
Optimizing an Equity Program

Michael Lin, CFA

Investment Strategist, Systematic Equity — Active

Clive Maguchu, CFA

Senior Strategist, Investment Strategy & Research

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Executive Summary

- **At State Street Global Advisors (SSGA), we think there are six key considerations for large asset owners building an equity portfolio: tracking error budget, the investable universe, manager capacity, asset owner AUM, diversification and fees.**
- **We believe enhanced index strategies are often more effective as a core allocation than multi-manager active combinations; particularly for large asset owners with a limited tracking error budget.**
- **At low tracking error budgets, we recommend a larger allocation to index core, with a smaller allocation to enhanced and active strategies on top. As tracking error budgets increase beyond minimal levels, we recommend a significantly larger allocation to enhanced index strategies.**
- **The case study analysing the trade-off between active risk and return in this paper demonstrates our reasoning for these recommendations. The case study provides a guide that asset owners can follow to build an equity portfolio that reflects their own circumstances.**

Introduction

For the first time in history, 2023¹ saw the assets in passive index equity funds surpass those of active equity funds. Does that mean active management is dead? If not, what is the optimal allocation to passive, smart beta, enhanced index and alpha seeking equity strategies? However, the 'optimal allocation' question remains a difficult one to answer because it depends on a host of factors. In this paper, we discuss key areas of concern that impact the optimal asset allocation of an equity program, including:

- **Overall Portfolio Construction Considerations** For example, is the investor limited by active risk (tracking error) budgets? A traditional index core allocation may not be the most efficient way to structure an equity program for investors with slightly higher levels of active risk budget.
- **The Investable Universe/Equity Market** For example, a higher allocation to passive makes sense in more efficient markets like the US.
- **Capacity, Fee and Other Considerations** Is the asset owner managing large amounts of AUM relative to their investable universe? How important are fees to the asset owner?

To provide a more pragmatic framework, we also conducted a case study to illustrate how investors can optimise their equity portfolios depending on the desired level of active risk or active return targets. We show how investors can achieve better risk-adjusted returns by incorporating varying amounts of passive, enhanced index and active strategies as part of their overall equity program.

Portfolio Construction and Other Considerations

Due to pressures arising from fees, benchmarking and investment philosophies, most large institutional investors face limits on how much capital they can devote to active management to reach an alpha return target. From our experience in working with institutional investors, active risk budgets typically vary from <0.50% p.a. to >2.5% p.a., with most clustering around the 1.5% p.a. active risk range. Figure 1 illustrates three bands of active risk, and our suggested starting equity allocation approaches for each.

Figure 1
Recommended Starting Equity Allocations Based on Tracking Error Targets

Active Risk	Tracking Error Range	Recommended Starting Equity Allocation
Low Risk	<0.50%–0.75% p.a.	Large Index Core (75%) + Satellites (25%) Large low TE Enhanced Core (75%) + Satellites (25%)
Moderate Risk	0.75%–1.50% p.a.	Large Enhanced Core (50%) + Satellites (50%)
High Risk	1.50%–>2.50% p.a.	Large Enhanced Core (25%) + Satellites (75%)

Source: State Street Global Advisors. The information contained above is for illustrative purposes only.

These starting allocations assume that investors are interested in a global portfolio, with capital being allocated across both developed and emerging market equities. Alongside these recommended starting equity allocations, investors should also consider various pros and cons before choosing the right mix of index, enhanced index, smart beta, active quant and active fundamental strategies. We highlight these considerations in Appendix A.

Investable Universe Matters

Equity markets differ by their breadth, analyst coverage, liquidity, geopolitical sensitivity and the efficacy of active management. The optimal combination of passive, smart beta, enhanced index and active equity strategies depends on these characteristics. Our preferred approach for regional markets, shown in Figure 2, considers several key elements including:

- 1 Evidence of factor premia,
- 2 Active manager outperformance,
- 3 Benchmark concentration, and
- 4 Market efficiency.

Note that these elements can change over time, so Figure 2 is by no means static.

