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THE FUTURE ROLE OF ACTIVE EXTENSION IN AUSTRALIA

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Only a year ago, long short active extension was being hailed as the next great advancement in active investing which would capture an increasing share of equity allocations. With the complete meltdown in global asset markets, there is now some uncertainty as to its role and benefits. This research paper shows that active extension remains the most efficient structure to deliver alpha in the Australian equity market and that the most significant impediment to capturing returns from any investment process remains the long only constraint. By removing this constraint, opportunities to access additional sources of alpha are opened up as well as significant improvements in portfolio construction.

Active extension involves taking short positions in some stocks and reinvesting the sale proceeds in other long positions. Uncertainty around the role of short selling during the significant market decline from November 2007 to February 2009 prompted regulatory intervention with complete and partial bans on various forms of short selling in September 2008 after the collapse of Lehman Brothers. This has created some uncertainty over the future regulatory framework and the scope for short selling. It is important to note that globally, regulators[1,2] have acknowledged the important role that short selling plays in driving pricing efficiency and this paper examines the positive impact that short selling has on markets, economies and investing.

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[1] 1st October 2008 — US Securities and Exchange Commission (SEC): "The Commission notes that short selling plays an important role in the market for a variety of reasons, including contributing to efficient price discovery, mitigating market bubbles, increasing market liquidity, promoting capital formation, facilitating hedging and other risk management activities, and importantly, limiting upward market manipulations. In addition, there are circumstances in which short selling can be used as a tool to mislead the market. For example, short selling can be used in a downward manipulation whereby a manipulator sells the shares of a company short and then spreads lies about a company's negative prospects. This harms issuers and investors as well as the integrity of the market. This kind of manipulative activity is particularly problematic in the midst of a loss in market confidence. For example, in the context of a credit crisis where financial institutions face liquidity challenges, but are otherwise solvent, a decrease in their share price induced by short selling may lead to further credit tightening for these entities, possibly resulting in loss of confidence in these institutions."

[2] 6th February 2009 – UK Financial Services Authority (FSA): "In a discussion paper (DP) issued today, the Financial Services Authority (FSA) has proposed a general short selling disclosure requirement for all UK listed stocks. The proposals follow a comprehensive review of short selling undertaken since the FSA introduced its temporary ban in September 2008. The FSA believes that the benefits of short selling such as price efficiency and liquidity, normally outweigh the disadvantages and proposes that there should be no direct restrictions on short selling. However, the FSA sees advantages in having enhanced transparency of short selling and so proposes that disclosure requirements for significant short positions should be introduced for all UK listed stocks."

This paper examines the theoretical underpinnings for active extension strategies and finds that they should deliver superior information ratios compared to long-only strategies. This was certainly true prior to the global financial crisis, but since then active extension strategies as a group have struggled. This is illustrated by examining the universe of Australian equity managers over multiple time periods, showing that that the underperformance during the market decline is due to an over-representation of pure quantitative strategies within the Australian equity active extension universe. Quantitative strategies have historically struggled during periods of extreme market volatility.

The role of short selling

Short selling has been attracting regulatory attention[3] since stock markets first came into existence in Holland in the 1600s. Short selling was first banned in 1610 in Holland after the Dutch East India Company came under pressure from a bear raid by a former board member. It again drew the ire of regulators in 1733 in England following the bursting of the South Sea bubble in 1720, and it was again banned in 1867 following several bank failures and a market panic in England. It was blamed for the 1929 stock market crash and the Great Depression that followed. The US Securities Exchange Commission (SEC) was formed and given the power to regulate short selling in 1934. An uptick rule (short selling only when the last price movement was up) was introduced in 1938 after another significant decline in the market. In 1971, the Sydney Stock Exchange placed a temporary ban on short selling in the wake of the Antimony Nickel affair at the end of the nickel boom. Short selling was also banned in Malaysia in 1997 during the Asia crisis.

In September 2008, following the sub-prime crisis and the market crash, the SEC introduced a temporary ban on certain financial stocks in conjunction with the Financial Services Authority (FSA) in the UK and many other countries following suit. In Australia, the Australian Securities and Investment Commission (ASIC) introduced a permanent ban on all naked short selling (selling without borrowing the stock) and a temporary ban on covered short selling. The ban on covered short selling was lifted in November 2008 for non-financial stocks and in May 2009, the ban was completely lifted.

