Holdings-based Style Trail
Style characteristics vary among small-cap indices



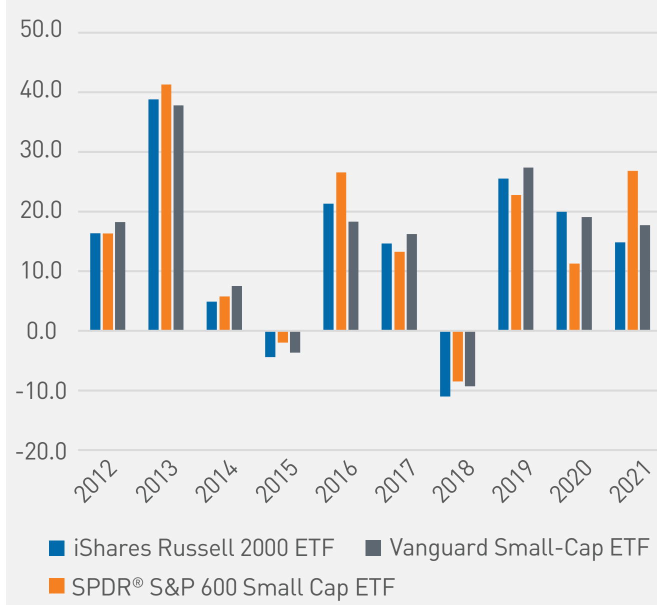
As of 12/31/2022. Source: Morningstar

Figure 12. Comparison of Trailing Returns %
Performance among small-cap indices varies, particularly in the short term



As of 12/31/2022. Source: Morningstar

Figure 13. Comparison of Calendar Year Returns %
Performance among small-cap indices varies, particularly in the short term



As of 12/31/2022. Source: Morningstar

Indices are unmanaged, not available for direct investment, and not subject to management fees, transaction costs or other types of expenses that an account may incur.

Decision time: What is the right mix?

A portfolio's investment objective is a key driver of the optimal active/passive mix. It is largely a subjective decision based on goals and risk tolerance that can also be influenced by behavior questions, such as:

- How likely is an investor be to be patient with a high-conviction, yet underperforming manager?
- What is an investor's tolerance for deviation from a stated benchmark?
- Will the possible temporary combination of higher fees and underperformance induce behavior that is likely to erode performance over time?

Even the most rigorous process does not guarantee selecting a skilled manager that will add value over time. A low-cost index fund removes the possibility of paying a higher fee for something that ultimately underperforms, but it also rules out the possibility of outperformance.

At the portfolio level, recognizing sources of active risk — allocation, implementation, and active manager risk — can aid decisions around how to implement asset allocations with active management. Being cognizant of allocation and implementation risk in the portfolio may influence the decision to only lean into active where it has displayed more consistent success, and to consider a target range for portfolio tracking error. In asset classes where relative performance has been more cyclical, such as U.S. large cap, many investors may be best suited for passive positions that can be adjusted tactically to express a particular view. Ultimately, the right active/passive mix depends on the composition of the overall portfolio, the market environment and the preferences of each individual investor. There is no one-size-fits-all approach.

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Data for Figure 4, Investment Platform Pricing Analysis is sourced from Morningstar Direct and placed into a report created by PNC Bank N.A. ("PNC"). The report assigns a percentile range (based on Morningstar's fee ranking data) to those strategies which form a part of the PNC Asset Management Group ("AMG") platform ("AMG Platform") of mutual funds (MFs), exchange traded products (ETPs), and separate account (SMAs). **The AMG Platform is a list of investment vehicles and strategies representing different style and risk profiles which have been approved for use by PNC AMG account officers in fulfilling investment objectives of discretionary managed client accounts.** The percentile ranges are then aggregated to create summaries for MFs and EFPs based-on their net expense ratios, and for SMAs based-on their investment management or model provider fees. Note that SMA strategies may be in the form of either sub-advisory or model provider structures.

The Platform Pricing Analysis report uses Morningstar's default categories as peer-groups except for strategies where PNC's Investment Advisor Research Group ("IAR") has determined a more appropriate peer-group in which to classify strategies. The rationale for IAR reclassifying strategies into custom peer-groups is to better align them with peers that have similar investment objectives and styles. AMG's platform of MFs is largely comprised of institutional share-classes, which typically offer lower expense ratios than retail-oriented share-classes of the same strategies which are also included in the relevant peer-groups. MFs and ETPs are assigned/compared to relevant peers based-on whether the strategies are active or passive in nature. Passive strategies are identified through the use of Morningstar's "Index Fund" data.

SMA'S are assigned/compared to Morningstar's entire peer-group for each category regardless of active/passive classification. Within the Morningstar SMA peer groups, data for managers utilizing sub-advised structures is commingled with, and not distinquishable from, data for managers utilizing model provider structures. The fee structure for a sub-advised account differs from that for a model provider account. Therefore, it is not possible to confirm that in our summary percentile ranking that the SMA investment management fees for the SMAs on the AMG Platform are matched to the identical type of SMA account structure within the Morningstar SMA peer group.

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