Figure 2

Our Preferred Approach to Equity Allocation for Risk Aware Investors

Region/Country	Factor premia persistence and efficacy	Active outperformance and efficacy	Benchmark Concentration	Market Efficiency	Comments on Preferred Approach to Equity Allocation
North America	Persistent and effective	Very limited	Medium	High	Increasing concentration and historically low efficacy of active management leads us to recommend a combination of Index and Enhanced Index
Europe	Persistent and effective	Very limited	Medium	High	Increasing breadth and historically low efficacy of active management leads us to recommend Index/Active Quant approaches
EM ex China and India	Persistent and effective	Limited	High	Low	Historical low efficacy of active management together with strong evidence of factor premia lead us to recommend an Enhanced Index or Smart Beta approach
China	Persistent and effective	High	High	Low	Combination of political risk, low market efficiency, high retail participation and limited breadth lead us to recommend an Active Fundamental approach
Japan	Persistent and effective	Mixed	Medium	Medium	High breadth and improving efficacy of active management suggest that an Active Fundamental and/or Active Quant approach could be profitable
Australia	Persistent and effective	Limited	High	Medium — High	Relatively small size and concentrated market leads us to recommend a combination of larger Index Core and Enhanced approaches, with a smaller allocation to Active strategies
Developed Market Large Cap	Persistent and effective	Very limited	Low	High	US dominance, efficiency of this market and low efficacy of active — we favor Index/Enhanced Index depending on active risk budgets
DM/EM Small Caps	Persistent and highly effective	Mixed	Low	Low	For their efficacy we favor Enhanced/Active Quant or Smart Beta strategies

Source: State Street Global Advisors. The information contained above is for illustrative purposes only.

The variations in Figure 2 make constructing a global equity portfolio from regional or country building blocks difficult. Not only do investors need to consider different approaches for different markets, wayward country and currency exposures can also add significantly to active risk. Further, regional or country building blocks prevent active managers from implementing globally integrated views in relation to industries or factors.

For this reason, our experience has been that many investment mandates are global in scope, with only the home country or region being carved out. In the section that follows we have therefore focussed on global equity portfolios.

Global Equity Markets: Empirical Evidence

Under the risk budgeting framework, empirical evidence suggests that lower tracking error Active and Enhanced Index strategies can offer more efficient ways to generate excess returns per unit of active risk budget. In other words, **they tend to be better at maximizing information ratio while remaining style neutral.**

Average Information Ratios Degrades Slightly with Higher Active Risk

Performance data from eVestment indicate that while higher tracking error active strategies do on average generate slightly higher excess returns (before fees), they do not generate higher information ratios (IR). In fact, within the MSCI World and MSCI ACWI universes, low tracking error Active and Index Enhanced strategies have historically achieved notably higher IRs (on average). We illustrate this in Figure 4, by separating the eVestment global equity core universe² of enhanced and active managers into 3 groups — Enhanced (non-index), Active and Highly Active as per Figure 3.

Figure 3
eVestment Manager Categories by Active Risk vs. Average Information Ratio

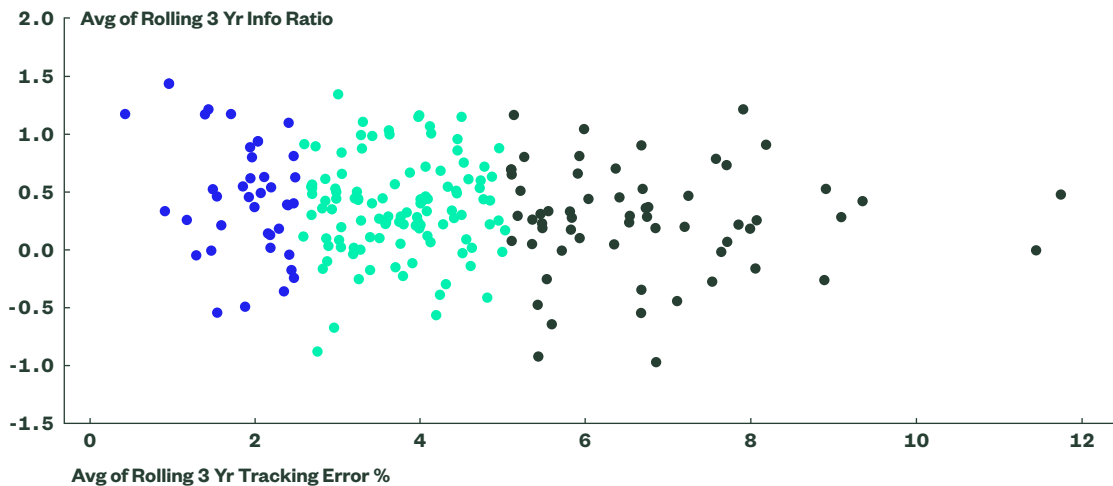
Group	Active Risk (p.a.)	Average Gross Excess Returns (% p.a.)	Average Information Ratio
Enhanced (Non-Index)	< 2.5%	0.7	0.48
Active	2.5%–5%	1.1	0.38
Highly Active	>5%	1.3	0.28

Source: State Street Global Advisors, eVestment as at 30 June 2023. Past performance is not a reliable indicator of future performance. The performance figures contained herein are provided on a gross of fees basis and do not reflect the deduction of advisory or other fees which could reduce the return. The performance includes the reinvestment of dividends and other corporate earnings and is calculated in USD. Note due to limited data availability and survivorship bias, we have only included eVestment data from January 2012 to June 2023.