Despite its chequered history, short selling continues to play a role in markets, bringing significant benefits in the form of enhanced liquidity and pricing efficiency. Deep and liquid markets with efficient and transparent pricing play a pivotal role in a market economy. They allow scarce capital to be allocated efficiently across the economy to promote the highest possible level of growth. The case for short selling then becomes a trade-off between the positive impact of enhanced liquidity and price discovery versus the actual or perceived potential for price manipulation during market declines.

Following its ban on short selling in September 2008, the FSA commissioned a study to examine the impact. The main conclusions of the study[4] were:

[3] J. Edward Meeker, "Short Selling" (1932)
[4] Matthew Clifton, University of Technology, Sydney and Mark Snape, University of Sydney. http://www.londonstockexchange.com/about-the-exchange/regulatory/short-selling-restriction-market-quality-december-2008.pdf

- **Average spreads**: stocks subject to the short-selling ban experienced a subsequent increase in spreads that was 150% greater than the increase in spreads in the control sample. During the 30 trading days prior to the introduction of the ban, the average spread had been steady for both groups, but increased by 140% from 15 basis points (bps) to 36 bps for those stocks which were no longer available for short-selling, compared with a rise of only 56% to 20 bps for the control sample.

- **Market depth**: as measured by calculating the volume required to move the bid and ask price in each stock by 1%, market depth declined more markedly for the stocks subject to the ban, decreasing by approximately 59%, compared with only 43% for the control group.

- **Trading activity**: the number of trades and volume of shares traded fell by roughly 10% in the affected stocks after the ban, but actually increased by 50% in the control sample. The divergence in trading volumes was reflected in turnover, which fell by 21% in the affected stocks, but increased by an average of 42% in the control sample.

By contrast, another study by Cass Business School[5] at the City University in London found:

1. No strong evidence that restrictions on short selling changed the behaviour of stock returns. Stocks subject to the restrictions behaved very similarly both to how they behaved before their imposition and to how stocks not subject to the restrictions behaved.

2. comparing investor behaviour across countries where the nature of the restrictions differed, there were no systematic patterns consistent with the expected effect of the new regulations, i.e. no evidence of a reduced probability of large price falls,

3. no sign of any detrimental impact of the constraints in terms of reduced efficiency of pricing.

4. that regression analysis suggested that changes in stock returns were driven mainly by other factors affecting the financial sector as a whole rather than the restrictions on short selling. That is, some systematic changes in the behaviour of financial sector stocks could be discerned, but no strong evidence of a systematic impact of the restrictions could be identified.

The difficulty with both studies is that the post ban period occurred during a time of extreme market dislocation that was focused in the group under study – namely, financials. It is almost impossible to segregate what was occurring in the broader market panic from the short sale ban. It is a reasonable inference from these two studies that banning short selling did not prevent continued volatility and weakness in the financial sector and that there was a reduction in market liquidity, however it is not possible to draw empirical conclusions due to the large exogenous shocks during the study period.

When the SEC and FSA lifted their bans, both acknowledged the role that short selling plays in enhancing market liquidity and pricing efficiency. It seems likely that short selling is here to stay, but

[5] Professor Ian Marsh and Norman Niemer, Cass Business School.
http://www.cass.city.ac.uk/media/stories/resources/the-impact-ofshort-sales-restrictions.pdf

with greater regulatory scrutiny. Given this improvement in market efficiency, those investment strategies that employ short selling should be able to capture superior returns.

The next section of this paper examines the rationale for active extension strategies and then examines the recent performance of such strategies.

