Exploring the impact of market concentration on actively managed portfolios: A quantitative investing perspective

Global equity markets have experienced a remarkable increase in market concentration over the past several years. Since the end of 2019, the S&P 500 Index has more than doubled in value, and seven specific stocks – known collectively as the "Magnificent Seven"[1] – have accounted for approximately half of the market's return, with the remaining 493 stocks accounting for the rest. This concentration of returns has led the U.S. market to outperform global indices by a significant margin, and as a result, the U.S. now constitutes a substantial portion of the global equity market – as of September 30, 2025, it accounted for 72% of the MSCI World Index.[2]

Active global equity managers have struggled to outperform the market in this environment. As shown in Figure 1, over the five-year period ending December 31, 2024, the median global equity manager underperformed its benchmark by 1.7%. The last year of this period was particularly challenging, with the median active global equity manager underperforming by a whopping 5.9%.[3] However, when we divide global equity managers into three categories – fundamental, quantitative, and low volatility (a subset of the quantitative style) – we get three very different performance stories. While fundamental global equity managers underperformed meaningfully, the median quantitative equity manager achieved significantly better (though admittedly still lackluster) results. Low volatility equities, meanwhile, struggled mightily.

While there have been numerous influences at play over the past five years, the rise in market concentration has been undeniably consequential. Following a more or less steady rise from March 2019 onwards, market concentration in the S&P 500 Index is currently the most elevated it has ever been. However, it is also critical to note that concentration levels are cyclical. As shown in Figure 2, market concentration tends to be marked by peaks and valleys over the longer term. With that in mind, the purpose of this paper is to

consider the influence of changing market concentration regimes on the performance of actively managed equity strategies; more specifically, quantitatively managed long-short, long-only, and low volatility portfolios.

## Figure 1: Median global equity manger relative returns

	Relative returns – one year to Dec 31, 2024	Relative returns – five years to Dec 31, 2024
Median active global equity manager	-5.91%	-1.67%
Median fundamental global equity manager	-7.86%	-1.97%
Median quantitative global equity manager	-1.12%	0.08%
Median low volatility global equity manager	-7.57%	-5.00%

Source: RBC GAM, eVestment, as of December 31, 2024.

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[1] Apple, Microsoft, Alphabet, Amazon, NVIDIA, Meta, and Tesla.
[2] Source: Bloomberg, as of October 30, 2025.
[3] Source: eVestment, as of December 31, 2024.
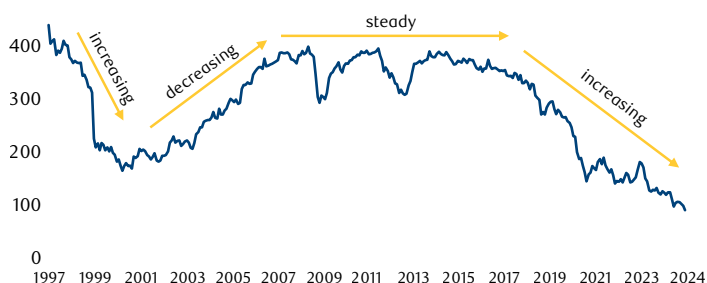
Figure 2: S&P 500 weight of Top 10 holdings
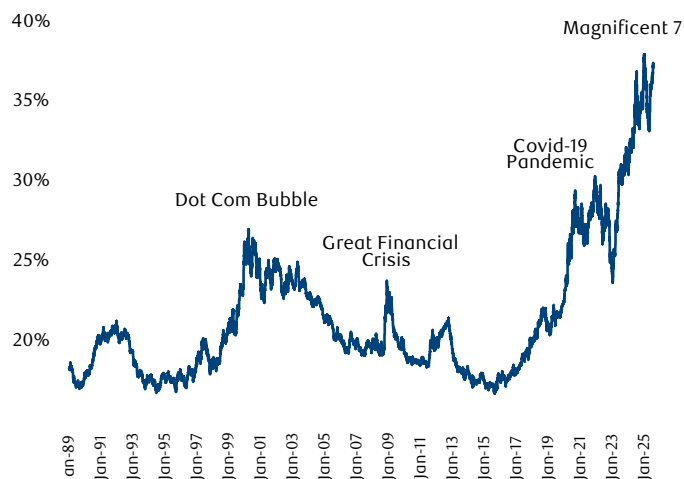
Source: RBC GAM. There is no assurance that any of the trends depicted or described herein will continue. Period represented is from January 1989 to July 2025.

Methodology

For the purposes of this study, we measured market concentration by assessing the effective number of names – that is, the number of unique securities that significantly contribute to the index's performance – in the MSCI World Index from 1997 to the end of 2024.[4] An increase in the effective number of names indicates decreasing market concentration, while a decrease suggests rising concentration.