Figure 4

More Active, Higher Tracking Error Strategies Have Not Generated Superior Information Ratios

- Highly Active
- Active
- Enhanced



Source: State Street Global Advisors, eVestment as at 30 June 2023.

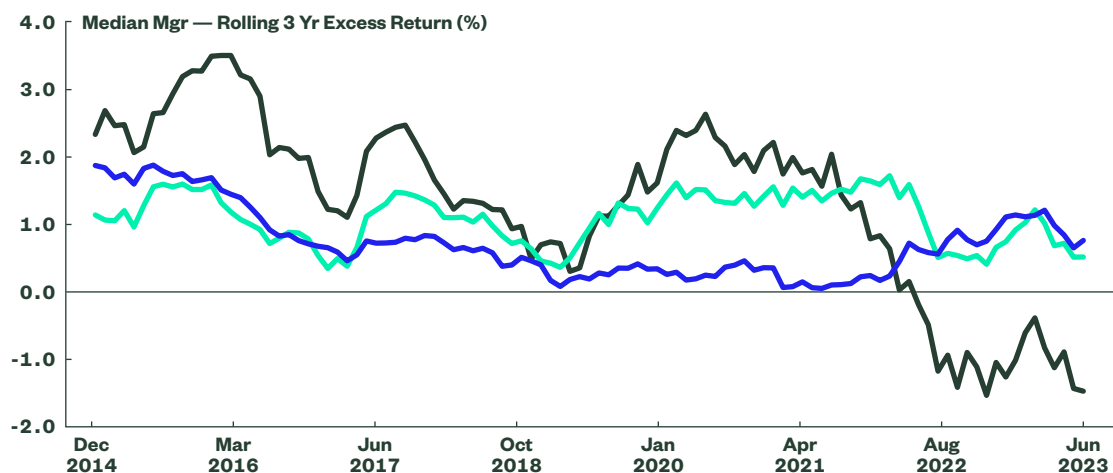
Highly Active Excess Returns are Less Consistent and More Unpredictable

Using the same breakdown of active managers from Figure 4, Figure 5 shows median rolling 3 year excess returns (gross). Enhanced strategies have been more consistent than Active and Highly Active strategies.