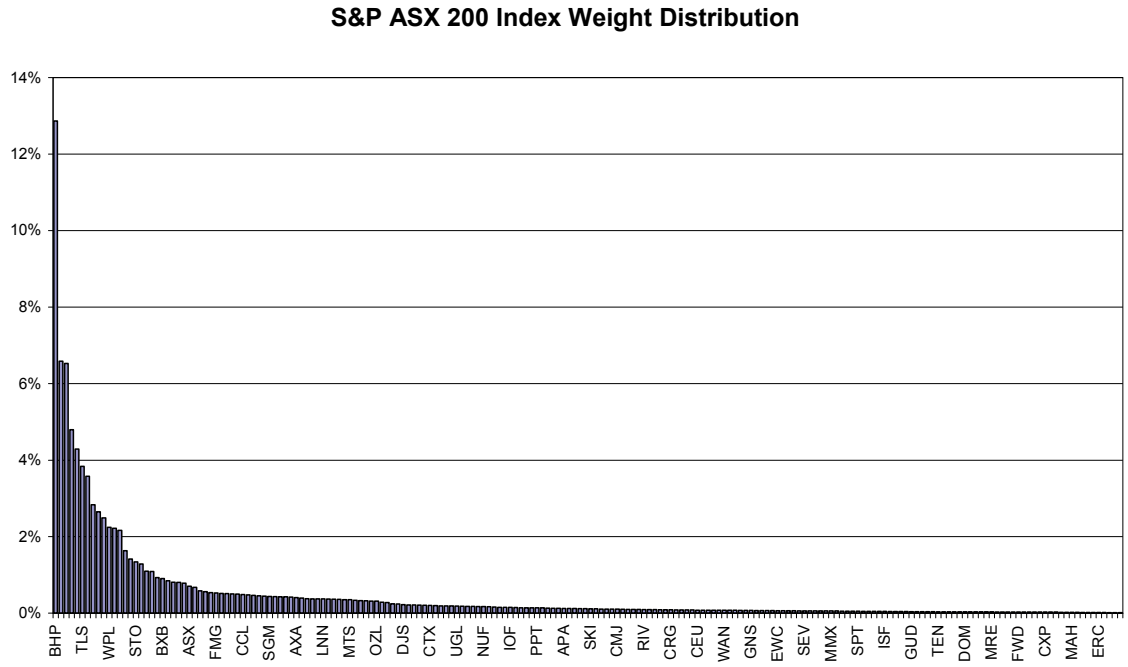
Recap on active extension

Active extension strategies evolved to combat the inherent inefficiencies of managing against market cap weighted benchmarks. Benchmarks fulfil several useful functions for investors. As well as providing a passive default option against which returns can be compared, they also constrain the risk profile of managers relative to that benchmark. This makes assessment of manager investment skill more transparent on an historic basis with returns (alpha) assessed relative to the benchmark and any passive exposure (beta) stripped out.

When a manager is constructing an active portfolio against a benchmark, the primary consideration for risk should be the active weights of the portfolio relative to that benchmark, as opposed to its absolute size. When the portfolio construction problem is framed in this context, it should be apparent that every active portfolio can be considered as a composite of an index portfolio and a market neutral long-short portfolio - that is, any fully invested benchmarked portfolio P can be expressed as a long-only portfolio making up the benchmark positions and a long-short portfolio consisting of the overweight and underweight positions. A traditional long-only benchmarked portfolio is therefore simply a special, less optimal case of a more general class of benchmarked long-short portfolios. For a traditional long-only portfolio, the size of the underweight positions is bound (i.e. constrained) by the size of the benchmark constituents. This limits the effectiveness of the portfolio manager to generate the most efficient return on the portfolio.

The *excess return* of a portfolio (α_P) is the difference between the total return of the portfolio minus the return of the benchmark. The standard deviation of the excess return is referred to as the *tracking-error* (TE_P) of the portfolio. In order to generate an excess return, it is necessary to hold overweight and underweight positions in securities that make up the benchmark. Ideally, to generate the highest excess return per unit of tracking error, the portfolio is constructed such that the securities with the greatest individual excess returns are overweight while the securities with the lowest excess returns are underweight. In the case of a long-only portfolio, there is an upper limit to which this goal can be achieved. This limit is imposed by the long-only constraint that prevents the allocation of capital to underweight positions if they exceed the benchmark holding. Above this limit, overweight positions must be offset by less desirable underweight positions, thereby reducing the portfolio excess return per unit of tracking error (information coefficient). For benchmarks that consist of highly non-uniform weightings, the long-only constraint leads to less than optimal holdings in the largest constituents of the benchmark. This is particularly so for the Australian market where the median stock in the S&P/ASX 200 represents only 12 basis points in the index. Figure 1 highlights the extreme nature of this skew.

Figure 1: S&P ASX 200 Index weight distribution



Source: IRESS

This problem may be overcome via active extension, i.e. taking short positions in some stocks and reinvesting the sale proceeds in other long positions. This gives the manager the freedom to assign more meaningful overweight and underweight positions that are based on expected excess return, rather than having positions influenced by a stock's benchmark weighting.

