White Paper
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Navigating the concentration conundrum

A Core-Satellite approach to active equity investing

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Introduction

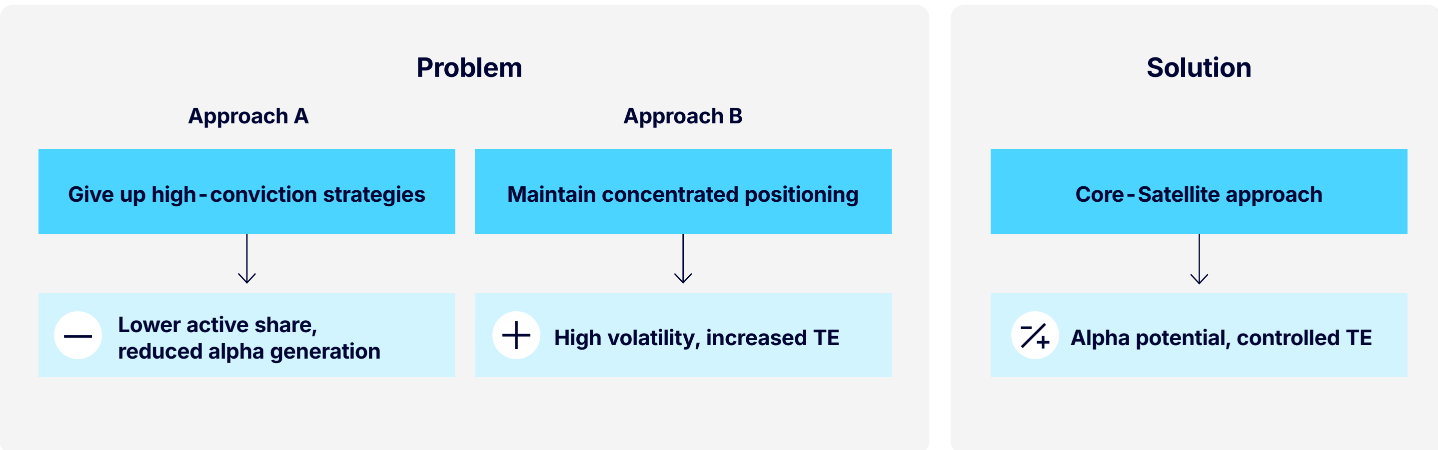
Concentration risk has increased alongside strong earnings growth from hyperscalers, and investors are tasked with managing the growing influence of AI on global index performance. In this piece, we consider how asset allocators can use a Core-Satellite approach to invest via active management in today's environment, but ensure that risk is mitigated and tracking error is controlled.

The recent extraordinary rise in equity index concentration has important consequences for active managers of bottom-up focused portfolios.

Stock picking in the prevailing concentrated market environment leads to relatively large overweight and underweight positions outside the top of the index. This in turn can lead to large return deviation and significant tracking error (TE) relative to the market cap-weighted benchmark.

This piece explains how a Core-Satellite approach can allow investors to continue using an active management approach, but while mitigating risks and TE.

Figure 1: Managing highly concentrated market cap-weighted benchmarks



Background: The rise of equity index concentration

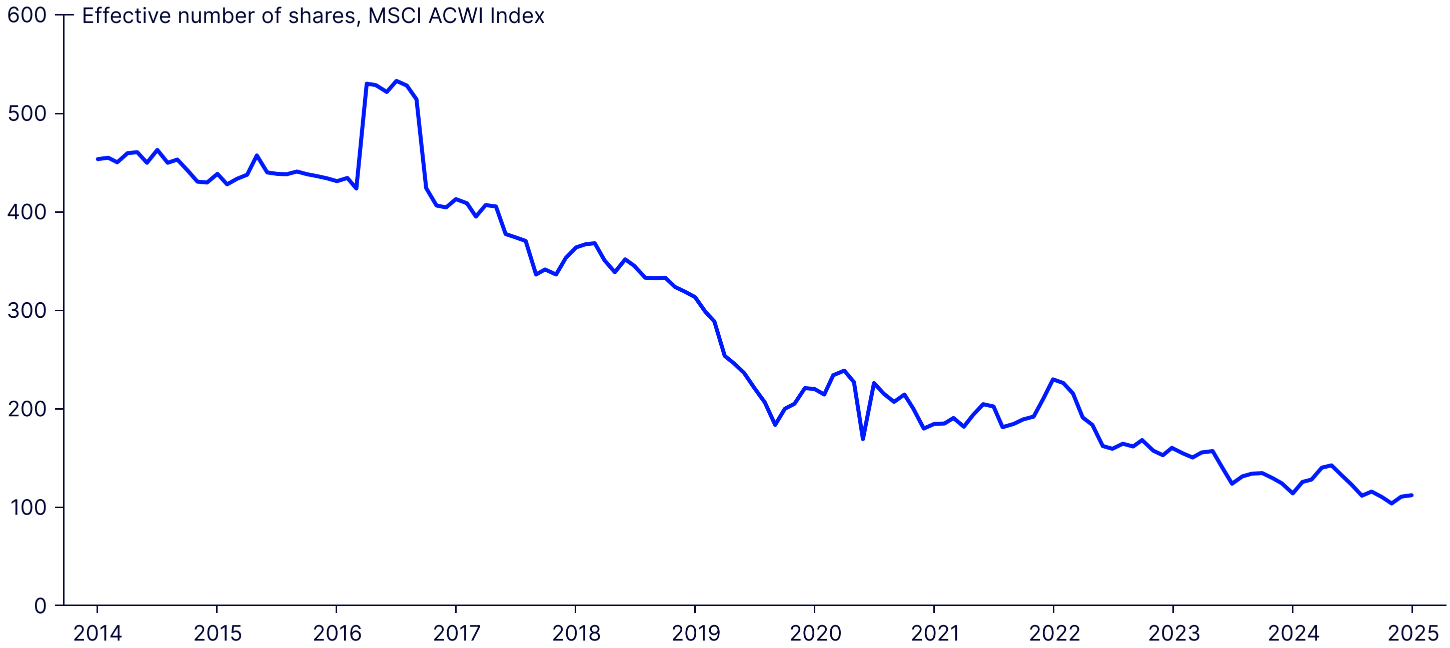
Enthusiasm over the economic potential for AI has led to IT-related names dominating both global and US benchmarks. The extent of market concentration in the MSCI ACWI is exhibited by Figure 2. The effective number of shares was at just 112 (out of a total of 2,517) as of December 31, 2025.[1]

