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Quants: Beyond multi-factor models

Nomura Global Quantitative Equity Conference
May 21st 2010

It is like the old story of the man who was going to fight a duel the next day.

His second asked him, "Are you a good shot?"

 "Well," said the duelist, "I can snap the stem of a wine glass at twenty paces"

…and he looked modest.

"That's all very well," said the unimpressed second.

"But can you snap the stem of the wineglass while the wineglass is pointing a loaded pistol straight at your heart?"
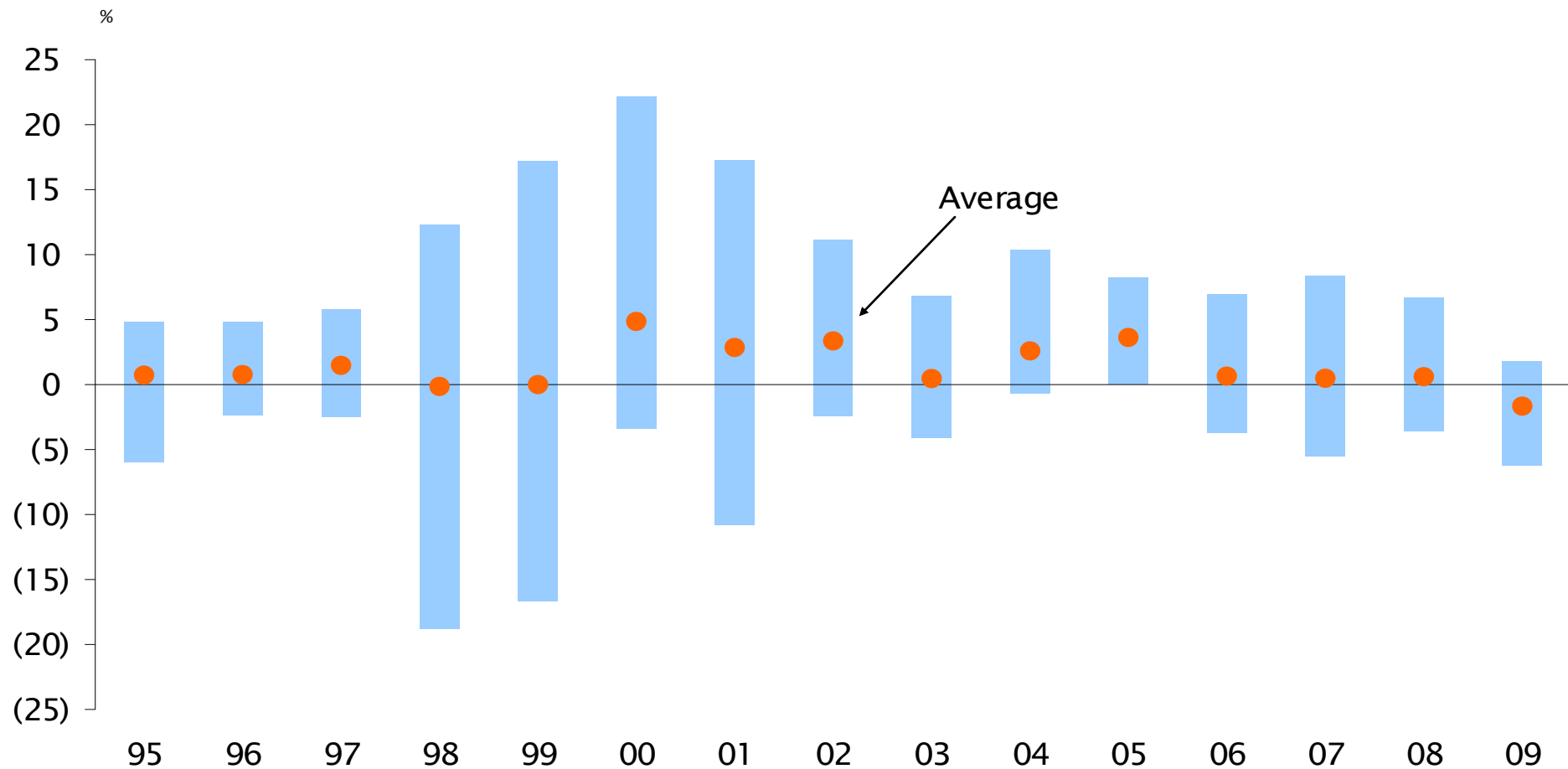
(Jesse Livermore Quote)

The story so far… or how we arrived here

Quant has been a long-term value creator

US Quantitative managers versus the S&P 500. Average relative return and Range around it (1995 through first-half 2009)
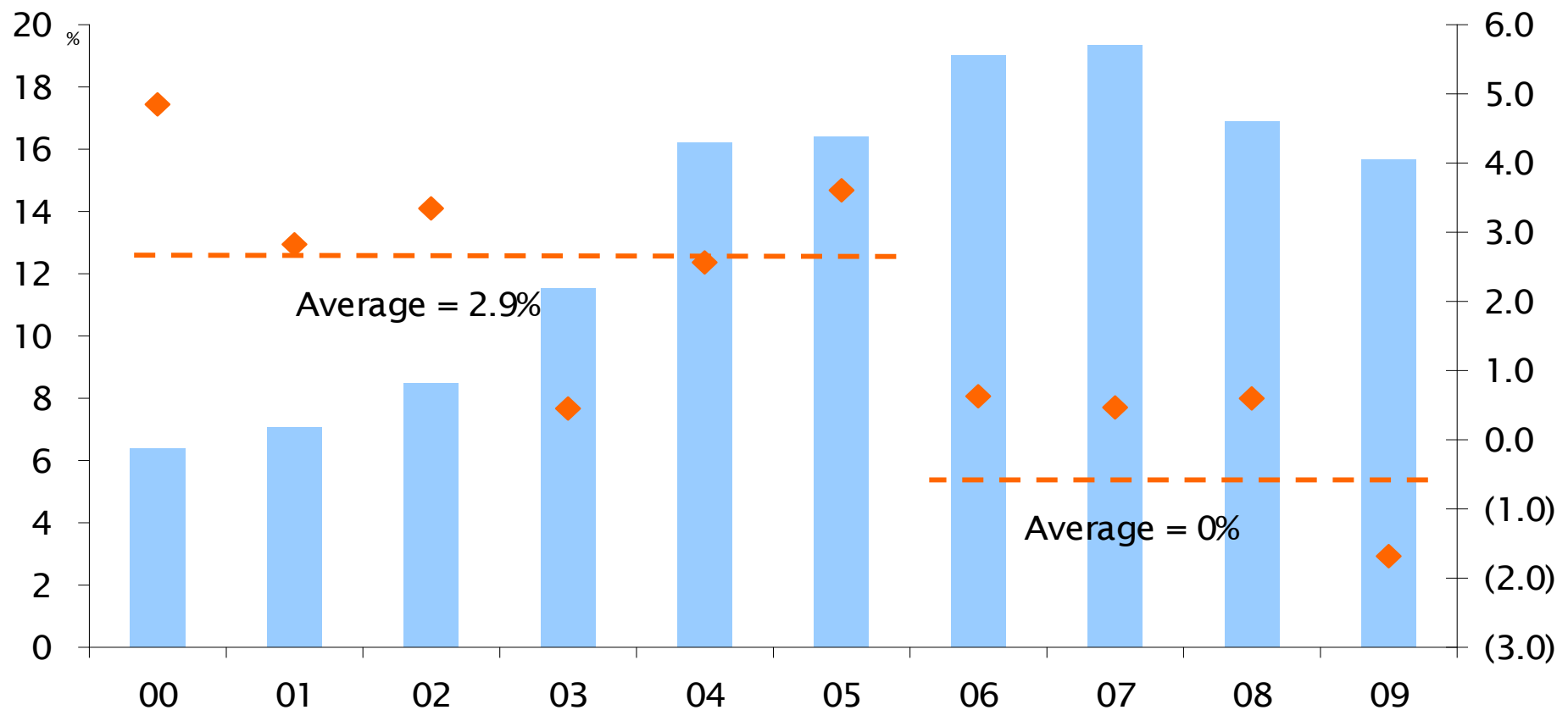
Performance since 2006 has not been stellar, but positive nonetheless. 2009 deserves an explanation