Our analysis identified three distinct market concentration regimes over this period, illustrated in Figure 3.

Figure 3: Effective number of names in the MSCI World Index - 1997 to 2024

Source: RBC GAM. There is no assurance that any of the trends depicted or described herein will continue.

1. **Increasing market concentration:** There were two periods of increasing market concentration, between January 1997 – March 2000 and March 2019 – Dec 2024, characterized by a decreasing effective number of names.

2. **Decreasing market concentration:** April 2000 - June 2008, marked by an increasing effective number of names.

3. **Steady market concentration:** July 2008 - February 2019, where the effective number of names remained relatively stable.

Our quantitative investments platform provides a unique window into this issue, because we are able to study the performance of both long-only and long-short portfolios using the same underlying forecasts (or alpha scores). Thus, we can isolate the impact of the long-only constraint during these three different concentration regimes.

The impact of market concentration on long-only and long-short quantitative portfolios

To evaluate the impact of market concentration on a long-only portfolio, we first consider the performance of an unconstrained long-short portfolio as a reference point.

A long-short portfolio has the ability to short stocks expected to underperform. This allows for positioning based solely on return forecasts, buying stocks expected to outperform (those with positive alpha scores) and selling short those expected to underperform (those with negative alpha scores). In our analysis, the hypothetical long-short portfolio is market neutral, with equal long and short positions.

In contrast, a long-only portfolio is constrained by the fact that it cannot short stocks, so its maximum underweight is limited to the index weight of the stock. This constraint significantly impacts positioning, especially for stocks with negative alpha scores.

Figures 4 and 5 compare the active positions in a hypothetical long-short portfolio and long-only portfolio. Most of the positioning difference between the two portfolios is in the stocks that have a negative alpha score and are expected to underperform. As evidenced by the underweight positions illustrated on the far left-hand side of each chart, the long-short portfolio is able to express a negative view on a stock to a much greater degree than a long-only portfolio, given its ability to short stocks. This ability to short stocks has a meaningful impact on portfolio performance, particularly during increasing market concentration environments.

[4] The effective number of names is calculated as the inverse of the Herfindahl index, which measures the concentration of security weights within an index. The Herfindahl index ranges from 1, indicating a fully concentrated index where all capitalization is allocated to a single stock, to N, which equals the total number of securities in the index and represents an equal-weighted index.

Figure 4: Active positions in a market-neutral, long-short portfolio, sorted by their alpha forecast

Alpha forecast increases from left to right
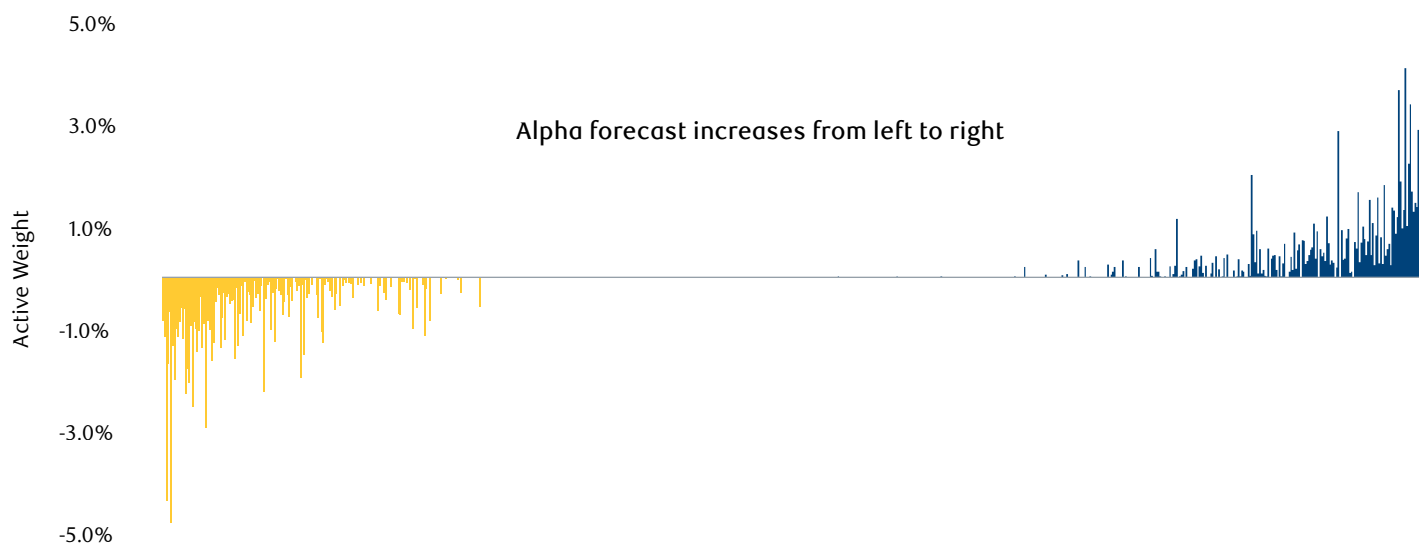
Source: RBC GAM as of December 31, 2024.

