



Invesco White Paper Series on the Active/Passive Debate

This white paper was generated in conjunction with Invesco's global Investors Forum, based on research conducted by Invesco's Americas Product and Market Research group. The Investors Forum brings together each of Invesco's 650-plus investment professionals from around the world to discuss issues that are critical to global investors.

Executive summary

Think active can't outperform? Think again.

Examining the historical outperformance of active management

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Questions routinely arise about the value of active investing: Can active managers beat their benchmarks? Should investors abandon active strategies? Invesco conducted an extensive study of approximately 3,000 equity mutual funds over the past 20 years – covering five distinct market cycles – to investigate the true value of active management.

Our study focused on active share, which measures the difference between a fund's holdings and the holdings of its benchmark index. If a fund held completely different stocks than its benchmark, it would have an active share of 100%. A fund that perfectly mirrored its benchmark would have an active share of 0%. For the purposes of our study, we define "high active share" using the common threshold first used by Cremers/Petajisto¹ and others – an active share level of 60% or greater.

Please note that during the time frame of our study, there are time periods where active management did underperform the passive benchmark. The study focuses on the stated time periods, as we believe they represent five distinct full market cycles over the past 20 years.

Invesco's perspective on the active/passive debate

At Invesco, we believe the greatest opportunity for investors to achieve their unique objectives is through a well-constructed portfolio that spans asset classes and considers both actively managed and index-based strategies. However, we believe in taking a high-conviction approach that goes beyond the limitations of traditional passive investing and benchmark-centric active management.

In this white paper series, we explore various topics that are key to building outcome-oriented portfolios and moving past the active/passive debate.

Key takeaways

Individual investors often reduce "active" and "passive" to their simplest terms – active funds have portfolio managers who make investment decisions, and passive funds simply seek to replicate the holdings of an index. But as a way to gauge performance, those definitions are much too simple. Some active management teams may not stray very far from their benchmark. And some passive funds take a smart beta² approach, tracking innovative indexes that are constructed and weighted very differently than traditional, market-cap-weighted benchmarks. Other active managers may also take a smart beta approach by managing quantitatively enhanced index funds that seek added benefits for investors.

- **Excess return.** On an asset-weighted basis, 60% of high active share fund assets beat their benchmarks (after fees) across all market cycles studied. On an equal-weighted basis, 53% of high active share funds beat their benchmarks (after fees) across all market cycles.
- **Downside capture.** Active management displayed significant outperformance in this area as well: 64% of high active share fund assets had a better downside capture than their benchmarks across all market cycles (62% on an equal-weighted basis). This evidence helps support our belief that active managers are better able to weather negative return environments than cap-weighted portfolios.
- **Risk-adjusted returns.** When historical returns were adjusted for risk, active continued to outperform passive benchmarks: 59% of high active share fund assets had a better Sharpe ratio (providing more return per unit of risk) than their benchmarks across all market cycles (53% on an equal-weighted basis). Even after adjusting for risk, actively managed portfolios performed better in aggregate compared to the results of passive benchmarks.