Figure 5

The Median Enhanced Strategy has Produced More Consistent Excess Returns

- Highly Active
- Active
- Enhanced

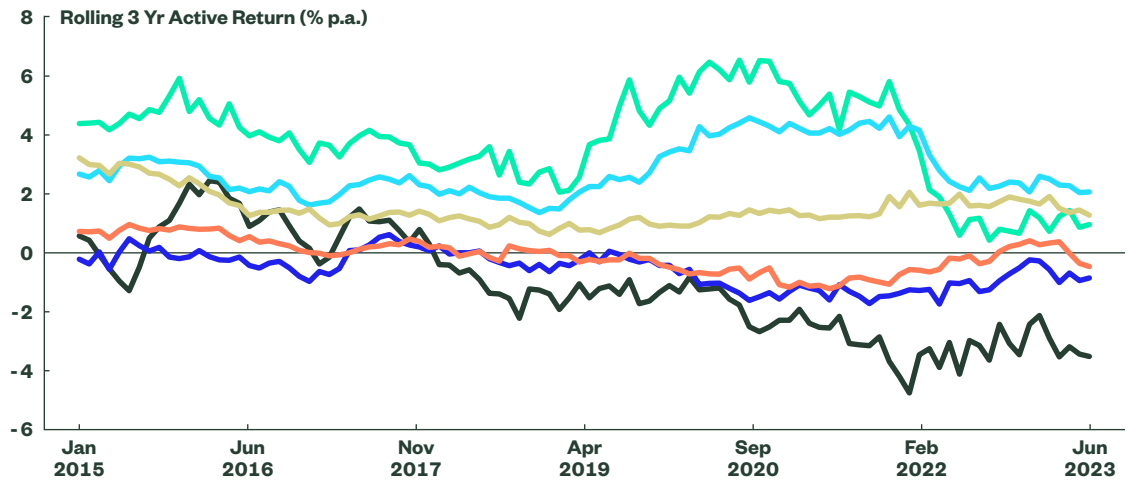


Source: State Street Global Advisors, eVestment as at 30 June 2023. Note due to limited data availability and survivorship bias, we have only included eVestment data from January 2012 to June 2023. Past performance is not a reliable indicator of future performance. The performance figures contained herein are provided on a gross of fees basis and do not reflect the deduction of advisory or other fees which could reduce the return. The performance includes the reinvestment of dividends and other corporate earnings and is calculated in USD.

The median result hides the dispersion of returns. Unsurprisingly, the range of excess returns is also wider for active strategies with higher tracking errors. Figure 6 shows the dramatic differences in top (75th) and bottom (25th) quartile performances for different levels of active risk.

Figure 6
Highly Active Strategies Exhibit Greater Dispersion of Excess Returns

■ Highly Active — 25th
 ■ Highly Active — 75th
 ■ Active — 25th
 ■ Active — 75th
 ■ Enhanced — 25th
 ■ Enhanced — 75th



Source: State Street Global Advisors, eVestment as at 30 June 2023. Past performance is not a reliable indicator of future performance. The performance figures contained herein are provided on a gross of fees basis and do not reflect the deduction of advisory or other fees which could reduce the return. The performance includes the reinvestment of dividends and other corporate earnings and is calculated in USD. Note due to limited data availability and survivorship bias, we have only included eVestment data from January 2012 to June 2023.

In understanding Figure 6, it is important to stress that we have divided the eVestment universe using active risk as measured by the variability in *monthly* excess returns. Figure 6 shows the dispersion in rolling 3 year excess returns.

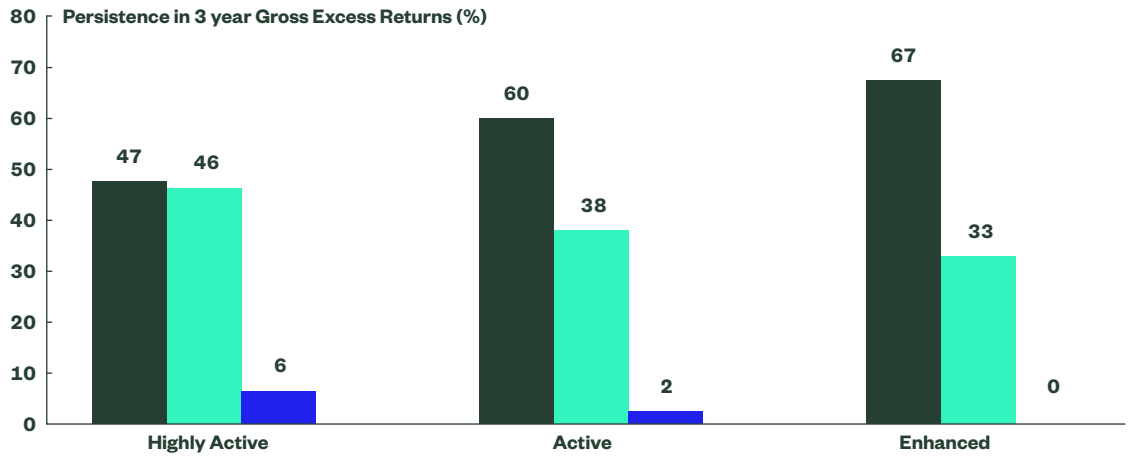
Past Performance is Not a Guide to Future Performance

Figure 5 and Figure 6 make it clear that manager selection is critical when allocating to highly active strategies. However, consistently allocating to outperforming active managers is notoriously difficult. Investors must contend with higher fees, capacity limits and changing market environments that favor different investment styles. To invest in highly active strategies investors must be willing to withstand bouts of prolonged underperformance that can occur for even the most successful long term (10+ years) strategies.

To demonstrate the difficulty in picking highly active strategies we have reviewed every 3 year track record among the Enhanced, Active and Highly Active strategies. In Figure 7 we have filtered results to identify strategies that have outperformed over a trailing 3 year period, and then considered their performance over a forward looking 3 year period. Highly Active strategies with a positive 3 year excess return only have a 47% chance of showing a positive excess return over the next 3 year period. A success rate not too different to a coin toss. Enhanced strategies tend to deliver more consistent outcomes; with 2/3 of those with a positive 3 year outperformance delivering a positive excess return over the next 3 year period.