Apple, Alphabet, Microsoft, Amazon, Nvidia, Meta Platforms and Tesla, known collectively as the "Magnificent 7," have invested heavily in AI, both in terms of computing science, and around developing products and infrastructure to sell to their customers. Their spearheading of the market has come from strong revenue and earnings generation in AI.

More recently, two more AI-related names—Broadcom, which builds AI infrastructure solutions, and Taiwan Semiconductor Manufacturing Co Ltd.—have moved into the top-10 names by weight in the MSCI ACWI.

As a result of strong outperformance in these names, the MSCI ACWI has become more highly concentrated. As of December 31, 2025, the Magnificent 7 took up around 21.8% of the weight in the Index, which consisted of 2,517 members, per FactSet. The top 10 stocks by weight continued to dominate the Index; the combined weight was 25.7% as of end-2025 (Figure 3), FactSet data shows.

Figure 2: The AI juggernaut has driven index concentration significantly higher



Source: FactSet, Data between 31 December 2014 and 31 December 2025. The specific securities listed do not represent all of the securities purchased, sold, or recommended for advisory clients. You should not assume that investments in the securities identified and discussed were or will be profitable.

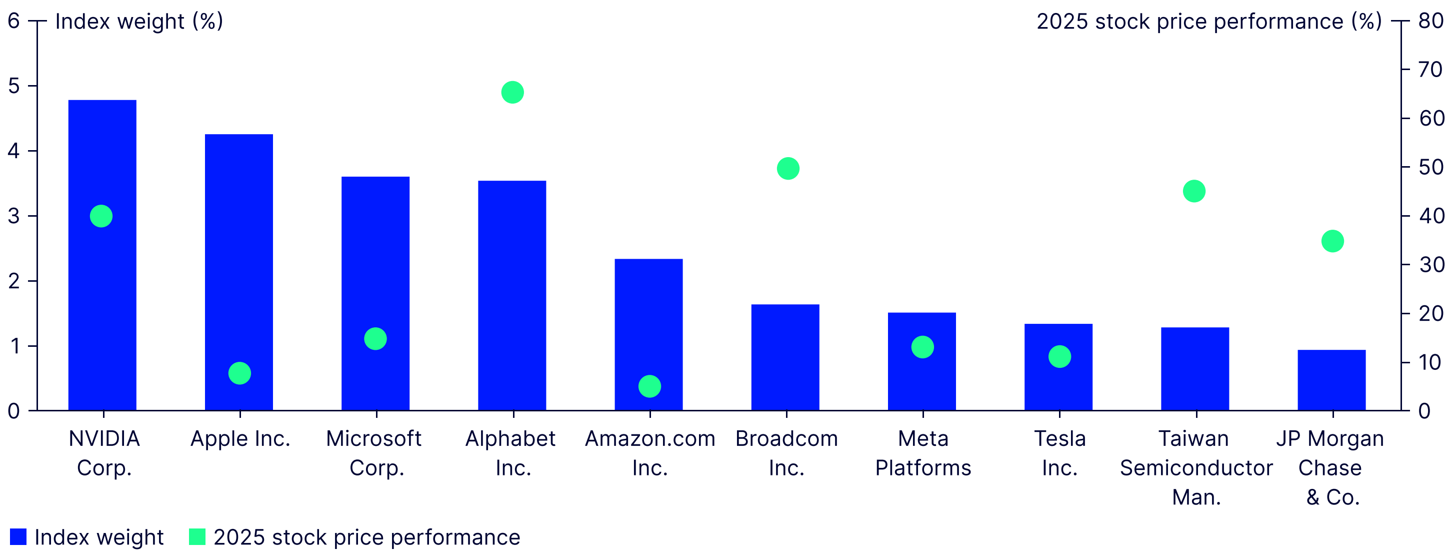
An enduring trend

In our view, AI is not a bubble that is about to burst; rather, AI is a long-term earnings driver for firms that can boost their earnings by using the tools that AI provides. AI could potentially transform the way the global economy operates in the next five to 10 years, including the following:

- **Stiffer competition.** Competition in this new era will require firms to work harder to maintain market position, as a competitor's successful adoption of AI can increase its efficiency.
- **Equity performance broadening out.** The timing and the speed of the broadening out is difficult to predict, given that AI will take time to be implemented across sectors. This will create both opportunity[2] and short-term tracking risk where equities are concerned.
- **New investment lens.** The implementation of AI as an important corporate productivity tool is adding a major new dimension to the way we, as equity investors, evaluate our portfolio holdings, our earnings forecasts, and our qualitative Confidence Quotient, or "CQ" scoring system.
- **Industry themes.** Healthcare is set to be transformed by AI, as are the Logistics and Auto sectors. Industrials will be the beneficiaries of a vast build-out of data centers for AI, and automated plants, driven by AI. The Defense sector is leaning towards sophisticated cyber and space technologies, many of which will rely on AI.
- **Importance to sustainability.** Climate resilience and the management of climate-related events increasingly relies on AI. The electric grid is faced with more and more sources of energy supply and this, coupled with fluctuations in demand, is more easily handled using AI.