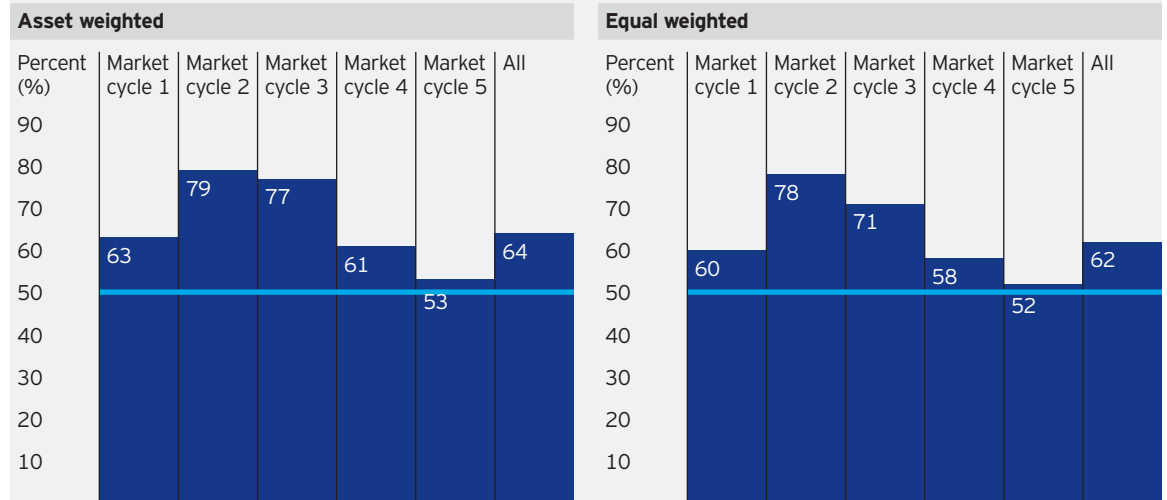
1 How Active Is Your Fund Manager? A New Measure That Predicts Performance, K.J. Martijn Cremers and Antti Petajisto, March 31, 2009.

2 Smart beta is an alternative, index-based selection methodology that may outperform a market-cap-weighted benchmark or mitigate portfolio risk, or both, through active or passive vehicles. Smart beta funds may underperform cap-weighted benchmarks and increase portfolio risk. There is no assurance that an investment strategy will outperform or achieve its investment objective.

% of high active share assets and funds that captured less of the downside than their benchmarks

Asset-weighted and equal-weighted results by market cycle

■ = >50% success rate for high active share



Market cycle 1: Peak to peak (7/98-3/00)
 Market cycle 2: Trough to trough (10/98-9/02)
 Market cycle 3: Peak to peak (4/00-10/07)

Market cycle 4: Trough to trough (10/02-2/09)
 Market cycle 5: Peak to present (11/07-12/16)
 All: Aggregate of all five market cycles (7/98-12/16)

Source: FactSet Research Systems, Inc.

Because the drivers behind active share can vary so dramatically, we believe this metric should not be used in isolation to select one strategy over another. Investment process, philosophy, manager experience and other qualitative measures are important components of the decision-making process. Additionally, there are other metrics that, when crossed with active share, can identify more differentiated results among the high active share funds and aid with manager selection (a subject for further research).

While investors have many factors to consider, the results of our study found that across multiple market cycles, active management has a history of benchmark-beating results in a variety of metrics, including excess returns (outperformance over the benchmark), downside capture (how a manager performed in relation to a falling benchmark) and risk-adjusted returns (the amount of risk involved in generating a return).

Appendix Methodology

- **Fund selection.** We analyzed 17 US open-end mutual fund Morningstar categories, which encompass all of the major US and foreign equity capitalization styles defined by Morningstar. About 3,300 total funds resulted from this primary screen. Net-of-fee performance from the oldest share class was used to provide the longest available return history for each fund. Mutual fund sales loads were not included in the calculations for the analysis. High active share funds may potentially be more expensive than low active share funds, which may affect performance. Funds of funds were excluded from the analysis (64 funds/\$28.1 billion in AUM as of Dec. 31, 2016). All performance data was sourced from Morningstar.
- **Benchmark selection.** At least one widely used benchmark was assigned to each Morningstar category for the active share calculation. In several categories, active share scores were calculated against multiple common benchmarks to determine best fit. The lowest active share score, representing the highest commonality fund-benchmark relationship, was the used in the analysis.
- **Active share calculation.** Active share measures the percentage of equity holdings in a fund that differ from the benchmark index. Higher active share indicates lower holdings similarity between a fund and a particular index. A fund and an index that have no commonality would yield an active share of 100%. Funds that hold derivatives may actually generate an active share score above 100% due to financial leverage. Holdings data from FactSet Research Systems, Inc. was used to calculate annual active share in each of the previous six calendar years. An average of the annual active share statistic was used throughout the analysis. Only funds with at least four years of active share scores were included. Funds with incomplete holdings data were excluded from the analysis (208 funds/\$178.6 billion in AUM as of Dec. 31, 2016).