Figure 7
Lower tracking Error Strategies Exhibit Greater Persistence in Excess Returns

■ Outperformed
 ■ Underperformed
 ■ Terminated



Source: State Street Global Advisors, eVestment as at 30 June 2023. Past performance is not a reliable indicator of future performance. The performance figures contained herein are provided on a gross of fees basis and do not reflect the deduction of advisory or other fees which could reduce the return. The performance includes the reinvestment of dividends and other corporate earnings and is calculated in USD. Note due to limited data availability and survivorship bias, we have only included eVestment data from June 2011 to June 2023.

Capacity, Diversification and Fees

The analysis thus far has focussed on gross returns from the eVestment universe. However, these results ignore three significant “real world” considerations for institutional investors.

- 1 Capacity** is a key consideration for large asset owners, particularly in “home” markets where invested assets can be a material proportion of the local equity market. Some large asset owners have pre-empted their pending local capacity issues by a combination of switching into passive strategies locally, and increasing offshore allocations. Enhanced strategies typically have high capacity and so can be an effective alternative solution for investors facing capacity issues in any market.
- 2 Overdiversification** can result from blending a passive core with too many active strategies. In an effort to outperform their policy benchmark, an asset owner may hire dozens of active managers to create strategy diversity and to minimize idiosyncratic manager risk. The risk is that the asset owner takes a too-narrow, manager-by-manager view that misses the detrimental effect of the diversification on their total portfolio. The decision to hire many active managers is tied to capacity as well — asset owners with large AUMs may feel the need to spread their capital out due to capacity limits of individual active managers. Our research shows that idiosyncratic risk and the ability to generate excess return becomes diluted as the number of managers increases.³ This is a key reason why we tend to lean towards ‘enhanced index core + active’ as a starting allocation.
- 3 Fees** are an increasingly important consideration for large asset owners. Unlike excess returns, fees are completely predictable. Heightened public disclosure of fees and costs has placed asset owners under extra pressure to demonstrate they are getting good value from their equity managers. Strategies that deliver consistent excess returns with a relatively low fee become particularly attractive.

Figure 8 compares median fees from eVestment for a global large cap equity portfolio for different management styles and mandate sizes.

Figure 8
**Median Fees by Active
 Risk and Mandate Size**

Style	Mandate Size	
	US\$250 million	US\$1 billion
Active	57 bps	46 bps
Enhanced	22 bps	18 bps
Passive	8 bps	6 bps

Source: State Street Global Advisors, eVestment as at 31 March 2023.

Of course, actual fees vary greatly depending on mandate size, customisation and competitive pressure. However, the table unsurprisingly shows that passive strategies are significantly cheaper than enhanced strategies which are, in turn, less than half those charged for active strategies.

Comparing the fees from Figure 8 with median excess returns in Figure 3 highlights even more starkly the importance of manager selection. Given the greater variability in excess returns, higher risk strategies can become significant detractors of portfolio returns, particularly after accounting for higher fees. Hence, the higher the fee, the more important it is for the investor to be certain they are getting value for money.

Global Equity Markets: Theoretical Considerations

Conspicuous by its absence in the empirical analysis above is the impact of style or factor exposures. Investors building multi-manager active portfolios typically try to combine managers with different styles who can be expected to outperform under different market environments. In this section we explore some of the theoretical considerations for building multi-manager global equity market portfolios.

We believe that Enhanced strategies can play an integral role in a multi-manager portfolio to balance out factor exposures given their style neutrality. In our experience, the exact proportion of allocations to index, enhanced and active sleeves depends on several key considerations. These considerations include the asset owner's tracking error budget, the target excess return, the mix of active managers and the diversification between these managers, and finally the information ratios of the various managers used. Below we go through a worked example of how an asset owners could decide on the structure of their multi-manager equity portfolio.

Understanding Portfolio Risks

Consistent with modern fundamental risk models, we start with three key groups of risk present in any actively managed equity portfolio:

- 1 Market Exposure** Overall market exposure can be affected by holdings of cash, or by “low beta” portfolio designs than have a muted response to market rises and falls.
- 2 Factor Risks** These include exposures to countries, currencies, industries and styles, which include factors like value, growth, momentum, size, liquidity and so on. Some investors deliberately target factor risks; investors with a strong bias to “value” for example. Other investors try to largely eliminate factor risks by carefully combining different management styles. However, even the most carefully constructed multi-manager portfolio can exhibit unintended factor risks. This can occur when, for example, style drift occurs with “growth” vs “value” managers, or when regional mandates are not carefully rebalanced, or when multiple active managers take positions in the same industry.