AI's entrenchment into global markets means that investors in high-conviction portfolios are operating in a new world of investing, in which risk of increased concentration can lower diversification and dramatically increase TE.

Figure 3: Dominance of the top 10 names persists due to strong outperformance
MSCI ACWI top 10 names by market cap, as % of index



Source: Bloomberg, MSCI, State Street Investment Management. As of December 31, 2025. **The performance data quoted represents past performance. Past performance does not guarantee future results.** Specific securities listed do not represent all of the securities purchased, sold, or recommended for advisory clients. You should not assume that investments in the securities identified and discussed were or will be profitable.

Managing concentrated equity markets using diversification

Diversification can be helpful in navigating strongly concentrated markets while retaining a high-conviction strategy to boost alpha. This can be done in the following ways:

1. **Combine the high-conviction strategy with the reference benchmark index in a Core-Satellite construction.** Adjust exposure to the high-conviction strategy by targeting the desired level of TE versus the reference market cap index.
2. **Combine the high-conviction strategy with a quantitative benchmark-aware strategy in a Core-Satellite construction.** To manage risk, the TE is controlled versus the reference market cap index. In this paper, we present the Global Enhanced strategy developed by State Street Investment Management's Systematic Equity Active (SEA) team.

   We demonstrate that when the Enhanced strategy (which holds roughly 500 names) is combined with our high-conviction Global Equity Select (GES) strategy (which holds 30-40 names) in a Core-Satellite approach, investors get an optimal blend of alpha and TE control.
3. **Combine the high-conviction strategy with other high-conviction strategies.** For example, investors could allocate to three equal-weighted high-conviction strategies that have low correlation, but are comparable in terms of their more general characteristics (e.g. global in nature, benchmark, and number of names). However, with this approach, there is no control of TE.

Diversifying by increasing the number of stocks in the high-conviction portfolio is another alternative, but this would change the strategy as intended, and may also become too much of a burden for the portfolio manager.

*Diversification does not ensure a profit or guarantee against loss.

Our Global Equity Select Strategy (GES): Description and review

The GES investment universe is defined by the MSCI ACWI Index. It is a high-conviction portfolio with holdings of between 30 to 40 stocks. The strategy has an ex-ante TE versus the MSCI ACWI Index in the range 4%-8%. The strategy targets an alpha of 3.0% over the benchmark, with a medium-term horizon or market cycle of 3–5 years.

Understanding Confidence Quotient (CQ) scoring

Our proprietary CQ issuer scoring system helps us test the premises of our earnings forecasts as well as their robustness. The CQs seek to identify the characteristics of companies with durable competitive advantages, including a strong business model, pricing power, business moats, solid balance sheets, and trustworthy management (read more in Spotlight on the Confidence Quotient). Our CQ analysis also helps us identify potential stock-specific risk. “Quality” growth is expected to be durable.