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US Quantitative managers: Share of Actively-Managed Equities Held in Defined-Benefit Plans (LH) and average performance (RS)

Average = 2.9%

Average = 0%

A tragedy in four acts: how quant moved from value-based models to momentum and 'dynamic' factor allocation

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Hedge Fund Market Neutral Index (LHS)
Correlation with the performance of momentum factors (RHS)

4 Momentum breaks down

2 Correlation to momentum increases

Average = 60%

3 Aug 07: models become more 'dynamic'

Average = 0.0

1 Value starts to fail

- **Multi-factor models were initially value driven models**

- **Gradually, as value became out of favour, models became more momentum driven**

- **Increasing quant research and new entrants caused them to converge**

- **As we all realised this in August 2007, we enhanced the models**

- **Part of this enhancement meant more 'dynamic' models: which lead to more momentum**

- **These dynamic approaches broke down in May 2009**

Evolution… and the fallacy of optimisation

Multi-factor models evolved in different ways

Evolution of multi-factor models

1

Dynamic models

- Models based on either momentum or dispersion of factors
- Momentum based rotation creates significant exposure to reversals
- Dispersion based rotation can lead to periods of poor performance

2

New alpha models

- Efforts to identify new alpha factors lead to a lot of 'data mining'
- No compelling evidence that new factors were identified after Aug 07
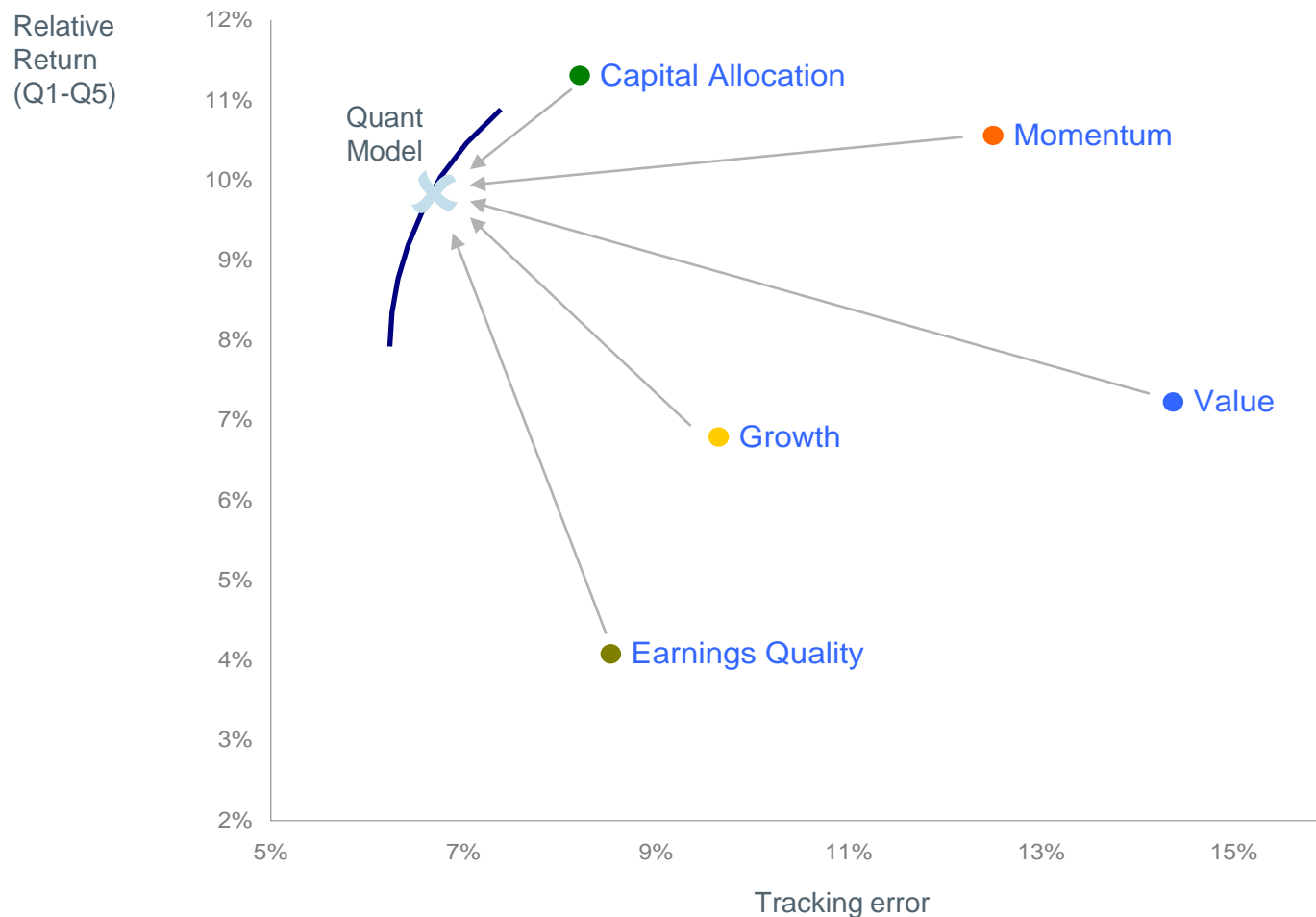- Better and more diversified models were a tangible output

3

Static models

- Do not fall into the 'momentum' and 'dispersion' traps
- Replicable by passive factor strategies
- Consultants and other buyers believe it lacks innovation / research

Source: Aviva Investors

Multi-factor models are created from a combination of market anomalies

Building up multi-factor models

In building multi-factor models, we aim to…

Relative Return (Q1-Q5)