3 Specific Risks These risks, sometimes called “stock specific risks”, are tied to individual security positions that cannot otherwise be explained by Market or Factor risks. Take the simple example of the performance of a fictional US health care company. Its performance may be explained partly by the fact that it operates in the health care sector, partly by its US domicile, partly by its exposure to USD, partly by the fact that it is currently trading at a low (or high) valuation, partly by its large (or small) size and so on. However, there will be a part of its performance that can’t be explained by any of those factors; it is something unique to that security. That is “specific risk”. Multi-manager portfolios often exhibit very little specific risk as this risk has been diversified away.

Market and Factor exposures can be captured efficiently from some combination of Index, Smart Beta (multi-factor) or Enhanced Index. Our preference is for an Enhanced core, supplemented by highly active satellites. Enhanced strategies have the advantage of delivering “style neutrality” via direct risk controls, rather than relying on uncontrolled multi-manager outcomes. This in turn leads to a relatively low-cost core that can generate more consistent excess returns in varying market environments. Highly active satellites then allow the investor to benefit more meaningfully from stock selection skill.

Building a Multi-Manager Portfolio

We conduct a case study below to illustrate how an asset owner can make the most efficient use of their active risk budget when constructing an equity program. We analyse the impact of having differing allocations to indexed, enhanced and active strategies for a range of active risk budgets. Given the limitless number of possible combinations, the case study shows a generalized case that illustrates some of the key trade-offs. This exercise is aimed at helping asset owners understand the impact of the assumptions used and how they can replicate this case study for their specific portfolio.

For the case study we used up to 20 years of equity manager universe returns data from external sources including eVestment, Morningstar and MSCI, as well as internal data from SSGA-managed active and enhanced strategies. This data was used to get different perspectives on the outcomes that asset owners could expect from a diversified selection of managers for Global equity allocations. Given the large variance present in the empirical data we analyzed, the figures used in the analysis are not simple averages across the manager universe. Rather, we have applied judgement and used stylized numbers that more closely represent reasonable ex-ante expectations that an asset owner may have for the managers they appoint. For this exercise we assumed that the asset owner is deciding to allocate between an indexed holding, an enhanced manager and seven active managers with different factor styles. The resulting tracking error and excess return figures used in the analysis are tabulated in Figure 9.

Figure 9
**Our Preferred Approach to
Equity Allocation for Risk
Aware Investors**

	T/E (%)	Alpha (%)	IR	Specific (%)	Factor (%)
1. Index	0.10	0.00	—	50	50
2. Enhanced Core	1.00	0.75	0.75	30	70
3. Momentum	7.00	2.00	0.29	30	70
4. Quality	5.50	4.00	0.73	30	70
5. Size	3.50	0.50	0.14	30	70
6. Value	8.00	1.00	0.13	30	70
7. Growth	4.00	3.00	0.75	30	70
8. Multifactor	3.00	1.50	0.50	30	70
9. Min Vol	7.50	0.10	0.01	30	70

Source: State Street Global Advisors. The information contained above is for illustrative purposes only. Projected characteristics are based upon estimates and reflect subjective judgments and assumptions. There can be no assurance that developments will transpire as forecasted and that the estimates are accurate.

Figure 10
Factor Correlations

	1	2	3	4	5	6	7	8	9
1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	1.00	0.40	-0.20	-0.20	0.10	0.20	0.50
4	0.00	0.00	0.40	1.00	-0.20	-0.20	0.20	0.30	0.40
5	0.00	0.00	-0.20	-0.20	1.00	0.60	-0.20	-0.20	-0.20
6	0.00	0.00	-0.20	-0.20	0.60	1.00	-0.10	0.00	-0.20
7	0.00	0.00	0.10	0.20	-0.20	-0.10	1.00	0.00	0.00
8	0.00	0.00	0.20	0.30	-0.20	0.00	0.00	1.00	0.50
9	0.00	0.00	0.50	0.40	-0.20	-0.20	0.00	0.50	1.00

Source: State Street Global Advisors. The information contained above is for illustrative purposes only.