Realized risk and return

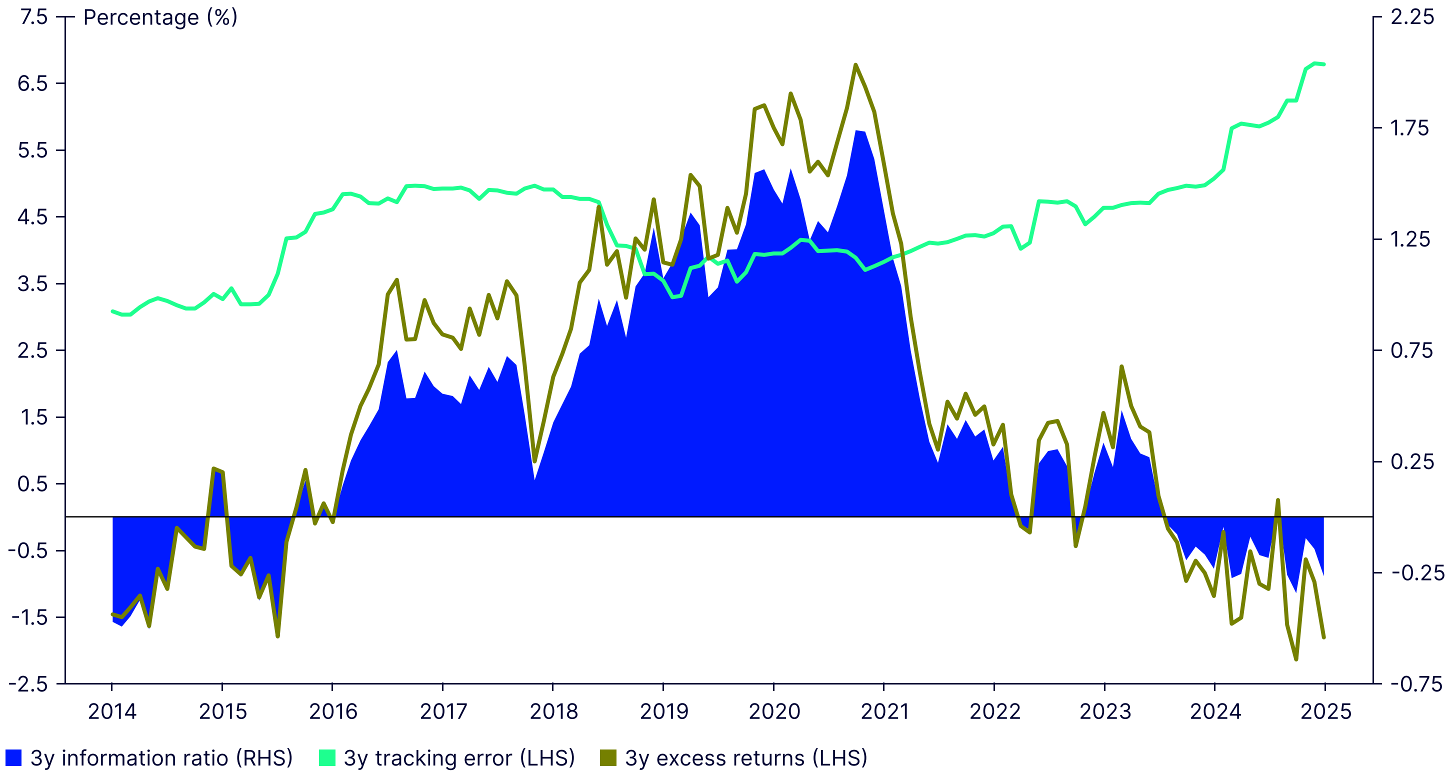
For GES, performance over the past 10 years has displayed excellent and consistent risk and return characteristics. The realized 3-year TE has been 4.4% on average, varying between 3% and 7%. However, the past year has been difficult for the Strategy (Figure 5). This is, in part, due to the Strategy maintaining its bottom-up, selective, and yet diversified approach amid the prevailing concentrated market environment. The portfolio has also experienced a rise in TE as variances to benchmark positioning have grown.

Figure 4: Our CQ analysis helps us identify durable growth and idiosyncratic risks
An outline of our confidence quotients and a sample of analyst questions for an evaluation of AI implementation in a firm

CQ category	Quality assessment	Examples of questions regarding AI implementation*
Management	**Conviction in leadership**	
	• Clear, effective strategy & execution • Effective stewards of capital • Code of conduct/Anti-corruption • Governance	Does Management have the vision and strategy to reorganize its operations and change job descriptions in order for the firm to fully benefit from AI implementation? How clearly has management articulated its AI roadmap?
Market position	**Durable competitive advantage**	
	• Porter five forces • Durable business model • Government/regulatory influence • Fair labor standards • Environmental track-record	Can Market Position and the business model be defended and improved on with new AI tools so as to produce enduring earnings growth? Does the firm have proprietary data or unique AI capabilities that create a defensible advantage?
Financial condition	**Strength of the financial model**	
	• Balance sheet strength • Cash flow generation • Exposure to environmental/regulatory fines	How much capex and other expense is required for AI implementation and can the cashflow support it? What is the expected ROI and payback period for AI investments?
Transparency	**Visibility of business model**	
	• Financial disclosure • Quality of earnings • Predictability of business model	Will the use of AI enhance the revenue line as well as produce cost efficiencies so as to improve the quality of earnings? Will AI make the business model more predictable over the longer term and accelerate durable growth?
Fundamental momentum	**Whether business is trending positively**	
	• Revenue/earnings revisions • Catalyst strength • Industry conditions • Exposure to environmental/regulatory changes	Does AI enhance positive trends in the business overall and can the company improve on industry conditions with its use? How does AI adoption position the firm relative to peers in terms of growth and innovation?

Source: State Street Investment Management. *For illustrative purposes only. The AI questions presented above are meant as examples only and are not necessarily a representation of our process.

Figure 5: High index concentration has impacted GES performance and increased the strategy's TE



Source: State Street Investment Management, as of December 31, 2025. **The performance data quoted represents past performance. Past performance does not guarantee future results.** Returns greater than one year are annualized. The performance data quoted represents past performance. Past performance does not guarantee future results. Current performance may differ from the performance shown. Returns shown are asset-weighted using composite member market values, where the composite member's return calculations are time-weighted; reflect the reinvestment of dividends and other income. These performance figures are provided gross of fees and expenses other than actual trading fees and expenses, and reflect all items of income, gain, and loss. These performance figures (i) are provided net of actual trading, audit, custody, administrative and legal fees and expenses; (ii) adjusted for an assumed investment management fee, which is equal to or higher than the highest investment management fee on the actual fee schedule, inclusive of incentive fee, if any, of any account within the Composite (except certain small accounts-subject to a minimum investment management fee-may have incurred an actual investment management fee higher than that fee assumed in calculating the performance shown above); and (iii) reflect all items of income, gain and loss (other than unrealized gain or loss on units of the securities lending pools held by any portfolio in the Composite (as defined below)). Performance returns are calculated in (US dollars).

Constructing a Core-Satellite approach with control over TE

If an investor wishes to control the TE of a portfolio versus the reference benchmark, then a Core-Satellite approach could be suitable. Investors could combine a concentrated portfolio such as GES with its reference benchmark index, or, the concentrated portfolio could be combined with a quantitative benchmark-aware strategy such as the Systematic Equity Active (SEA) Enhanced. This strategy is managed within a 1% ex-ante TE budget constraint.