Figure 5: Active positions in a long-only portfolio, sorted by their alpha forecast


Alpha forecast increases from left to right
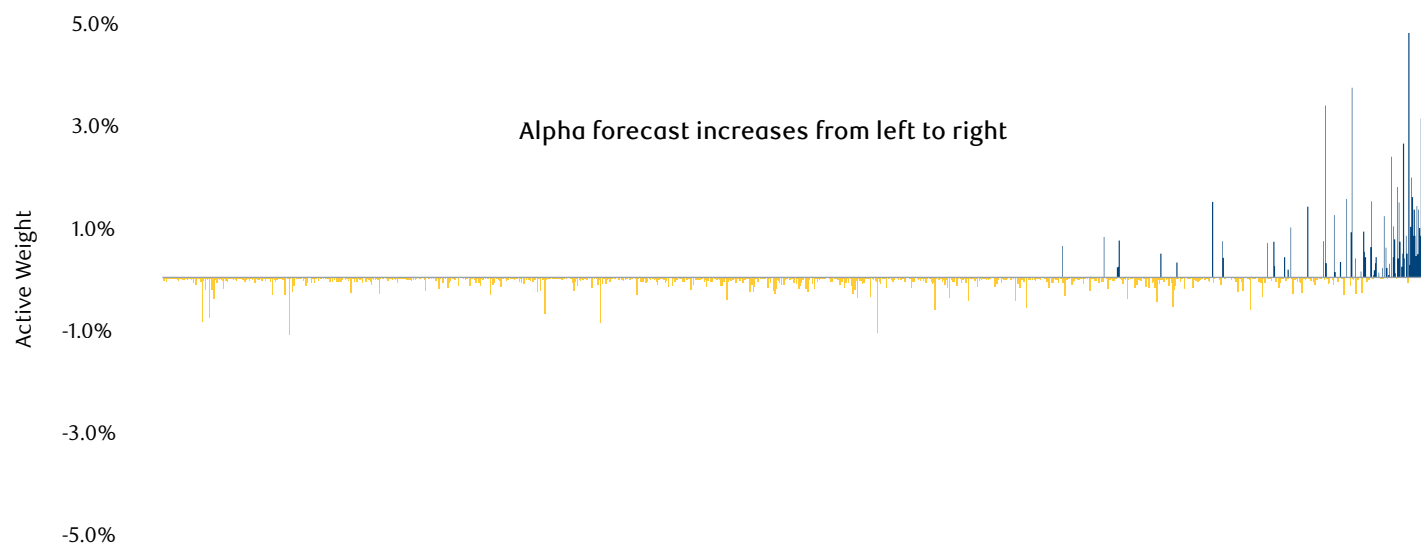
Source: RBC GAM as of December 31, 2024.

Performance analysis

Comparing the performance of the long-only and long-short portfolios across the three concentration regimes revealed meaningful differences in the ability of the long-only portfolio to capture the full alpha opportunity set.

As demonstrated in Figure 6, the long-only portfolio's alpha capture – defined as the ratio of its active (or relative) return to the return of the unconstrained long-short portfolio – was relatively strong during periods of both decreasing or steady market concentration, capturing 80% of the alpha opportunity over those periods. During the two periods of increasing market concentration, however, its alpha capture declined to 59% and 27%, respectively.