While tracking error and excess return assumptions often garner the most attention, correlations of excess returns are also critical. For this example, we assumed that factor correlations existed across styles. For example, Figure 10 shows a +0.60 correlation in the *factor* component of excess returns between Value and Small or Mid-Cap focussed strategies. We have assumed however that *specific* risks are uncorrelated.

With these inputs, a portfolio optimisation to maximize the information ratio (IR) was then performed. The optimization was done based on the type of equity program constrained by a tracking error budget that ranged from 50 bps to 300 bps.

While not exhaustive, the above range of analyses is generalized enough to provide a useful guideline given the diversity of the tracking error budgets that we have observed from our clients and the various strategies currently being employed given respective market dynamics and investor priorities. This analysis can be further enhanced by using the client's own specific active risk budget, their preferred list of managers or their current starting point. Additionally, the asset owner will need to take scale, capacity and trading costs into consideration.

Global Equity Program Results

Figure 11
Optimal Allocation of Index, Enhanced and Active Strategies for a given Tracking Error Budget

The results of the optimisation of the optimal Global equity allocation by active risk budget are presented in Figure 11.

	T/E 0.5%	T/E 1%	T/E 1.5%	T/E 2%	T/E 2.5%	T/E 3%	Unconstrained
Index (%)	51.9	10.0	10.0	10.0	0.0	0.0	9.5
Enhanced Core (%)	27.9	48.8	29.4	12.7	5.3	0.0	52.3
Active (%)	20.2	41.2	60.6	77.3	94.7	100.0	38.2
Excess (%)	0.67	1.34	1.83	2.25	2.72	3.11	1.27
T/E (%)	0.50	1.00	1.50	2.00	2.50	3.00	0.94
Information Ratio	1.34	1.34	1.22	1.13	1.09	1.04	1.35

Source: State Street Global Advisors. Note: A minimum allocation of 10% was used as a constraint for the index up to TE of 2%. The results shown represent current results generated by our Equity program mean-var model. The results do not reflect actual trading and do not reflect the impact that material economic and market factors may have had on SSGA's decision-making. The results shown were achieved by means of a mathematical formula, and are not indicative of actual performance which could differ substantially. The performance does not reflect management fees, transaction costs, and other fees expenses a client would have to pay.

These modelled results suggest that the best information ratio at lower tracking error budgets is achieved by combining index and enhanced core allocations, with only a small allocation to active strategies. As the tracking error budget increases, the allocation to index falls sharply while enhanced strategies increase significantly to the point where this becomes the core holding at tracking error budget around 100 bps. This happens while increasing excess returns and maintaining high information ratios.

As the tracking error increases further, active allocations increase significantly beyond a tracking error budget of 100 bps. It is worth noting that in our analysis, higher active risk budgets would achieve higher excess returns but at a declining rate of increase. Therefore, information ratios begin to fall for those portfolios with tracking errors above 100bps.

Interestingly, when the tracking error constraint is removed and the optimizer is allowed to seek the highest information ratio, the resulting allocation settles close to a tracking error of 100 bps, with enhanced strategies forming the core of the equity program.

Conclusion

The above analysis and case study illustrate how an asset owner can make the most efficient use of their active risk budget when constructing an equity program. In addition to suggesting an optimal allocation framework, our analysis suggests asset owners can achieve better equity portfolio outcomes by allocating some of their risk budget to index enhanced strategies. This is because the systematic construction of enhanced strategies have tended to deliver more consistent excess returns with low tracking errors than active strategies.

While we our broad conclusion is that investors consider a greater allocation to enhanced strategies, there are some specific issues investors should take into account. For example, whether the portfolio is home market, regional or global may influence the optimal mix of strategies. We have provided guidance on which strategies we would recommend for allocations in different regions/market segments. Finally, the number of managers included in the active component, along with their respective investment styles, can impact the optimal mix of passive, enhanced and active strategies to achieve the desired portfolio risk/return outcomes.