Combining GES and Enhanced to promote diversification

In our example, we combine GES with the Enhanced strategy in a Core-Satellite construction, with the Enhanced—a more diversified, lower-TE active portfolio—as the Core holding. Note that the Enhanced strategy is a blend of 90% World Enhanced (benchmark MSCI World), and 10% Emerging Enhanced (benchmark MSCI Emerging). Figure 6 outlines the key characteristics of the two strategies.

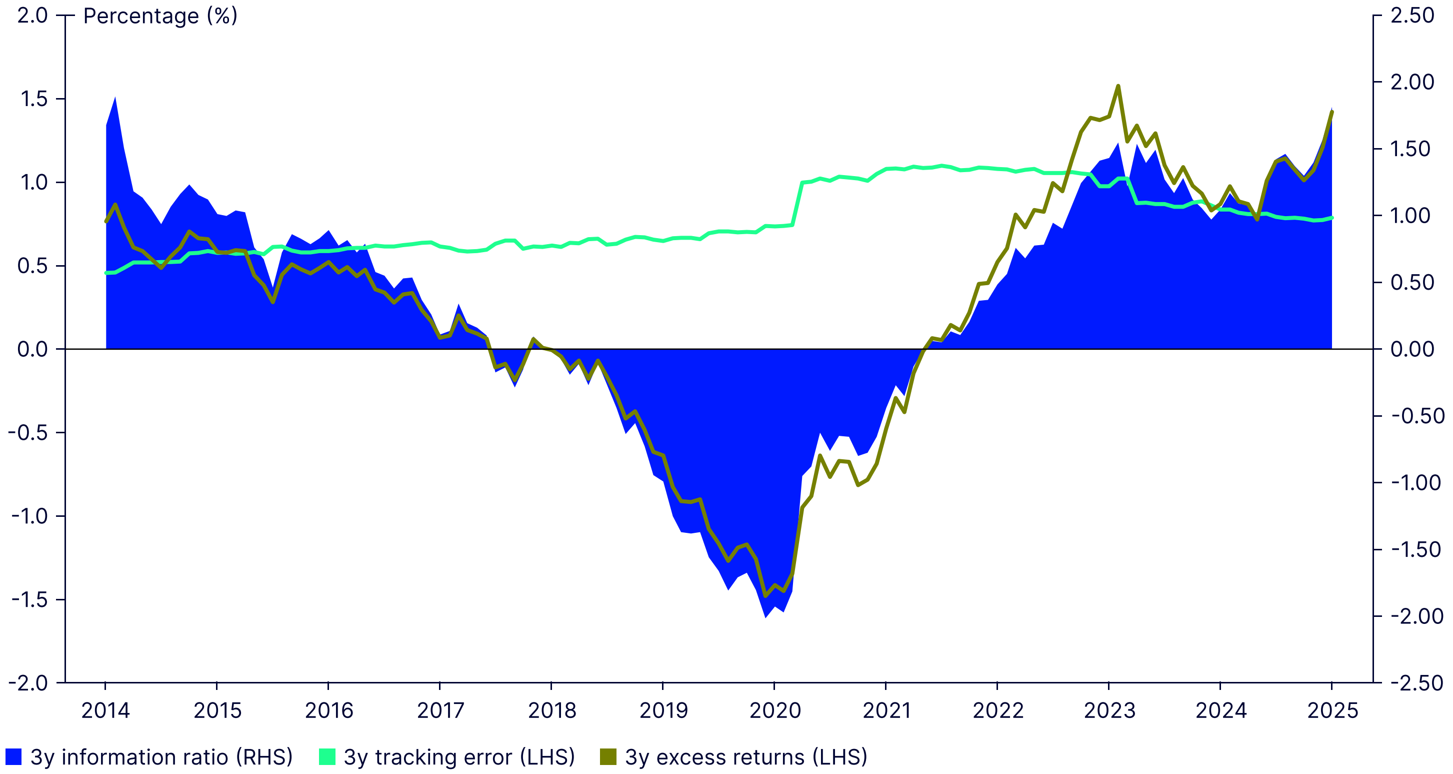
Figure 6: How these two State Street Investment Management active strategy styles compare

	Systematic Equity Active (SEA) Enhanced	**Active Fundamental Equity (AFE)**
Description	An active systematic option with an explicit relative risk budget and alpha target. Stocks are statistically selected based on their historical characteristics and/or attributes.	High-conviction portfolios based on in-depth fundamental research and demonstrated stock-picking skills. Company-specific risk drives performance, rather than market beta.
Attributes:		
Return-driver	Alpha	Alpha
Principle sources of risk	Idiosyncratic as well as systematic risk	Idiosyncratic risk, with returns driven by the 30–40 companies selected for the portfolio
Decision-making	Quantitative/rules-based	Qualitatively based Confidence Quotients (CQs)
Approach	Bottom-up	Bottom-up
Holdings	Broadly-diversified, around 500 securities	Concentrated, around 30–40 securities
Orientation	Forward looking ideas, back-tested using historical data	Forward-looking
ESG impact	ESG is recognized as an alpha attribute	ESG integrated in the stock-picking process
Expected return	Benchmark outperformance of 0.75%–1.5% per annum over 5–7 years	Average 3% alpha over a market cycle of 3–5 years
Tracking error	0.25%–2.00% over 3–5-year period	4%–8%

Source: State Street Investment Management. *For illustrative purposes only.