Quant Model

- Capital Allocation
- Momentum
- Value
- Growth
- Earnings Quality

Tracking error

- **Maximise our information ratio (i.e. return per unit of volatility)**

- **Maximise our hit-rate (i.e. number of months we outperform the market)**

- **Minimise our turnover**

- **Minimise our drawdowns**

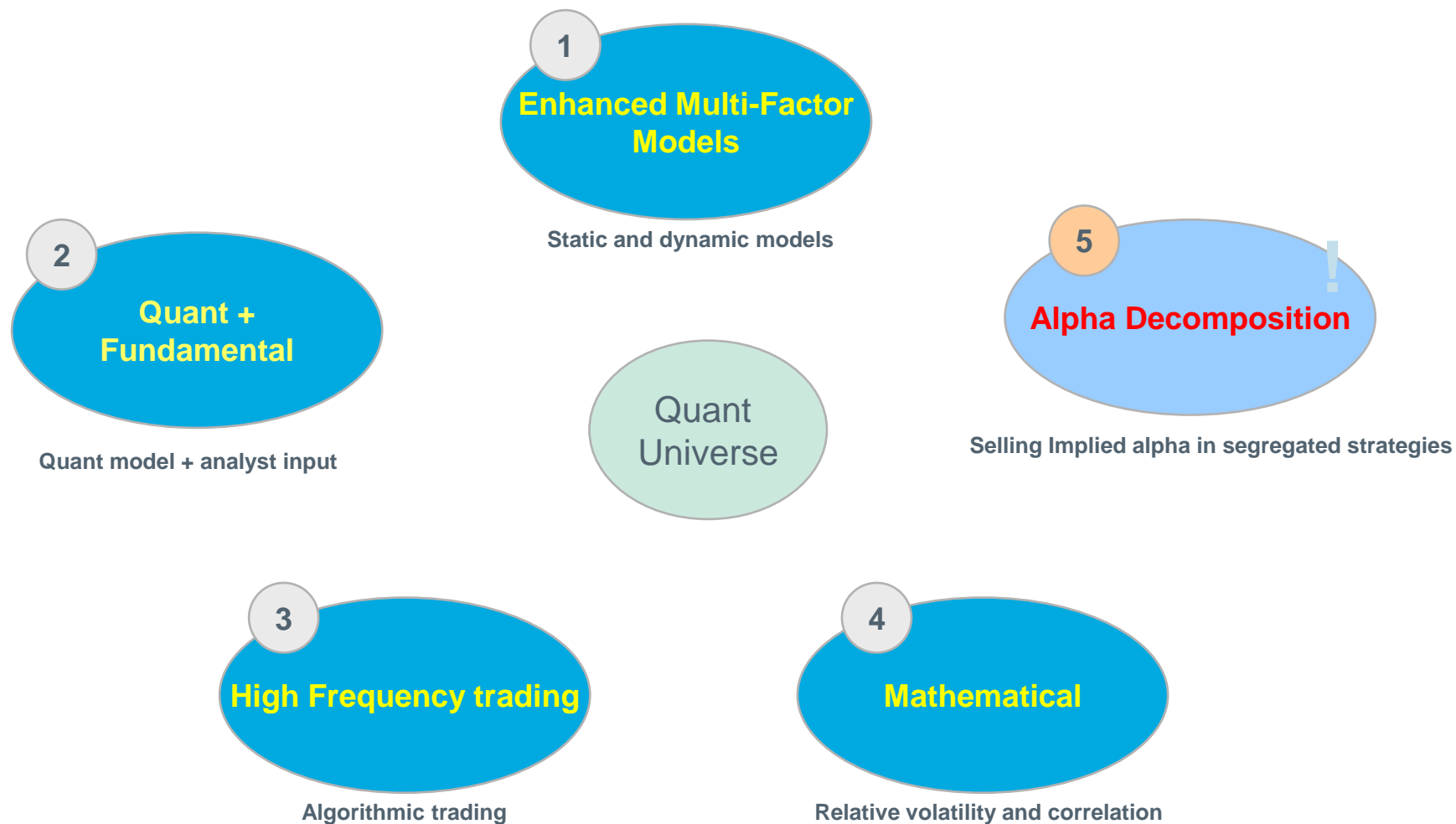Source: Aviva Investors

The fallacy of optimisation

- **Our desire for monthly/quarterly leveraged out-performance lead us to all of this**

- **We forgot that these inefficiencies exist because they do not work all the time**

- **In optimising our models for higher hit-rates, we were undermining the alpha of the underlying strategies**

- **Value investors did not stop being value investors in 1998-1999, but we stopped believing in what we were doing because it did not work in 2007-2008**

- **…But the alpha from these strategies is still there**
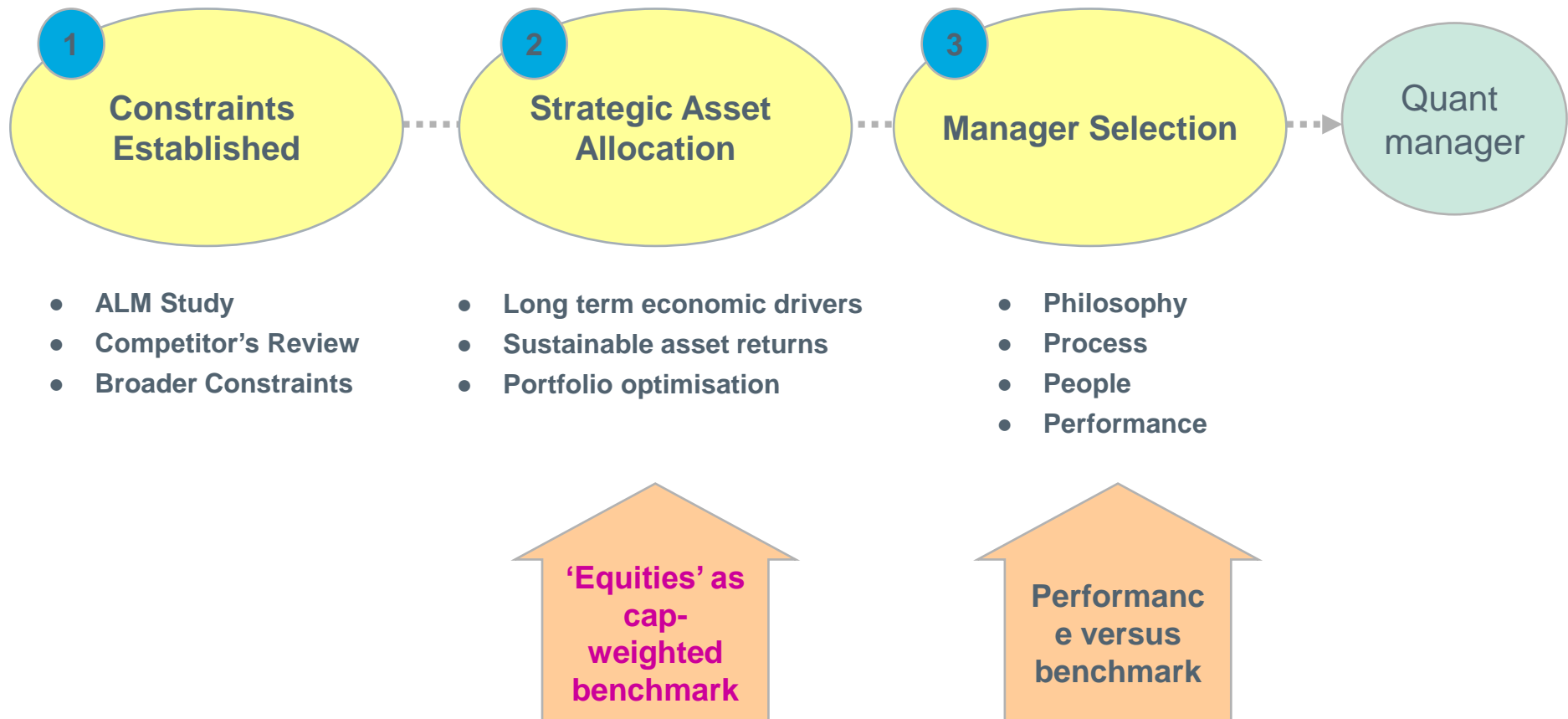
Breaking the paradigm: decomposing our alpha