Appendix A — Pros and Cons of Different Equity Strategies

Strategy	Purpose	Approach	Pros	Cons
Index	Replicate benchmark returns	Own a benchmark replicating portfolio	<ul style="list-style-type: none"> • Low cost • Transparent • Maximally scalable 	<ul style="list-style-type: none"> • Guaranteed to underperform after costs • Can be susceptible to 'gaming'
Smart Beta	Systematically capture longer-term, well known factor premia	Invest in portfolios with above benchmark exposure to selected well known factors	<ul style="list-style-type: none"> • Low cost • Backed by academic research • Higher degree of transparency • Meaningful outperformance over market cycles • Diversified multifactor approach can smooth cyclicalities 	<ul style="list-style-type: none"> • Single factors can endure long periods of underperformance • More advanced approaches can be less transparent • Susceptible to factor crowding
Enhanced	Outperform index with low tracking error	Tilt away from the benchmark using active stock selection (generally via a systematic process)	<ul style="list-style-type: none"> • Lower cost • Close to benchmark-neutral • More consistent excess returns with a diversified multifactor approach • Can benefit from proprietary factors & tailored exposures 	<ul style="list-style-type: none"> • Reliant on manager skill • Alpha may not be high enough to 'move the needle' • Not fully transparent
Active Quant	Systematically capture a wide variety of both known and proprietary factor premia and anomalies	Invest in portfolios with more exposure to proprietary (and alternative) factors and with a greater focus on portfolio construction/implementation	<ul style="list-style-type: none"> • Use full breadth of market and maximise transfer coefficient • to capture more nuanced and less researched factor premia and anomalies • Able to provide downside protection & other tailored exposures 	<ul style="list-style-type: none"> • Reliant on manager skill • Higher degree of model risk • Susceptible to shorter periods of underperformance (e.g. when behavioral biases dominate prices) • Not fully transparent
Active Fundamental	Exploit security-level mispricing	Use a more qualitative based assessment of company fundamentals and industry analysis	<ul style="list-style-type: none"> • Can provide Alpha that is uncorrelated to traditional factors • Can be entered into and exited opportunistically 	<ul style="list-style-type: none"> • Can rely too much on individual skill - 'key person risk' • Not highly scalable

Source: State Street Global Advisors. The information contained above is for illustrative purposes only.

Appendix B — Global Equity Program Detailed Results

	Unconstrained	T/E 0.5%	T/E 1%	T/E 1.5%	T/E 2%	T/E 2.5%	T/E 3%
Index (%)	9.5	51.9	10.0	10.0	10.0	0.0	0.0
Enhanced Core (%)	52.3	27.9	48.8	29.4	12.7	5.3	0.0
Momentum (%)	0.8	0.5	0.7	0.6	0.6	0.4	0.0
Quality (%)	7.4	3.9	8.6	16.4	23.0	29.2	37.2
Size (%)	6.8	3.6	6.6	5.4	4.3	4.4	0.0
Value (%)	1.1	0.6	1.3	2.6	3.8	4.8	5.4
Growth (%)	12.5	6.6	14.1	23.7	32.0	40.0	46.9
Multifactor (%)	9.6	5.1	9.9	11.9	13.6	16.1	10.4
Min Vol (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Active (%)	38.2	20.2	41.2	60.6	77.3	94.7	100.0
Excess (%)	1.27	0.67	1.34	1.83	2.25	2.72	3.11
T/E (%)	0.94	0.50	1.00	1.50	2.00	2.50	3.00
Information Ratio	1.35	1.34	1.34	1.22	1.13	1.09	1.04

Source: State Street Global Advisors. The results shown represent current results generated by our Equity program mean-var model. The results do not reflect actual trading and do not reflect the impact that material economic and market factors may have had on SSGA's decision-making. The results shown were achieved by means of a mathematical formula, and are not indicative of actual performance which could differ substantially. The performance does not reflect management fees, transaction costs, and other fees expenses a client would have to pay.

Contributors

Altat Kassam, CFA
EMEA Head of Investment
Strategy & Research

Jonathan Shead
Head of Investments, Australia

Endnotes

- 1 Source: EPFR Global, SG Cross Asset Research / Global Asset Allocation.
- 2 eVestment universe of Core strategies (no style bias) benchmarked against the MSCI ACWI and MSCI World Indices.
- 3 K. Karunakaran and R. Shapiro, 'A Solution for Overdiversification: Low Tracking Error Active Strategies', The Journal of Investing, Vol 28, Issue 4, 2019, p.75-82.

About State Street Global Advisors

Our clients are the world's governments, institutions and financial advisors. To help them achieve their financial goals we live our guiding principles each and every day:

- Start with rigor
- Build from breadth
- Invest as stewards
- Invent the future

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* Pensions & Investments Research Center, as of December 31, 2022.

[†] This figure is presented as of June 30, 2023 and includes approximately \$63 billion USD of 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 Global Advisors are affiliated. Please note all AUM is unaudited.

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