As explained earlier, any benchmarked portfolio can be expressed in terms of a long-only portfolio replicating the benchmark and a long-short portfolio containing over and under weights. The portfolio (*P*) is expressed in terms of its benchmark portfolio (P_B) and a portfolio of over/under weights (P_{OU}),

$$P = P_B + P_{OU}$$

If $\beta_i = \{\beta_1, \beta_2, \ldots\}$ are the *benchmark weights* and $w_i = \{w_1, w_2, \ldots\}$ are the *active weights* for the portfolio P_{OU}, then to be fully invested the *budget constraint* is expressed as:

$$\sum_i \beta_i + w_i = 1 .$$

Since the benchmark weights must sum to unity, the portfolio P_{OU} is a long-short portfolio where the short positions completely balance the long positions. This makes the portfolio *self-financing*,

$\sum_i w_i = 0$.

It is important to notice that under this representation, the only thing that distinguishes a long-only portfolio from a long-short portfolio is the conditions that are placed on the holdings in P_{OU} . For a long-only portfolio the *long-only constraint* is introduced:

$w_i \geq -\beta_i$.

This long-only constraint states that the largest underweight position for each individual security cannot exceed its benchmark weight. This constraint has a significant effect on portfolio construction as the tracking error is increased.

The budget constraint states that aggregate long positions must be offset by aggregate short positions of the same magnitude. Ideally the portfolio is constructed by taking long positions in securities with the greatest excess return and short positions in securities with the lowest excess return. However, as the long-only constraint comes into effect, the portfolio is forced to underweight securities with *higher* excess return to fund our overweights. This leads to a less optimal portfolio return.

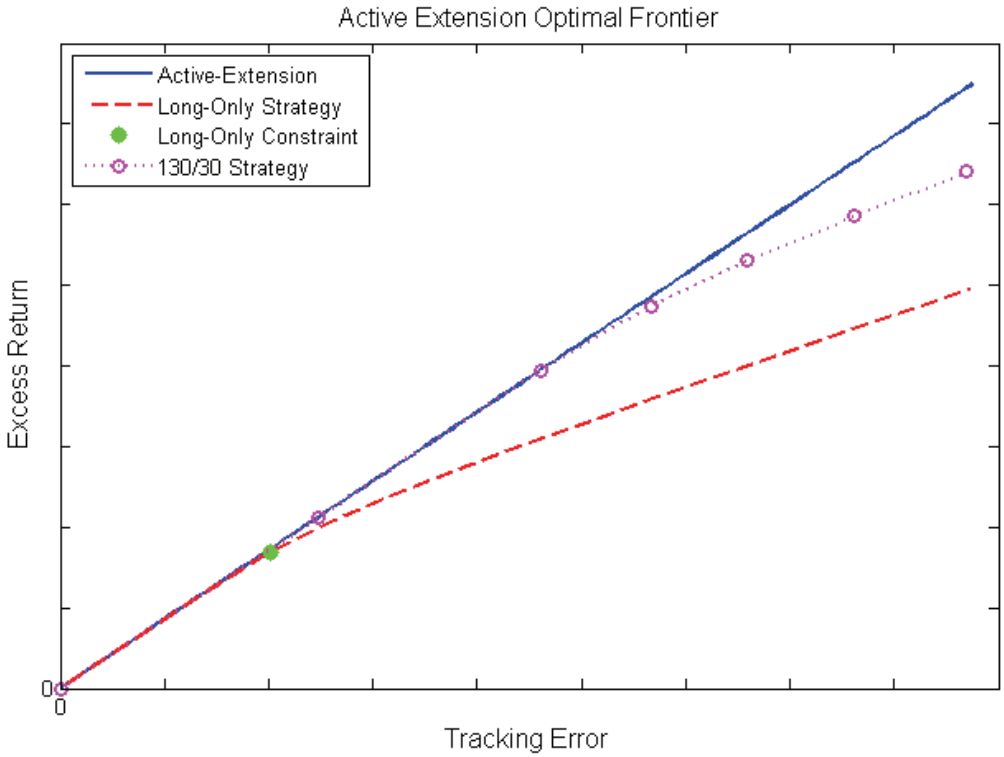
The excess return and tracking error of portfolio P can be expressed in terms of the over/underweight holdings. Let $r_i = \{r_1, r_2, \ldots\}$ be the expected returns for each security and **S** be the covariance matrix of the returns. The excess return and tracking error of P are given by,

$$\alpha_P = \sum_i w_i \cdot r_i ,$$
$$TE_P = w' \mathbf{S} w.$$

Figure 2 illustrates how active extension funds are able to offer higher returns with proportionately less risk than the same investment strategy employed in a long-only strategy. It displays the *efficient-frontier* (i.e. the maximum achievable excess return α_P for each level of tracking error TE_P) for the constrained and unconstrained cases. Any manager seeking to obtain the highest excess return per unit of tracking error will choose a portfolio on the active extension line. Notice that the point (0, 0) corresponds to the benchmark portfolio P_B as this has a tracking error of zero and no active return.