Quant sub-strategies

1

Enhanced Multi-Factor Models

Static and dynamic models

2

Quant + Fundamental

Quant model + analyst input

5

Alpha Decomposition

Selling Implied alpha in segregated strategies

Quant Universe

3

High Frequency trading

Algorithmic trading

4

Mathematical

Relative volatility and correlation

Quants can do more by acting at SAA level

Strategic Asset Allocation Process

1 — **Constraints Established**

- ALM Study
- Competitor's Review
- Broader Constraints

2 — **Strategic Asset Allocation**

- Long term economic drivers
- Sustainable asset returns
- Portfolio optimisation

'Equities' as cap-weighted benchmark

3 — **Manager Selection**

- Philosophy
- Process
- People
- Performance

Performance versus benchmark

Quant manager

Asset allocators see "equities" as a single asset class represented by a cap-weighted index

Mean-variance comparison: S&P500 versus non-cap weighted alternatives

Source: Aviva Investors
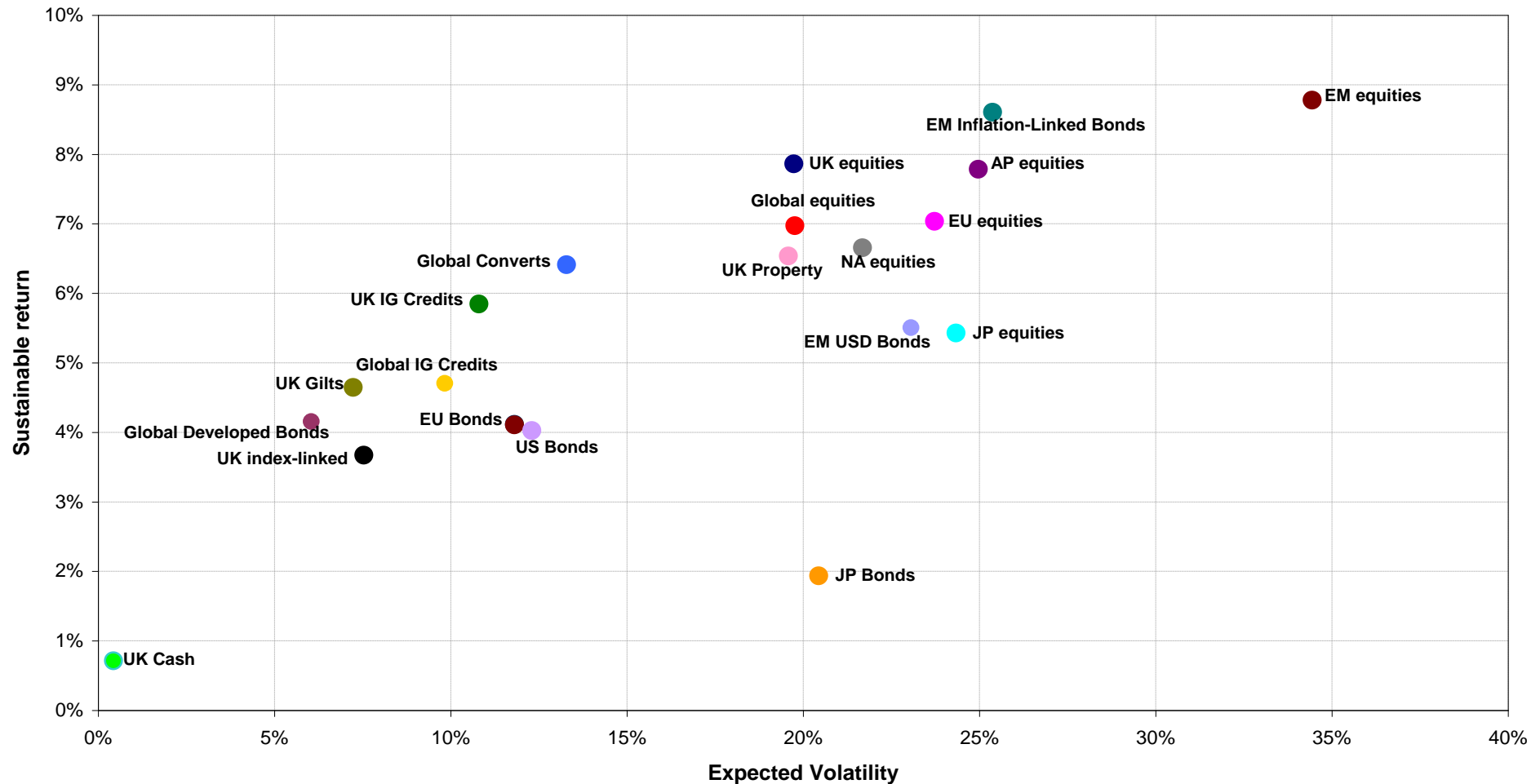
'Equities' should not be synonymous with to cap-weighted indexation