Figure 6: Performance of global long-short and long-only portfolios across market concentration regimes
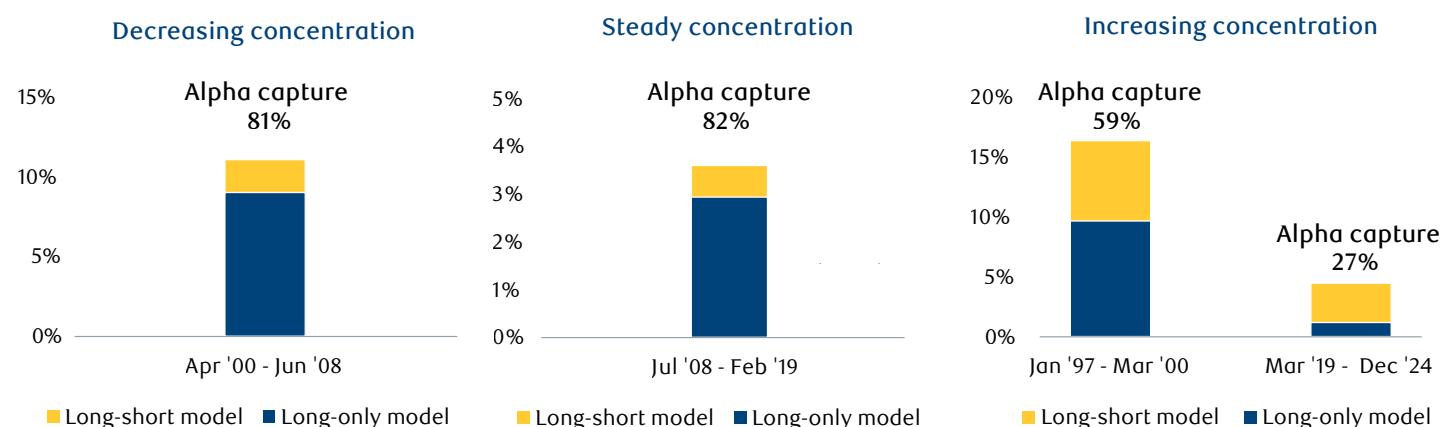
Source: RBC GAM

This decline in alpha capture is attributable to what we term "constraint-driven underweights." Because long-only portfolios cannot short securities, overweighting high-conviction positions requires underweighting other holdings to free up capital. A constraint-driven underweight arises when a long-only portfolio is forced to underweight a stock it has a favourable view on because it has already exhausted opportunities to underweight stocks with negative alpha scores, but still requires additional capital to fund desired overweight positions. The magnitude of constraint-driven underweights is influenced more by a stock's weight in the index than its alpha score or outlook.

This phenomenon limits the active return that long-only portfolios can generate, especially during periods of rising market concentration when larger-cap stocks dominate returns. Long-only portfolios will often underweight some mega-cap stocks in order to overweight stocks with higher alpha scores, but during a period of increasing market concentration, the biggest stocks in the index are by definition outperforming. Conversely, when market concentration

decreases, this effect is reversed. In contrast, long-short portfolios, which are not restricted by shorting constraints, are less affected by changes in market concentration.

Long-term perspective

Constraint-driven underweights will always exert a performance drag on long-only portfolios, ultimately reducing the amount of alpha a long-only portfolio can harness relative to an unconstrained long-short portfolio. And as we explained above, this performance drag is accentuated during times of increasing market concentration. However, when we consider the entire period that comprises the decreasing, steady, and increasing market concentration regimes, the alpha capture percentage of the long-only portfolio rises to 70% of the long-short portfolio (Figure 7) – a notable improvement over the 59% and 27% alpha capture experienced during the two increasing market concentration regimes. This suggests that while long-only portfolios may experience short-term periods of poor alpha capture, over the long term, they can still harness a relatively significant amount of alpha compared to their unconstrained long-short counterparts.

Figure 7: Long-term performance of global long-short and long-only portfolios

Alpha capture
70%

Legend: ■ Long-short model   ■ Long-only model
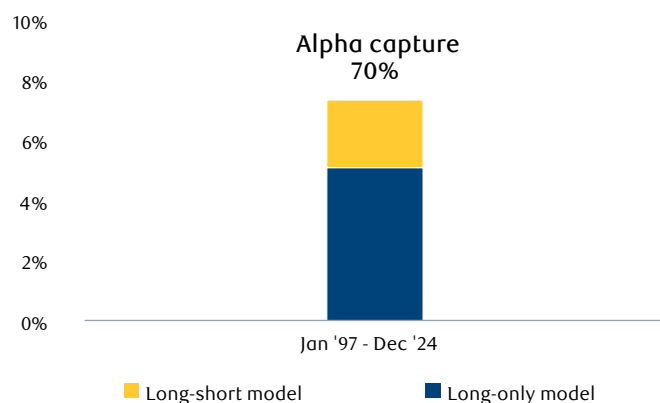
Source: RBC GAM

Applicability of this concept to fundamentally managed portfolios

As we noted in the introduction, the performance of quantitatively managed long-only strategies has been significantly better than fundamental strategies during the recent period of increasing market concentration. A detailed study of why this has been the case is beyond the scope of this paper, but may be due to quantitative strategies having better return (alpha) forecasts through this period, more effective or constrained risk management, or both. Either way, it should be noted that the issue of constraint-driven underweights applies equally to fundamentally managed strategies, and that these strategies should also benefit from a reversal of the increasingly concentrated environment.