Figure 7 shows that our Core strategy has a very tight TE versus the MSCI ACWI benchmark (the realized 3-year TE has been 0.8% on average and varied between 0.4% and 1.1% since 2011). Therefore, we can easily adjust the TE of the Core-Satellite portfolio by adjusting the weight of the fundamental Satellite strategy. For example, we assume that our ex-ante TE budget is 1%. Our Core-Satellite portfolio in this example is 75% Core, 25% Satellite. The realized 3-year TE came out to 1.1% on average—importantly, this is in line with the standalone Enhanced strategy. The TE of our Core-Satellite portfolio varied between 0.7% and 1.7% (Figure 8). In addition, the average correlation between GES and Enhanced excess returns versus the benchmark is -17.1%, illustrating a history of excellent diversification (Figure 9).

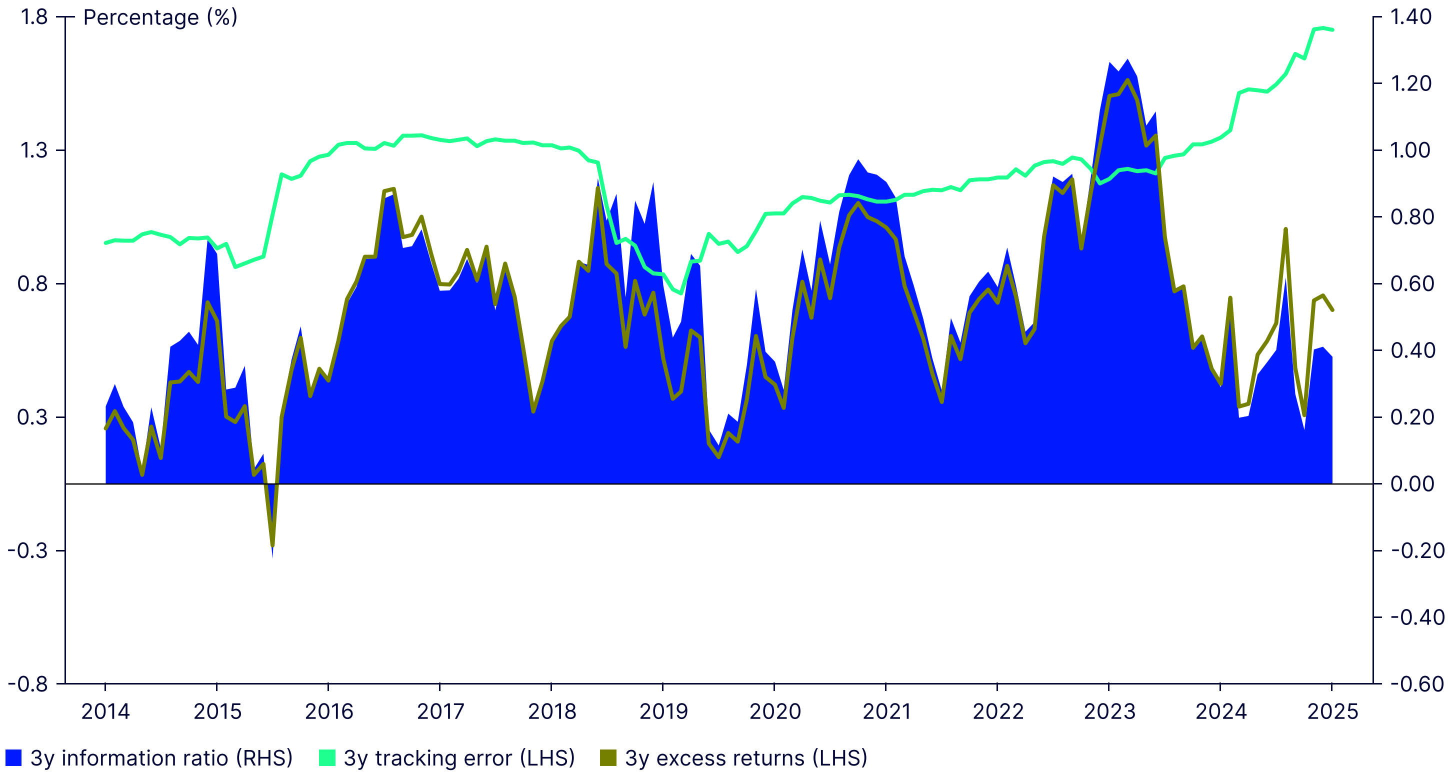
Figure 7: The Enhanced strategy has a low TE of 0.8% on average



Source: Refinitiv between January 2011 and December 2025. Enhanced is a blend of 90% World Enhanced and 10% Emerging Enhanced, rebalanced monthly. Realized net annualized 3-year IR, TE, and Excess Returns for the Enhanced strategy versus the MSCI ACWI Index. Returns do not represent those of the Enhanced strategy, but were achieved by mathematically combining the actual performance data of the World Enhanced and Emerging Enhanced strategies.. The performance figures contained herein are provided on a net of fees basis, reflecting the deduction of investment management fees. Some members of this composite may accrue administration fees. The performance includes the reinvestment of dividends and other corporate earnings and is calculated in USD.

Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income as applicable. Index returns are unmanaged and assume a 5bps fee.