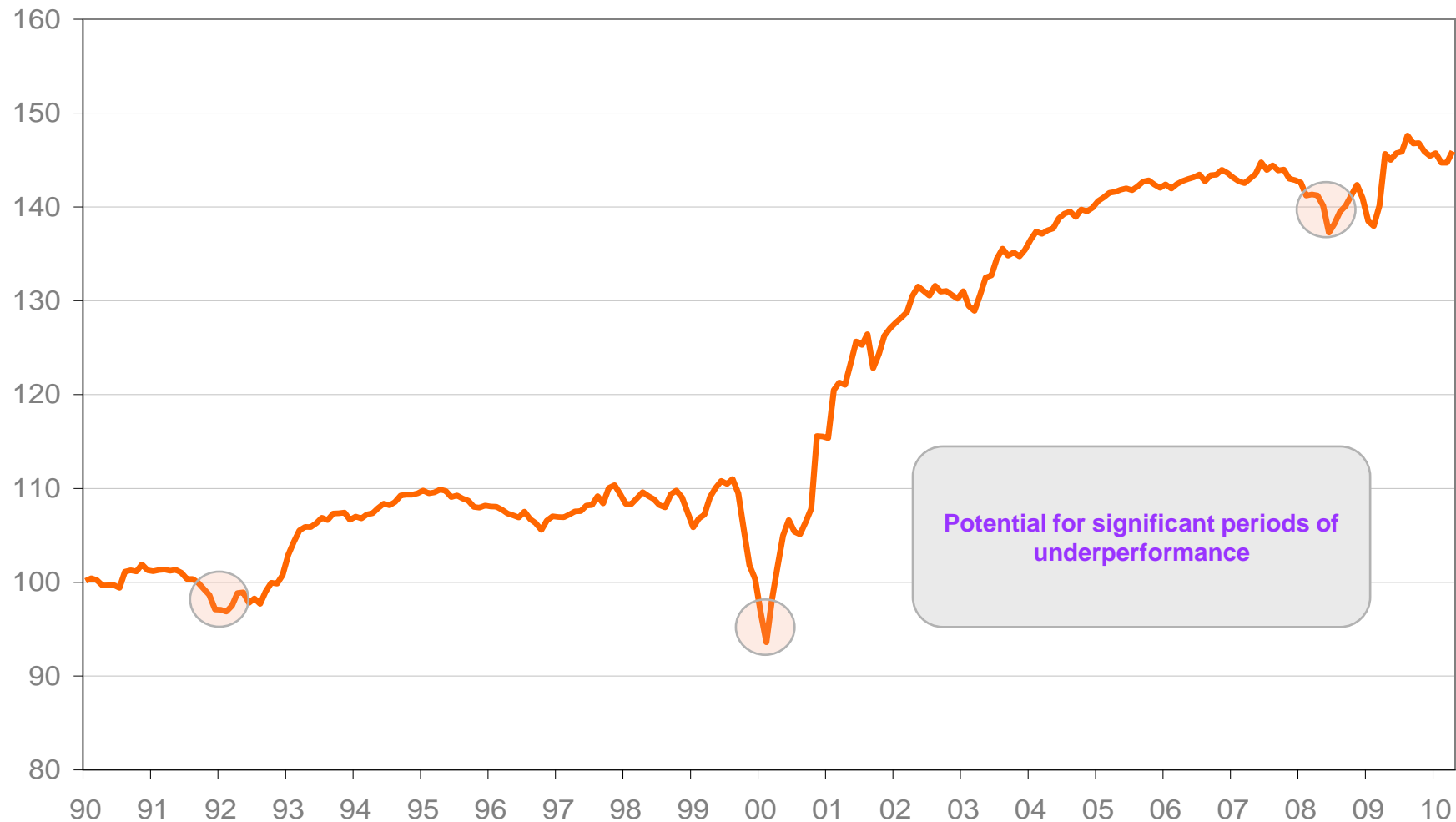Mean-variance comparison: S&P500 versus non-cap weighted alternatives
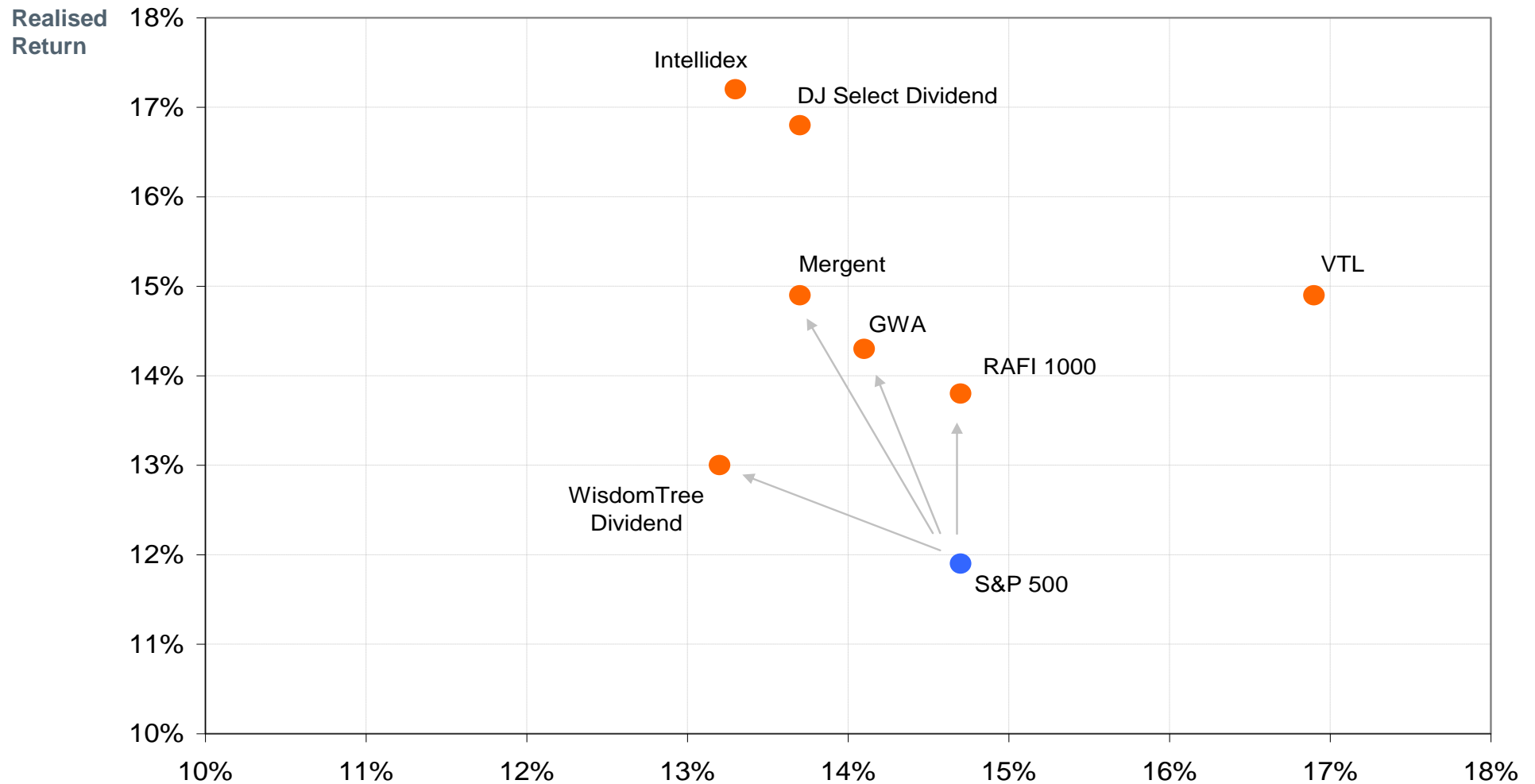
Alpha decomposition: Illustrative example (1)
Fundamental strategies, as a proxy for the value premium
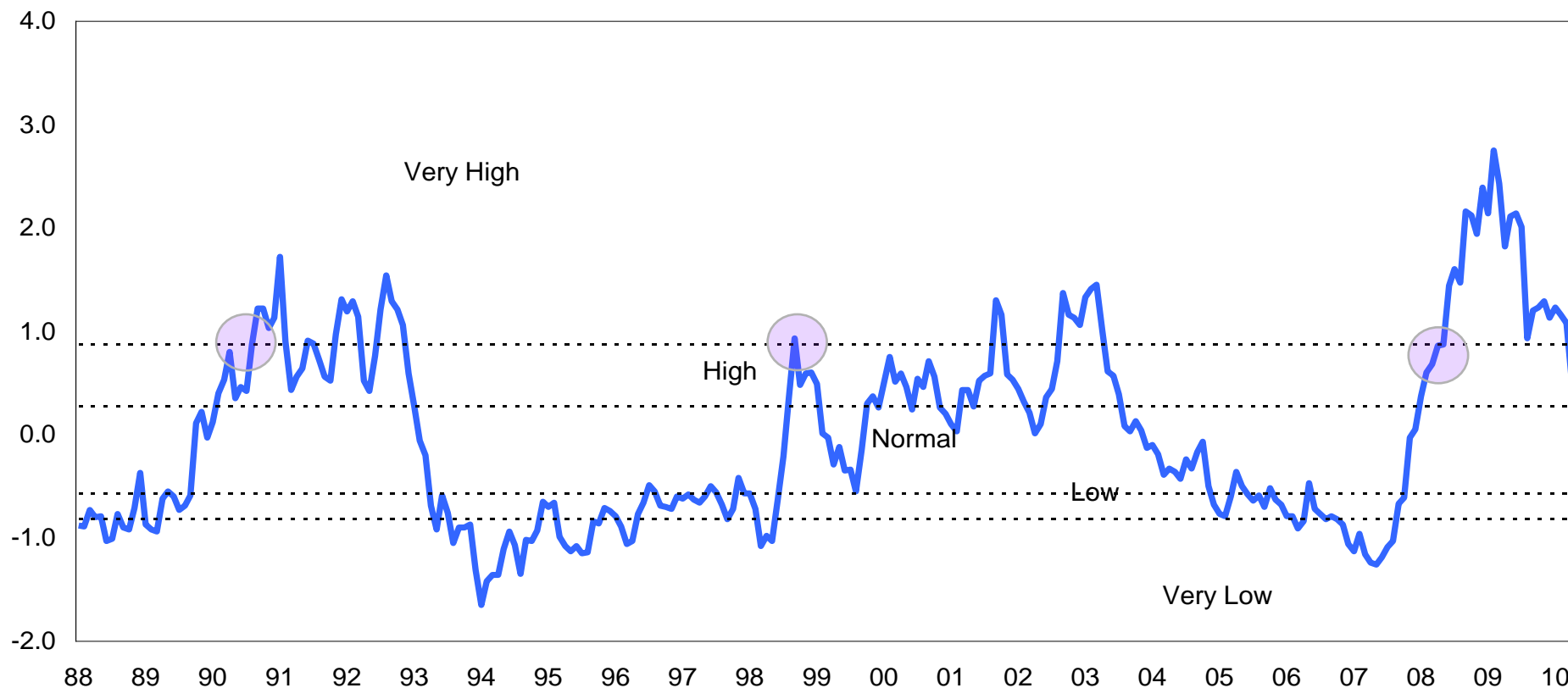
Fundamental Strategy (Value Driven): UK Market 1990-2010