The impact of market concentration on global low volatility equity portfolios

As discussed in the introduction, global low volatility equity strategies meaningfully underperformed broad-market indices amidst the rise in market concentration experienced since 2019. The following section explores the relationship between market concentration and the performance of global low volatility portfolios, examining whether the recent underperformance of these strategies is due to the erosion of the low volatility anomaly or the rise in market concentration. (Please see the breakout box on page 8 for a definition and consideration of the low volatility anomaly).
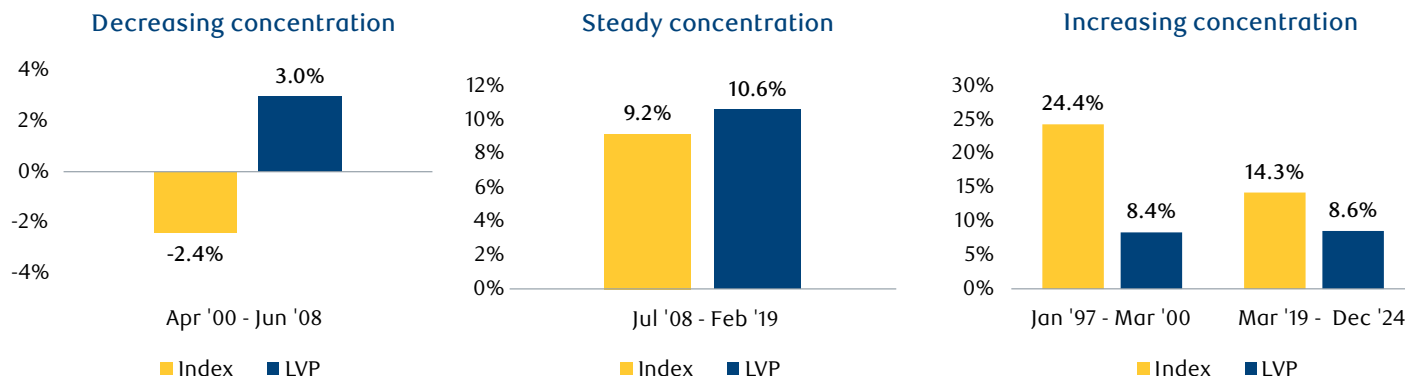
To analyze the impact of market concentration on global low volatility portfolios, we constructed a hypothetical low volatility portfolio (LVP) by determining the basket of stocks in the MSCI World Index that would exhibit the lowest level of volatility, and applying constraints to ensure the portfolio remains well diversified. Importantly, these constraints include a limit on the weight of any single stock, which can result in the weight of the biggest companies being less than the index when the market becomes increasingly concentrated.

As we consider the results of our analysis, it is worth noting that the objective of a low volatility portfolio is not to consistently outperform its benchmark, but rather to deliver lower volatility and superior risk-adjusted returns than the index. Accordingly, the following section considers the performance of our hypothetical low volatility portfolio from both a return and risk perspective, compared to the MSCI World Index over the three market concentration regimes.