In plain English, alpha extension funds offer better returns by capturing alpha from more efficient underweights. Figure 2 shows that an active extension strategy delivers a greater excess return with **less risk** than the corresponding long-only strategy.

Figure 2: Active Extension Optimal Frontier

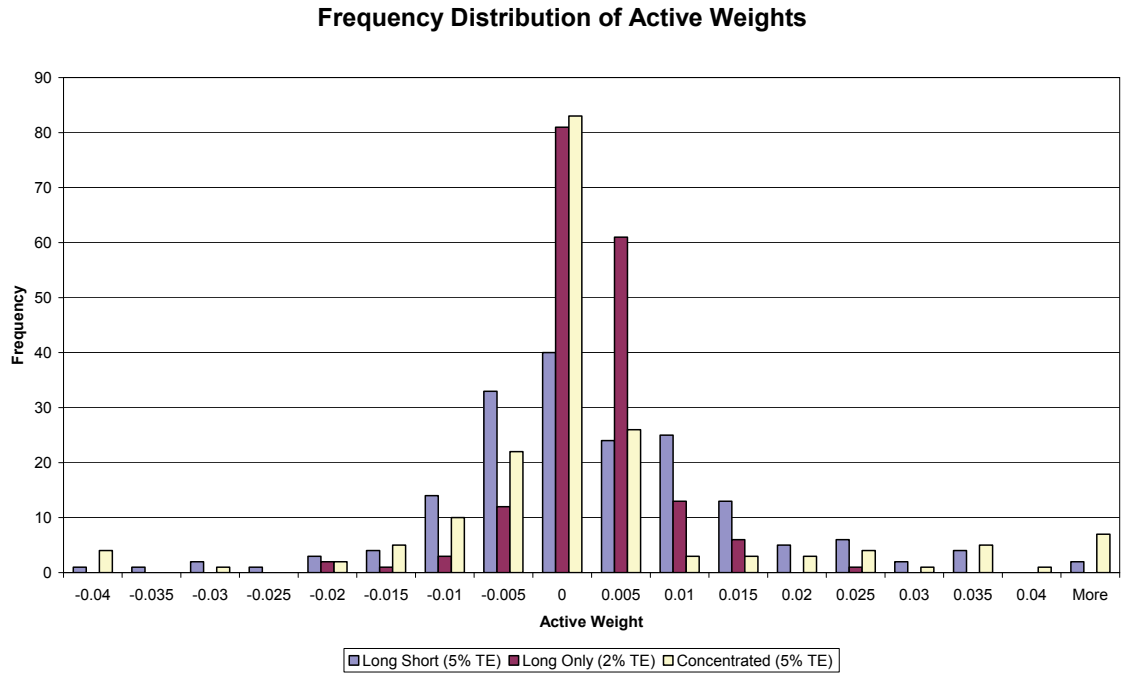


Source: Tribeca

What effectively happens is that in the long-only scenario, a manager is forced to concentrate positions in order to move up the tracking error curve and target higher returns. If it is assumed that expected excess returns are normally distributed, along with the actual relative returns, then under the theory of modern portfolio management[6,7] an optimised portfolio in the unconstrained long-short space will have largely normally distributed active weights. The imposition of the long-only constraint will result in a positive skew to the distribution of active weights as fewer underweight positions of the desired size can be taken. As the tracking error of the long-only constrained portfolio is increased, the kurtosis of the distribution will also increase – that is, there will be a larger number of extreme over and underweight positions. Figure 3 illustrates the impact of the long-only constraint on the distribution of active weights at different tracking errors. Portfolio simulations have been conducted using proprietary portfolio construction tools to highlight changes in the distribution of active weights with the imposition of the long-only constraint and at different targeted tracking errors.