Potential for significant periods of underperformance

Alpha decomposition: Illustrative example (1)
There are ways to measure the potential from this strategy

United Kingdom
Composite valuation dispersion
1988-2010

Very High

High

Normal

Low

Very Low

Alpha decomposition: Illustrative example (2)
Low vol strategies present much higher risk-adjusted returns

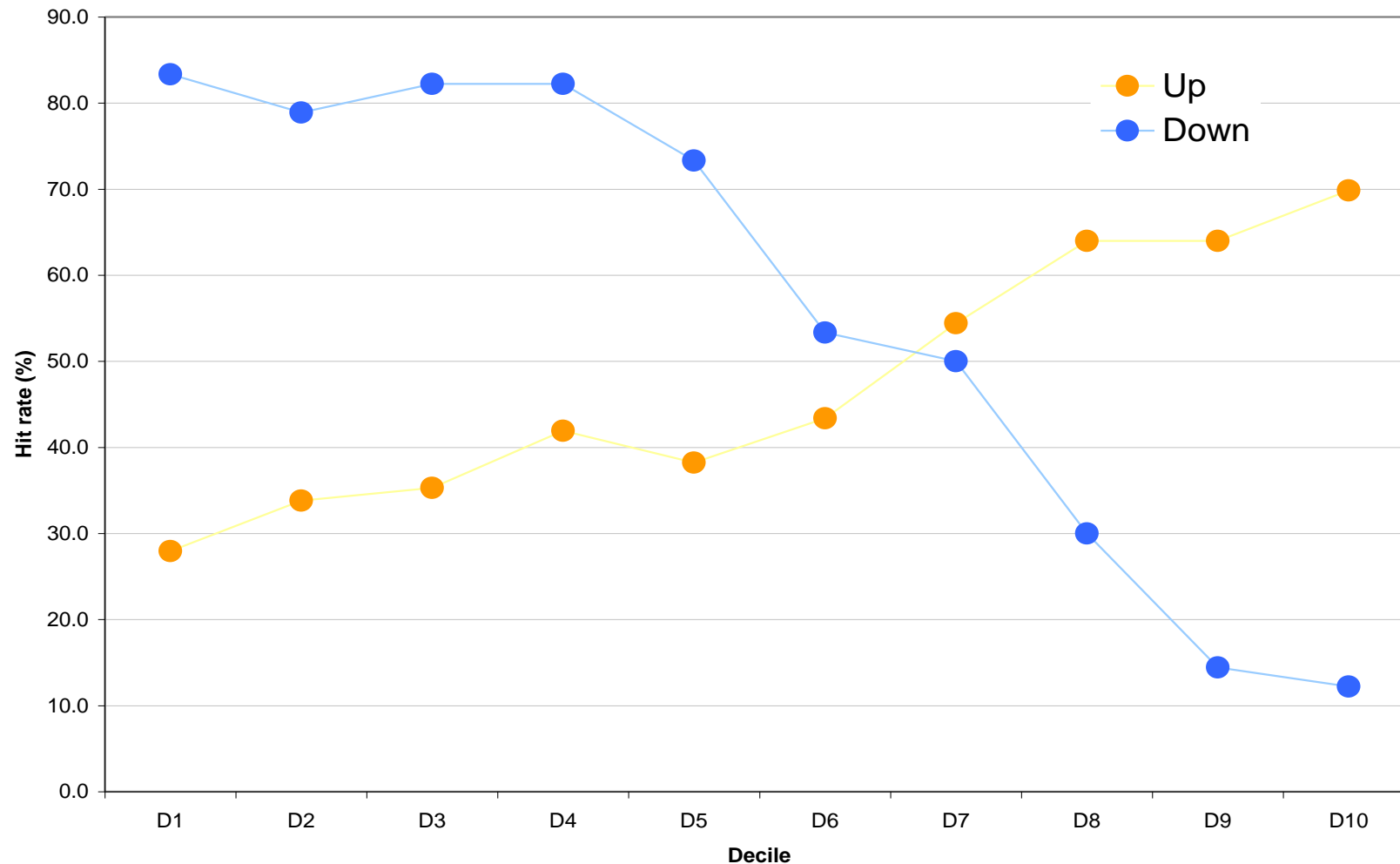Global portfolio: relative returns and Sharpe ratios of low vs high volatility strategies
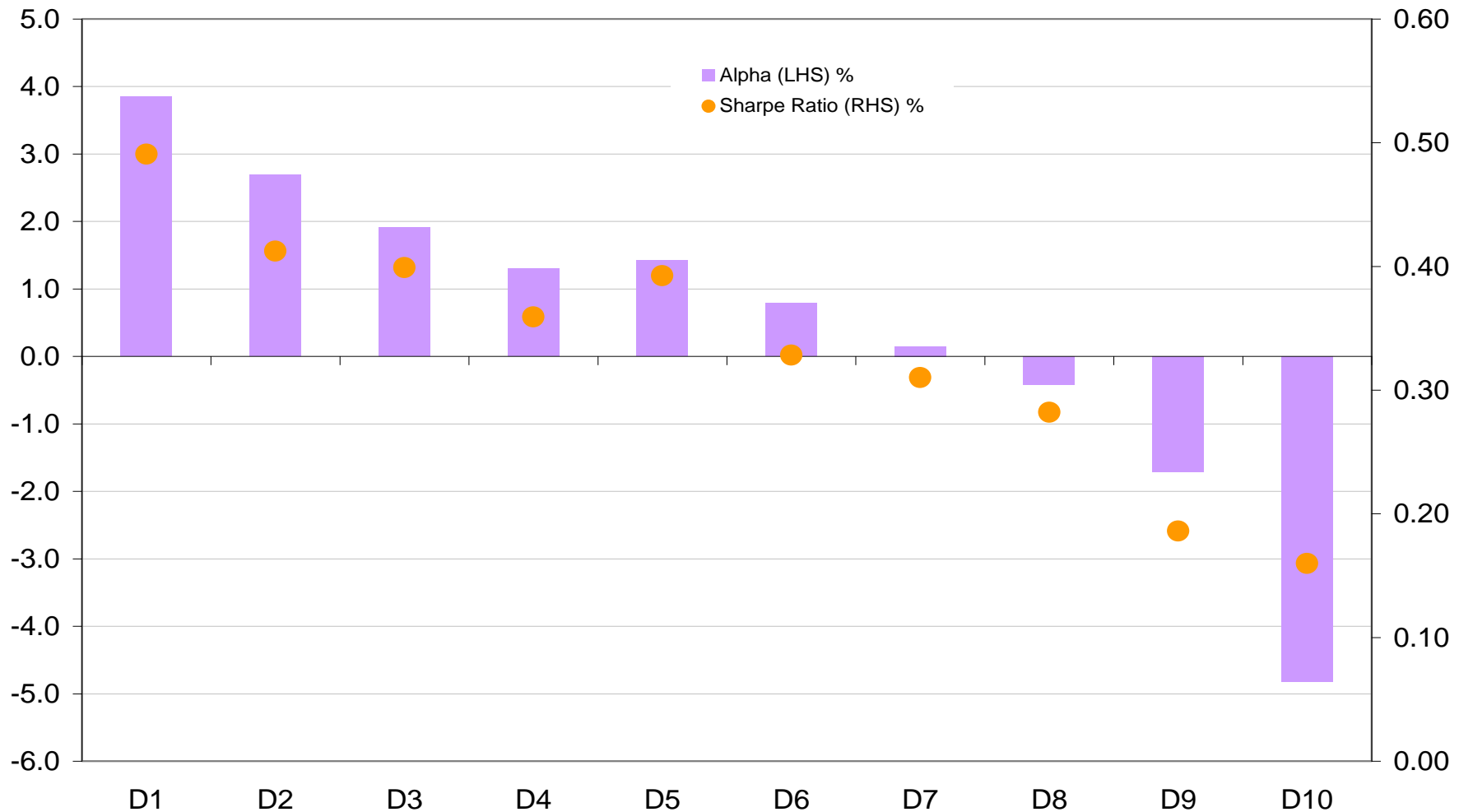
Source: Aviva Investors