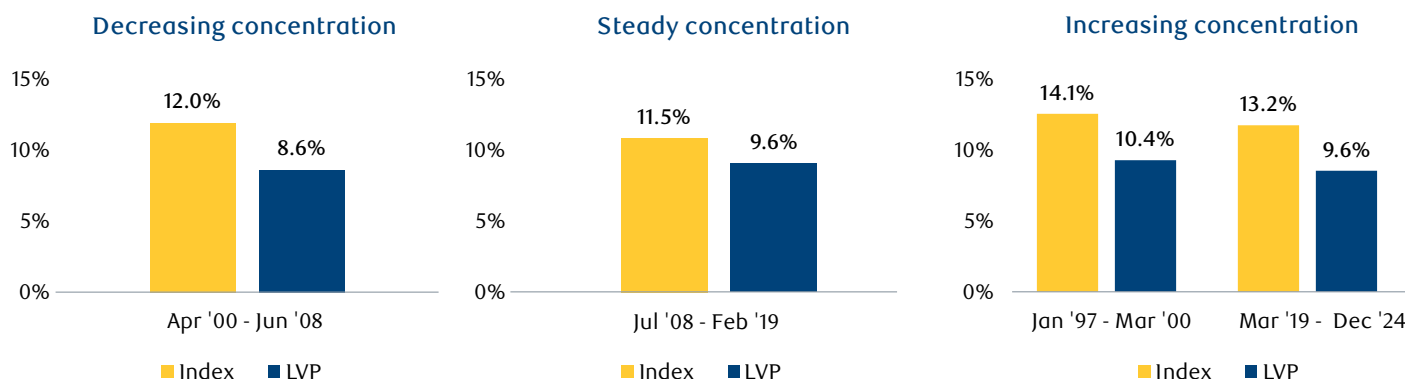### Performance analysis

Return

The performance of the LVP relative to the market cap-weighted MSCI World Index varies across different market concentration regimes (Figure 8). When market concentration is decreasing, the LVP generates a meaningful excess return. This excess return becomes more modest when market concentration is steady. During the two periods of increasing market concentration, the LVP's performance lags significantly behind the index. Given that low volatility strategies are not cap-weighted, they are very likely going to be underweight the largest stocks in the index, and therefore underperform in an environment of increasing concentration when these stocks are outperforming.

Figure 8: Return comparison across concentration regimes

Decreasing concentration

- -2.4% (Index)
- 3.0% (LVP)

Apr '00 - Jun '08

◼ Index ◼ LVP

Steady concentration

- 9.2% (Index)
- 10.6% (LVP)

Jul '08 - Feb '19

◼ Index ◼ LVP

Increasing concentration

- 24.4% (Index)
- 8.4% (LVP)

Jan '97 - Mar '00

- 14.3% (Index)
- 8.6% (LVP)

Mar '19 - Dec '24

◼ Index ◼ LVP

Source: RBC GAM

Risk (volatility)

The LVP effectively reduces volatility across all market concentration regimes (Figure 9). This volatility reduction is most significant when market concentration is either increasing or decreasing, which typically coincides with heightened market volatility.

Figure 9: Volatility comparison across concentration regimes

Decreasing concentration

- 12.0% (Index)
- 8.6% (LVP)

Apr '00 - Jun '08

◼ Index ◼ LVP

Steady concentration

- 11.5% (Index)
- 9.6% (LVP)

Jul '08 - Feb '19

◼ Index ◼ LVP

Increasing concentration

- 14.1% (Index)
- 10.4% (LVP)

Jan '97 - Mar '00

- 13.2% (Index)
- 9.6% (LVP)

Mar '19 - Dec '24

◼ Index ◼ LVP

Source: RBC GAM

Risk-adjusted return

The low volatility investment proposition, which aims for superior risk-adjusted returns as measured by the Sharpe ratio,[5] is supported when market concentration is decreasing or steady (Figure 10). During periods of decreasing or steady market concentration, the LVP achieves both excess returns and reduced volatility compared to the index, resulting in a higher Sharpe ratio. However, when market concentration is rising, the return drag of the LVP outweighs the risk reduction, resulting in a lower Sharpe ratio and challenging the proposition.

[5] The Sharpe ratio, a measure of risk-adjusted return, is calculated as the excess return of an investment over the risk-free rate, divided by its standard deviation. A higher Sharpe ratio indicates better risk-adjusted performance.
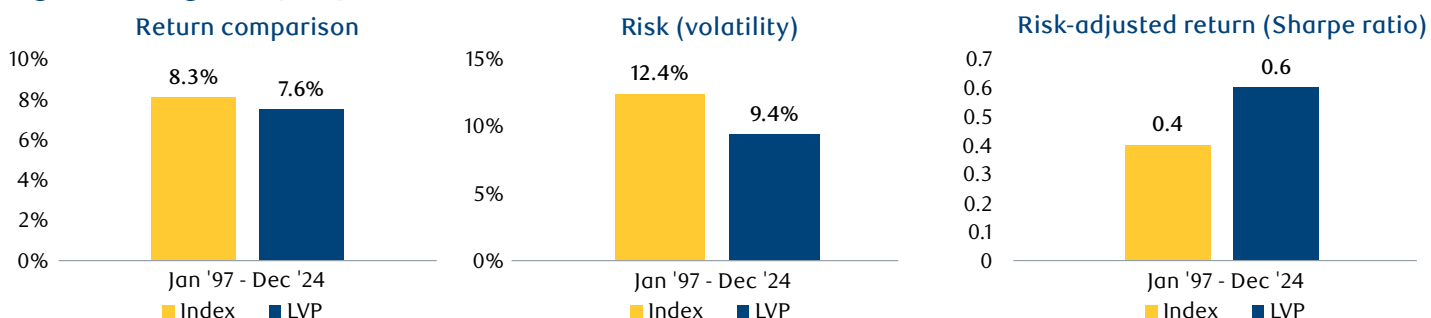
Figure 10: Sharpe ratio comparison across concentration regimes