[6] Markowitz, Harry., Portfolio Selection, Journal of Finance, 7, 1952, 77-96
[7] Sharpe, W.F.. CAPITAL ASSET PRICES: A theory of market equilibrium under consideration of risk, Journal of Finance, 19, 1964, 425-442

Figure 3: Frequency distributions of active weights



Source: Tribeca

When framed in the context of the fundamental law of active management[8]:

$$\alpha_P / TE_P = TC \times IC \times \sqrt{N}$$

Where: TC is transfer coefficient – the ability to reflect stock rankings in the portfolio
IC is information coefficient – skill at ranking stocks
N is breadth – the number of active weights

Active managers that are constrained to the same benchmark will all have the same breadth – that is, the same number of active weights or investment opportunities. Differences in excess return will then come down to manager skill at ranking stocks (information coefficient) as well as the transfer coefficient (the ability to reflect stock rankings in the portfolio). The long-only constraint significantly distorts the distribution of active weights and this effect becomes more pronounced at higher levels of targeted tracking error. Active extension strategies overcome this problem by short selling and reinvesting the proceeds to improve the transfer coefficient and deliver higher returns per unit of risk.

[8] The Efficiency Gains of Long-Short Investing (Grinold and Kahn), Nov/Dec 2000, *Financial Analysts Journal* (www.cfapubs.org/loi/faj)

The evidence in Australia

In the period leading up to the global financial crisis in late 2007 active extension strategies generally outperformed their long-only counterparts. However, since the inception of the crisis the performance has been less convincing.

Figure 4: Australian equity fund returns

	S&P/ASX 200	Long Only Median	Active Extension Median
Oct-03 to Oct-07	25.0% pa	25.5%pa (56 managers)	28.2%pa (6 managers)
Nov-07 to May-09	-26.8% pa	-23.7% pa (87 managers)	-27.6% pa (12 managers)

Source: Mercer MPA Australian Equity Survey

On the surface, it appears that active extension has simply been providing leverage to the market, as in aggregate they have outperformed in rising markets and underperformed in falling markets. However, this can be explained by the high concentration in Australia of quantitative-based investment strategies in the space. In the recent period, 8 out of the 12 managers surveyed (66.7%) have pure quantitative investment strategies while only 14 out of 87 long-only managers (16.1%) are quantitative. This concentration has evolved because quantitative funds were the early adopters of active extension.

Quantitative-based strategies tend to have a lot of breadth, be largely symmetrical in their stock rankings and tend to be style neutral. This makes them ideal candidates for active extension. By unlocking the long only constraint, they are able to fully capture alpha from their investment processes. However, quantitative funds are dealing with relatively limited information sets. An investment process that is limited to historical financial data and consensus earnings forecasts will always be limited in the amount of alpha that can be delivered. Further, these investment processes generally rely on exploiting investors' behavioural biases, something that is really only achievable in stable market conditions. It is not surprising to see quantitative processes struggle to generate returns in the recent environment of rapidly shifting fundamentals accompanied by a huge spike in fear and risk aversion. Figure 4 highlights the divergence of returns between quantitative and non-quantitative managers in the post-crisis period for active extension strategies.

Table2: Australian active extension equity fund returns

	S&P/ASX 200	Pure Quant	Other
Nov-07 to May-09	-26.8% pa	-30.2% pa (8 managers)	-16.6% pa (4 managers)

Source: Mercer MPA Australian Equity Survey

While the sample size is small, it should be clear that it is the lack of diversification of investment strategy that has really brought the performance of active extension strategies into question in Australia. The active extension structure still provides the best opportunity for managers to deliver a superior risk-reward outcome, although the results are still dependent on manager skill.

Conclusion

The Global Financial Crisis has brought considerable uncertainty to the future of active extension structures. This has been through two key areas: Firstly, the imposition of regulatory constraints on short selling (the key implementation mechanism for active extension) and secondly, through the poor performance of quantitative managers (the early adopters of active extension).

This paper explains that periods of financial stress and extreme market instability have historically prompted regulatory authorities to ban short selling in an attempt to provide stability. However, this intervention tends to be temporary in nature as it is widely acknowledged that short selling provides benefits in increasing market liquidity and pricing efficiency, viewed as being beneficial in driving capital efficiency in a market economy.

Active extension provides a more efficient basis for portfolio construction by allowing a manager to improve the transfer coefficient from their expected ranking of returns to their actual active weights. This will generally result in higher information ratios being achieved in active extension funds compared to their long-only counterparts.

The evidence of outperformance to date has been rather mixed, but this is more a result of the impact of the highly volatile market and economic environment. This has pressured the performance of pure quantitative strategies that are over-represented in the alpha extension sample. In the future, we are likely to see more traditional managers embracing active extension and a broader representation of investment strategies within the space.