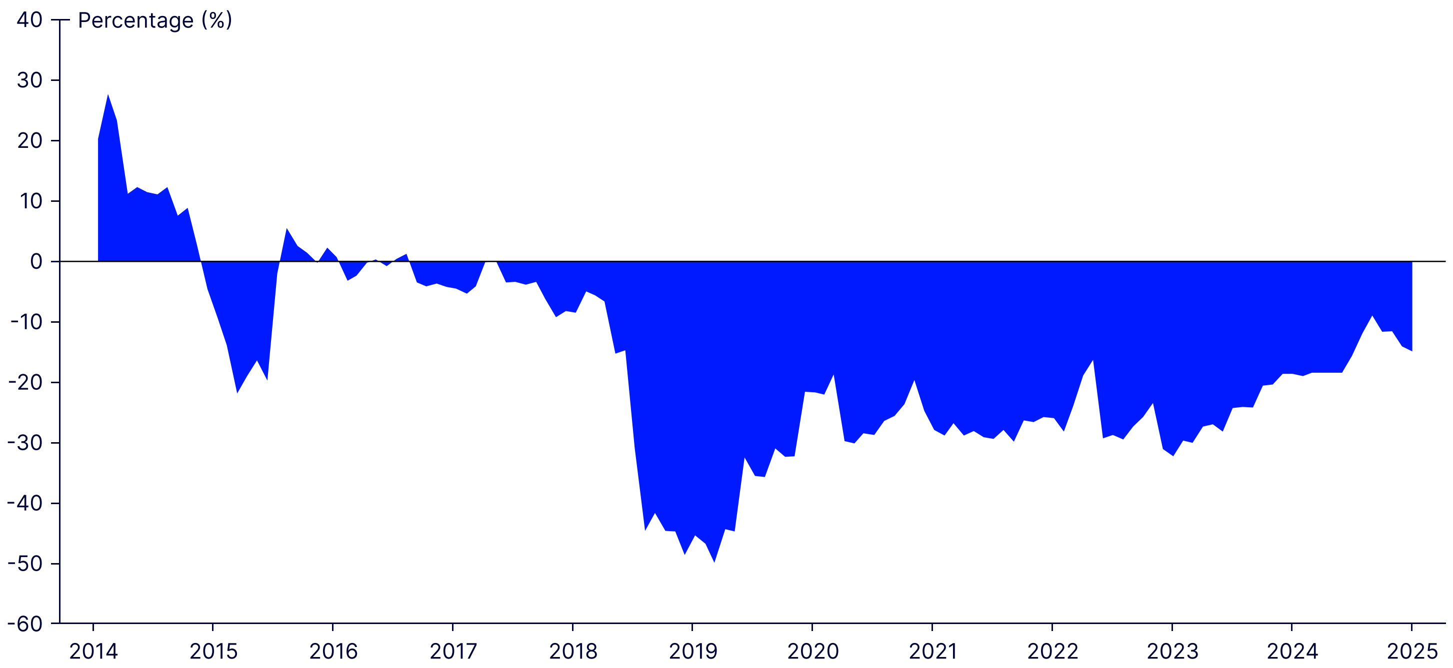
Figure 8: The Core-Satellite portfolio has shown a mostly positive 3-year excess return



Source: Refinitiv, between January 2011, and December 2025. **The performance data quoted represents past performance. Past performance does not guarantee future results.** Realized net annualized 3-year IR, TE, and Excess Returns for the Core-Satellite portfolio versus the MSCI ACWI Index. Returns do not represent those of a single portfolio but were achieved by mathematically combining the actual performance data of the Enhanced strategy (75%) and the Global Equity Select strategy (25%), rebalanced monthly.The performance figures contained herein are provided on a net of fees basis, reflecting the deduction of investment management fees. Some members of this composite may accrue administration fees. The performance includes the reinvestment of dividends and other corporate earnings and is calculated in USD. Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income as applicable. Index returns are unmanaged and assume a 5bps fee.

Figure 9: Low absolute correlation levels signify strong diversification

Three-year excess correlation between the GES and Enhanced



Source: SSIM and Refinitiv between January 2011 and September 2025.

To summarize, we observe:

01

The Enhanced strategy has a low TE versus the benchmark

02

Enhanced is a very different strategy in terms of style compared to GES, demonstrated by its low excess correlation with GES

03

The total Core-Satellite portfolio TE can be adjusted by adjusting the exposure to GES (the Satellite)

04

The Core-Satellite version with 75% Enhanced and 25% GES demonstrates robust excess performance with a low TE versus the benchmark, and with a similar TE to the standalone Enhanced strategy

Another approach: An equal-weighted portfolio of comparable concentrated equity strategies

This approach, which is used by some asset allocators, can offer good diversification when the strategies have low correlation. However, the resulting combination will not be able to achieve the same control over TE as the Core-Satellite approach described above.