$$\text{Active share} = \frac{1}{2} \sum_{i=1}^N |W_{\text{fund},i} - W_{\text{index},i}|$$

- **Equal-weighted calculations.** Equal-weighted figures represent the number of funds that outperformed a specified benchmark/value in each period relative to the total number of funds with calculable data in that period.
- **Asset-weighted calculations.** Asset-weighted figures represent the percentage of assets of funds that outperformed a specific benchmark/value in each period relative to the total assets of funds with calculable data in that period. For market cycles and trailing periods, assets were averaged using beginning- and end-of-period data.

Data limitations

- **Backcasting.** Due to the limited availability of historical holdings data, this analysis was based on average active share scores calculated from 2009 to 2016. Those scores were used to calculate historical equal- and asset-weighted success rates for periods as far back as 1998. It is possible that some funds may have had dramatically higher or lower active share measures prior to 2009, which our approach would not capture, though we observed a high degree of consistency in funds' active share weights in the examined time period.
- **Annual active share data.** Due to the complexity and time-intensive nature of the active share calculations, active share was measured once a year rather than building a quarterly or monthly data set.
- **Lack of holdings data.** A small number of funds (even smaller by weight) was excluded from the analysis due to a lack of holdings data available in FactSet Research Systems, Inc.

Challenges/biases

- **Survivorship bias.** This analysis looks at only the funds that existed and traded as of Dec. 31, 2016. This bias exists in the long-term trailing data.
- **Market cycle.** The active share scores were calculated during one of the strongest equity bull markets in history. Market conditions were considerably different in each of the remaining market cycles and long-term trailing periods.
- **Oldest share class.** The oldest share class for a majority of the funds is a lower expense share class (e.g., A, I or Y), but for a select few, the oldest share class represents the most or more expensive share class of the fund, thereby further diluting performance. An asset-weighted expense ratio was not used.
- **End-point style.** Active share scores for each fund were calculated against the hand-picked benchmarks based on its Morningstar categorization as of Dec. 31, 2016. The historical style of a fund may have differed from its current Morningstar categorization.
- **Portfolio manager turnover/strategy change.** The analysis looks at only the return series generated by the fund and does not take into account headcount turnover or significant investment process changes.

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About risk

Derivatives risk. Derivatives may be more volatile and less liquid than traditional investments and are subject to counterparty and leverage risk.

Value investing risk. A value style of investing is subject to the risk that the valuations never improve or that the returns will trail other styles of investing or the overall stock markets.

Foreign securities risk. The fund's foreign investments may be affected by changes in a foreign country's exchange rates, political and social instability, changes in economic or taxation policies, difficulties when enforcing obligations, decreased liquidity, and increased volatility. Foreign companies may be subject to less regulation resulting in less publicly available information about the companies.

Growth investing risk. Growth stocks tend to be more expensive relative to their earnings or assets compared with other types of stock. As a result they tend to be more sensitive to changes in their earnings and can be more volatile.

Management risk. The investment techniques and risk analysis used by the fund's portfolio managers may not produce the desired results.

Market risk. The prices of and the income generated by the fund's securities may decline in response to, among other things, investor sentiment, general economic and market conditions, regional or global instability, and currency and interest rate fluctuations.

Small- and mid-capitalization risks. Stocks of small- and mid-sized companies tend to be more vulnerable to adverse developments and may have little or no operating history or track record of success, and limited product lines, markets, management and financial resources. The securities of small- and mid-sized companies may be more volatile due to less market interest and less publicly available information about the issuer. They also may be illiquid or restricted as to resale, or may trade less frequently and in smaller volumes, all of which may cause difficulty when establishing or closing a position at a desirable price.

NOT FDIC INSURED | MAY LOSE VALUE | NO BANK GUARANTEE

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