Alpha decomposition: Illustrative example (2)
There are also ways to measure the potential from this strategy

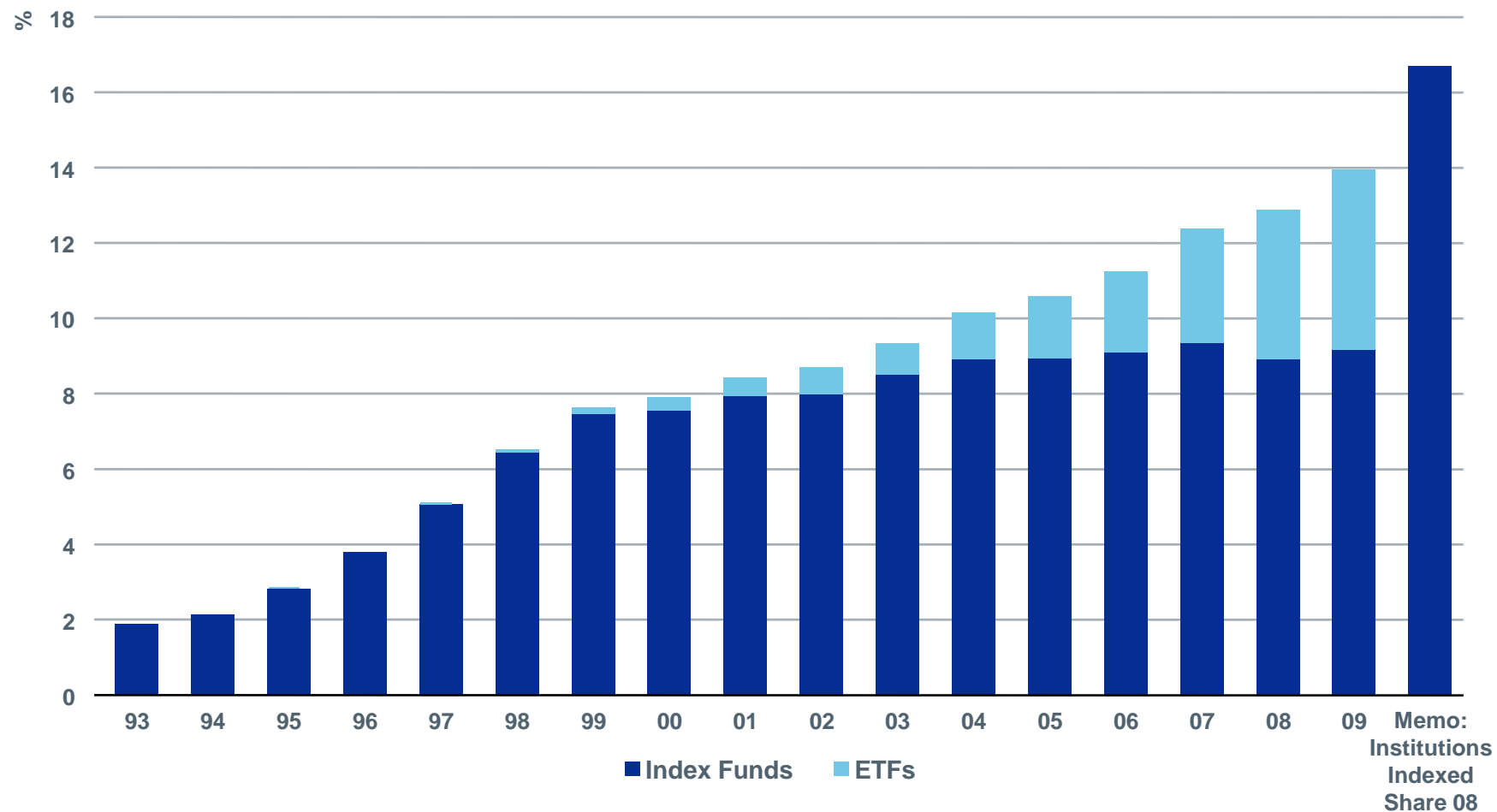Volatility Strategies: Hit Rates versus direction of the market

Alpha decomposition: Illustrative example (3)
Index arbitrage: an anomaly that has been increasing in size