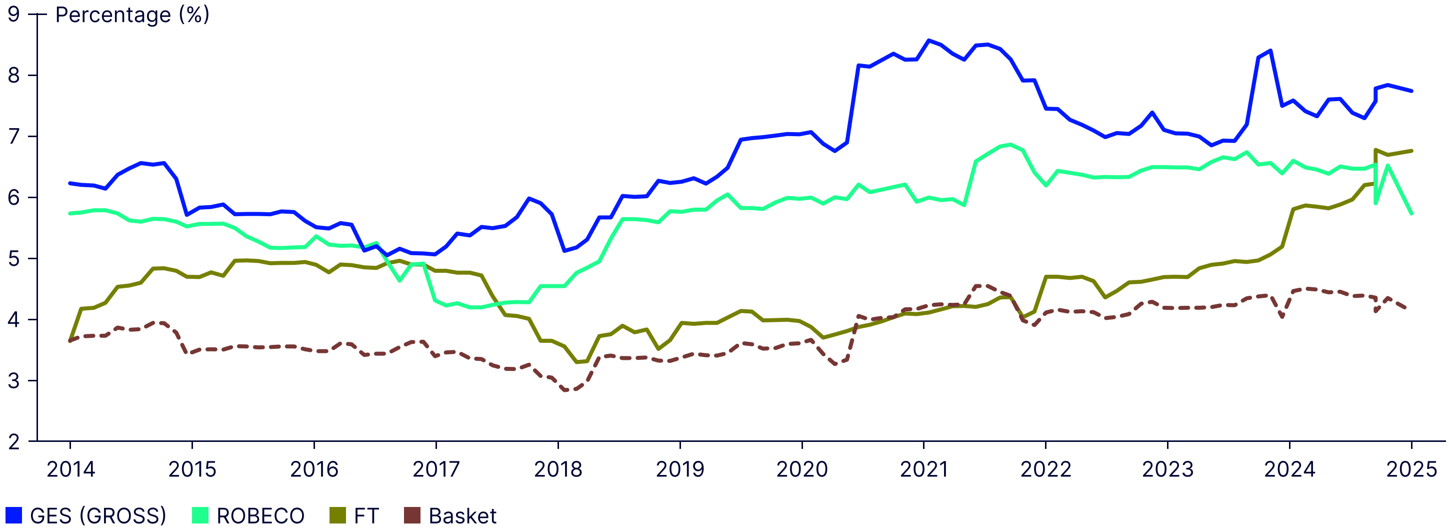
To make this point, we consider the following three strategies, combined with equal weights:

- Global Equity Select
- ROBECO GBL STARS EQS FD-USD
- First Trust WCM FOCUS GLBL GRW-INST-USD (available from end-June 2013)

We chose the Robeco and the First Trust strategies because (1) they have similar fundamental investment approaches and reference universes as GES; (2) each strategy has a low number of constituents in the range of 30-50; and (3) each has the MSCI ACWI as its reference universe. Looking at Figure 10, the TE of the equal-weighted basket is the lowest of all portfolios, demonstrating risk diversification. However, the basket's TE is still significant. Indeed, the TE of such a portfolio construction approach cannot be controlled or adjusted otherwise. Note that if we had seen a collapse in TE, this could have suggested over-diversification.

In summary, the equal-weighted comparable strategy approach is suitable only if a large TE can be tolerated at the overall portfolio level, and/or if the asset allocator is not looking for control over TE.

Figure 10: TE for the equal-weighted comparable strategy approach isn't controllable



Source: Bloomberg, from June 2013 to December 2025. The results shown do not represent those of a single fund, but were achieved by mathematically combining the actual data of the Global Equity Select strategy, the Robeco Global Stars Equities Fund (USD), and the First Trust WCM Focused Global Growth Fund Institutional Fund (USD).

The strategies listed do not represent an investment recommendation. You should not assume that investments in the strategies were or will be profitable.

In closing

The advent of AI provides strong opportunities for fundamental, bottom-up stock picking. This is particularly the case for all our State Street Investment Management Active Fundamental Equity strategies. Our equity analysts have the tools with which to pick winners in this domain, allowing our portfolio managers to select names with confidence across all sectors.

AI implementation, alongside the structural improvements in productivity that AI is set to create, will in turn create the conditions for a broadening out in the equity markets—as well as underpin earnings growth over the long term. We therefore see AI as a long-term earnings driver for those firms that use AI to promote earnings growth. The GES is actively seeking to take advantage of this long-term earnings driver.

However, nearer term, rapid structural change and a highly concentrated equity market can be a difficult environment for high-conviction strategies, given that concentration implies the performance of the "other" stocks—those that are not among the largest-weighted stocks in market cap-weighted benchmarks—can be amplified (either negatively or positively). This is where a Core-Satellite approach can be a strong source of diversification.

In terms of excess returns at the total portfolio level, the Core-Satellite version with 75% Enhanced and 25% GES demonstrates robust excess performance with a low and controlled TE versus the benchmark. This acts as a good offset to overall returns which show a lower long-term average return than GES on its own.

Endnotes

1 The effective number of shares is calculated as the inverse of the Herfindahl–Hirschman Index (HHI). The lower the number, the more concentrated the index. For an equal weighted basket of N shares 1/HHI = N.

2 Earnings are also more difficult to predict. The very speed of economic change can translate into overly optimistic street forecasts in earnings growth for a company or industry. However, some companies are currently having to grapple with both rapid structural change and large fluctuations in demand from their customers (who themselves are also being subjected to significant structural change). This can lead to earnings results which are not in line with forecasts, in turn generating enormous gyrations in individual stock prices.

3 Scores are assigned by research analysts on a screened universe (roughly 25% of companies globally excluding small cap stocks). A score of 5 indicates an average CQ score. Material sustainability considerations are integrated into the CQ Quality assessment. Changes in score signal improvement or deterioration of fundamentals. CQ scores are comparable between sectors and regions.

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* This figure is presented as of December 31, 2025 and includes ETF AUM of $1,950.80 billion USD of which approximately $173.02 billion USD in gold assets with respect to SPDR products for which State Street Global Advisors Funds Distributors, LLC (SSGA FD) acts solely as the marketing agent. SSGA FD and State Street Investment Management are affiliated. Please note all AUM is unaudited.

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