Decreasing concentration

	Apr '00 - Jun '08
Index	-0.5
LVP	-0.1

Steady concentration

	Jul '08 - Feb '19
Index	0.7
LVP	1.0

Increasing concentration

	Jan '97 - Mar '00	Mar '19 - Dec '24
Index	1.4	0.9
LVP	0.4	0.6
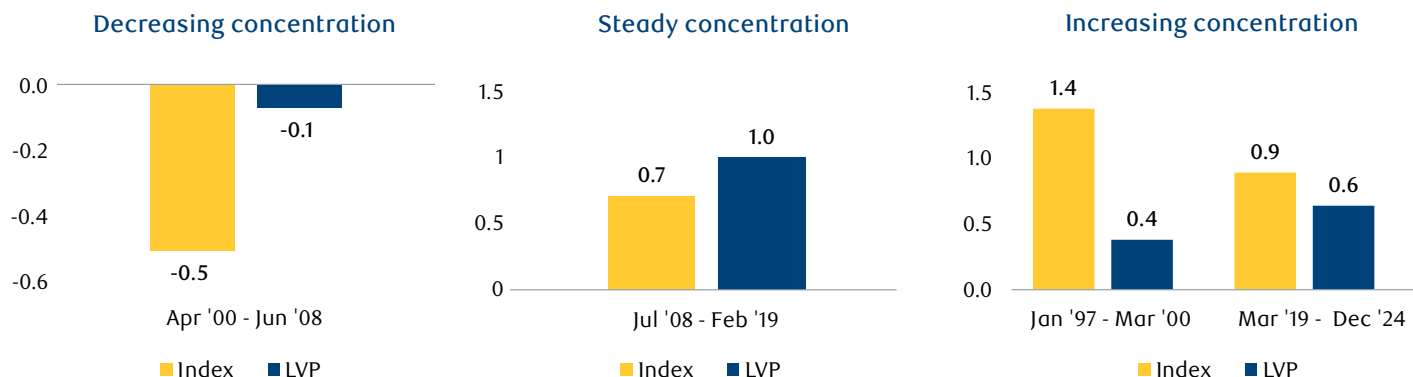
Source: RBC GAM

The underperformance of the LVP during periods of increasing market concentration can be attributed to the dominance of a few mega-cap stocks. These mega-caps, which often exhibit high volatility, are typically either excluded from low volatility portfolios entirely or, when included, subject to individual security caps imposed by the portfolio that result in significantly lower allocations than their benchmark capitalization weights. This makes the LVP more vulnerable to a concentrated market environment, as it has a smaller allocation to the high-performing mega-cap stocks.

Long-term perspective

Despite the challenges posed by periods of increasing market concentration, when we look at the entire period that comprises the decreasing, steady, and increasing market concentration regimes considered above, the LVP demonstrates superior risk-adjusted returns over the long term (Figure 11). Over multiple market cycles, the Sharpe ratio of the LVP outperforms the cap-weighted index, suggesting that low volatility portfolios can still deliver on their promise of superior risk-adjusted returns over extended periods.

Figure 11: Long-term perspective

Return comparison

	Jan '97 - Dec '24
Index	8.3%
LVP	7.6%

Risk (volatility)

	Jan '97 - Dec '24
Index	12.4%
LVP	9.4%

Risk-adjusted return (Sharpe ratio)

	Jan '97 - Dec '24
Index	0.4
LVP	0.6

Source: RBC GAM

THE LOW-VOLATILITY ANOMALY

The recent underperformance of low volatility equity strategies led to some concern among investors that the low volatility anomaly had eroded. However, our research finds that the low volatility anomaly – the empirical and well-documented observation that low volatility stocks outperform high volatility stocks on a risk-adjusted basis – persists across market concentration regimes (Figure 12).

Figure 12: Performance of equally weighted volatility deciles across concentration regimes
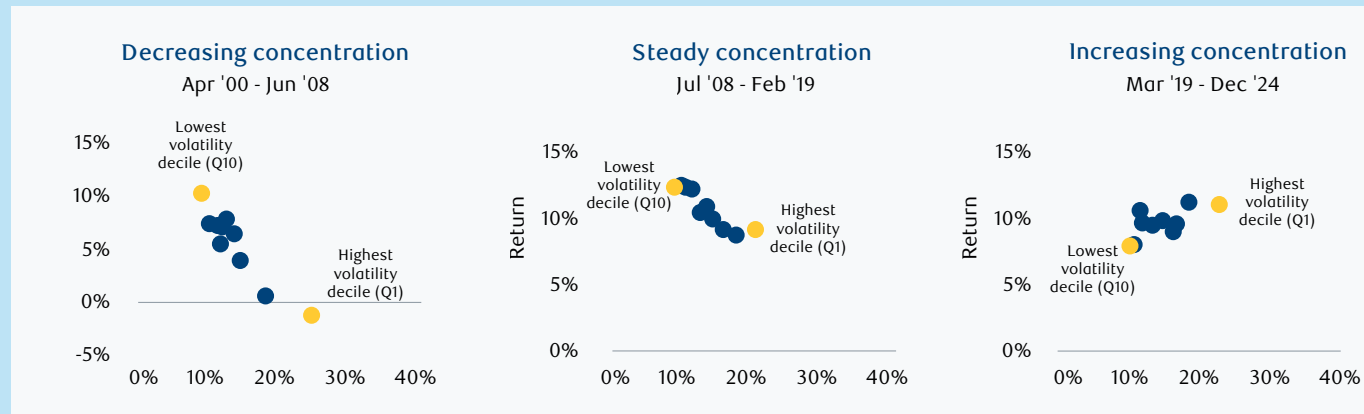
Source: RBC GAM

Lower volatility stocks yield higher risk-adjusted returns and a positive return premium in falling or steady market concentrations regimes. When market concentration is increasing, the lowest-volatility stocks yield lower returns than high-volatility stocks, however, the substantial reduction in risk still results in superior risk-adjusted performance.

Therefore, the recent underperformance of low volatility strategies is not a function of the low volatility anomaly eroding, but rather a reflection of the growing divergence between these strategies and the cap-weighted index, which has become increasingly dominated by a handful of high volatility, mega-cap stocks. When benchmarked against a "better behaved" equally weighted index, the strategies continue to exhibit the superior risk-adjusted performance that underlies their long-term appeal.

Conclusion

This paper highlights the significant implications of rising market concentration on actively managed investment strategies. While long-short portfolios remain resilient across varying market concentration regimes due to their mandate flexibility, long-only portfolios face substantial challenges during periods of increasing concentration, with reduced alpha capture driven by constraint-driven underweights. Over the long term, however, this effect is diminished and alpha capture is improved.

While our study has focused on quantitatively managed strategies, the issue of constraint-driven underweights is also a challenge for fundamental managers. Similarly, while low-volatility portfolios struggle during periods of rising market concentration due to their limited exposure to high-performing mega-cap stocks, they remain effective in reducing risk and delivering superior risk-adjusted returns over the long term. Ultimately, despite the challenges posed by increasing market concentration regimes, the persistence of the low-volatility anomaly and the long-term benefits of quantitative investment strategies underscore their continued relevance in navigating evolving market dynamics.

KEY TAKEAWAYS

- **Market concentration regimes are cyclical.** Periods of steady and decreasing market concentration do not present the same headwinds to equity portfolios as periods of increasing market concentration do, and historical patterns show that periods of rising concentration are followed by periods of stable or declining concentration. As always, a long-term perspective is critical when assessing investment performance.

- **Long-short strategies are particularly resilient to changes in market concentration.** Without the limits of the long-only constraint, long-short portfolios are free to fully express their alpha views. This flexibility allows them to overweight stocks with positive alpha forecasts and to underweight, without restriction, those with negative alpha forecasts, ensuring their performance remains primarily driven by alpha and insulating the portfolio from the impacts of trends in market concentration.

- **Rising market concentration has a negative impact on the active performance of long-only portfolios.** The long-only constraint forces a long-only portfolio's underweight positions to be concentrated in larger stocks relative to a market-capitalization benchmark. Since rising market concentration implies that larger stocks are outperforming, the active performance of long-only portfolios suffers during these periods.

- **Because they are also long-only portfolios, low volatility strategies tend to struggle during periods of rising market concentration when measured relative to a capitalization-weighted benchmark.** This underperformance can be misinterpreted as indicating a decay in the importance of the low volatility anomaly when in fact, it is being driven by the capitalization-weighted index's performance being increasingly dominated by large-cap stocks whose volatility is too high for inclusion in a low volatility strategy.

- **Despite recent headwinds from increasing market concentration, quantitatively managed long-only strategies – including core and low volatility – have performed well over the long term.** A market concentration trend can hold for multiple years, but these trends eventually reverse. When market concentration is steady or decreasing, the performance of long-only strategies improves. Ultimately, over a 25-year period that comprises periods of increasing, steady, and decreasing market concentration, the long-term performance of these strategies remains strong.

- **One of the key strengths of quantitative strategies is the integration of risk management into the systematic portfolio management process.** While long-only strategies are structurally exposed to market concentration trends, it is our view that the continuous re-evaluation and rebalancing of risk and reward within a systematic portfolio management process helps insulate quantitative strategies more from some of the adverse effects of increasing market concentration.