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S&P 500: Relative performance of additions versus deletions
between announcement and effective dates
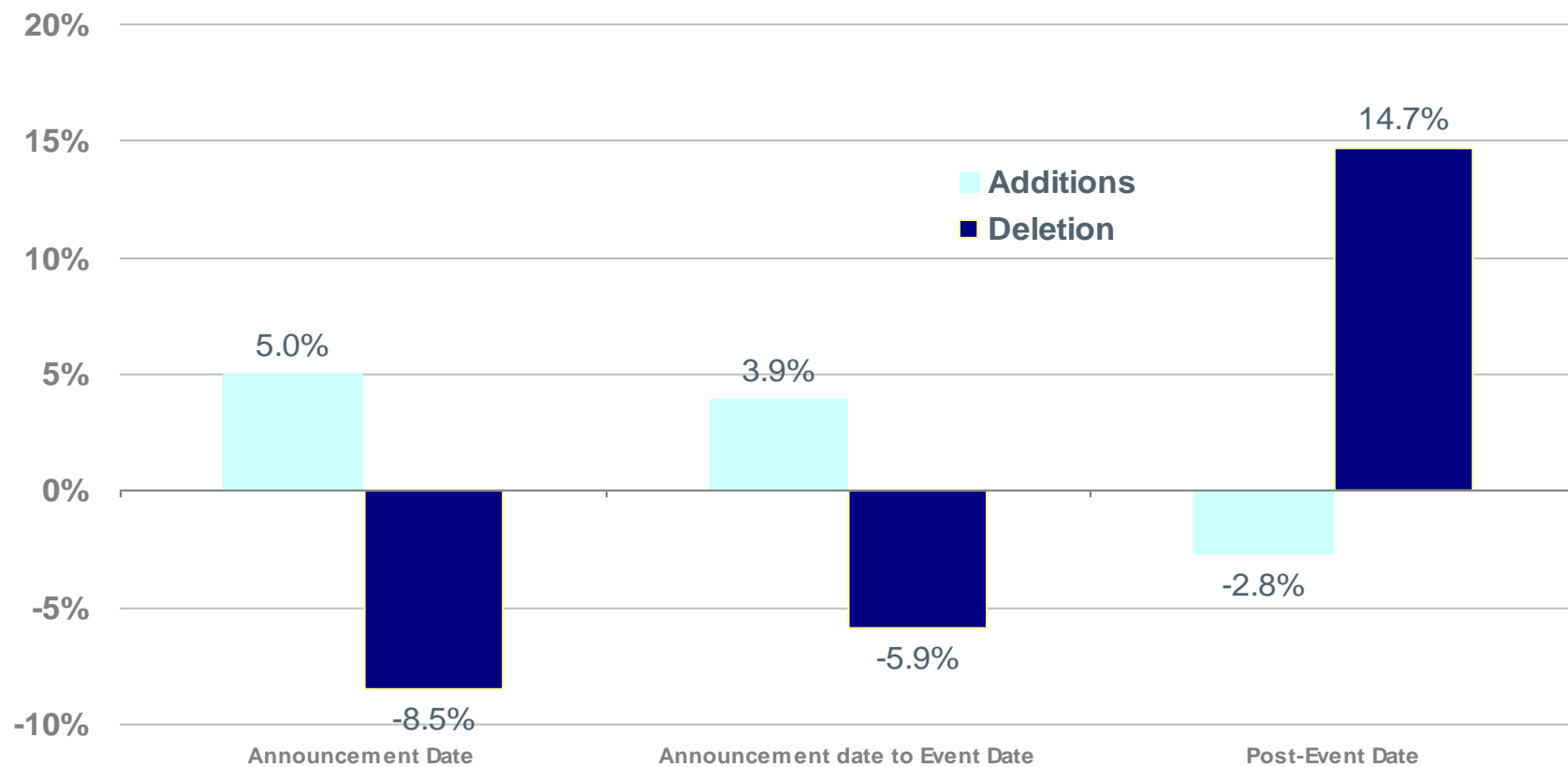
Alpha decomposition can fight cap-weighted indexation

- **Why are we allowing such huge pools of assets to be moved to passive strategies when we can offer better risk-adjusted solutions?**

- **Cap-weighted indexation is a poor solution: it has the known problem of overweighting overpriced securities – and even equal-weighted portfolios can generate better risk-adjusted returns.**

- **In order to be able to pitch our proposition to asset allocators and fight indexation, we should simplify and decompose our strategies – and therefore be much more transparent about the alpha opportunity we are presenting.**

This is not about a "new passive" approach

- **Implementing any of the above-mentioned strategies is far from trivial. It requires extensive modelling to understand risk-adjusted returns, hit-rates, drawdowns and turnover associated with each of them.**

- **They can often be implemented in a number of different ways (sector neutral, beta neutral, maximum weights for single stocks).**

- **Only Quants can perform the necessary modelling to successfully implement these strategies. And all of them should represent a better solution than classical indexation.**
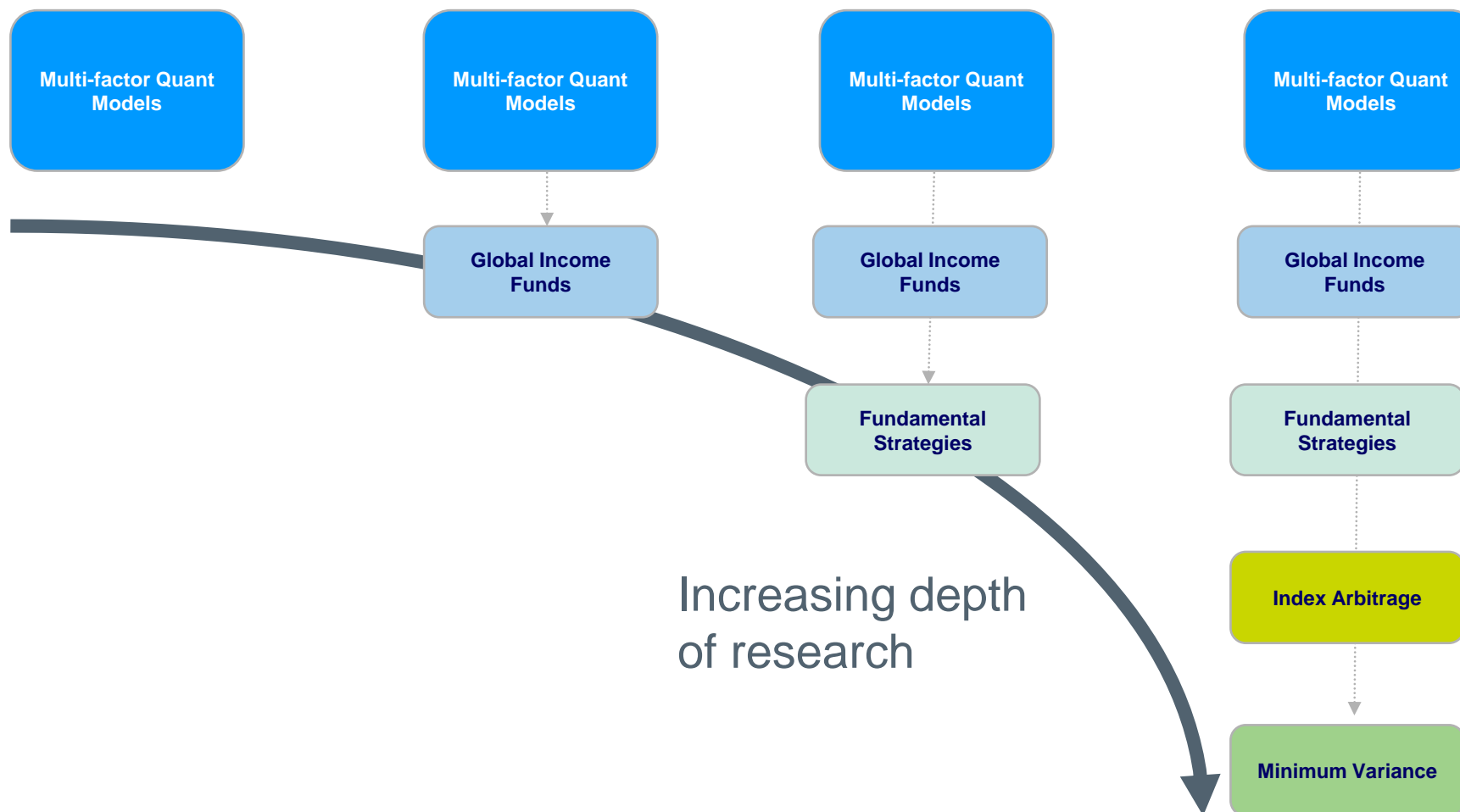
Breaking the paradigm: decomposing our alpha
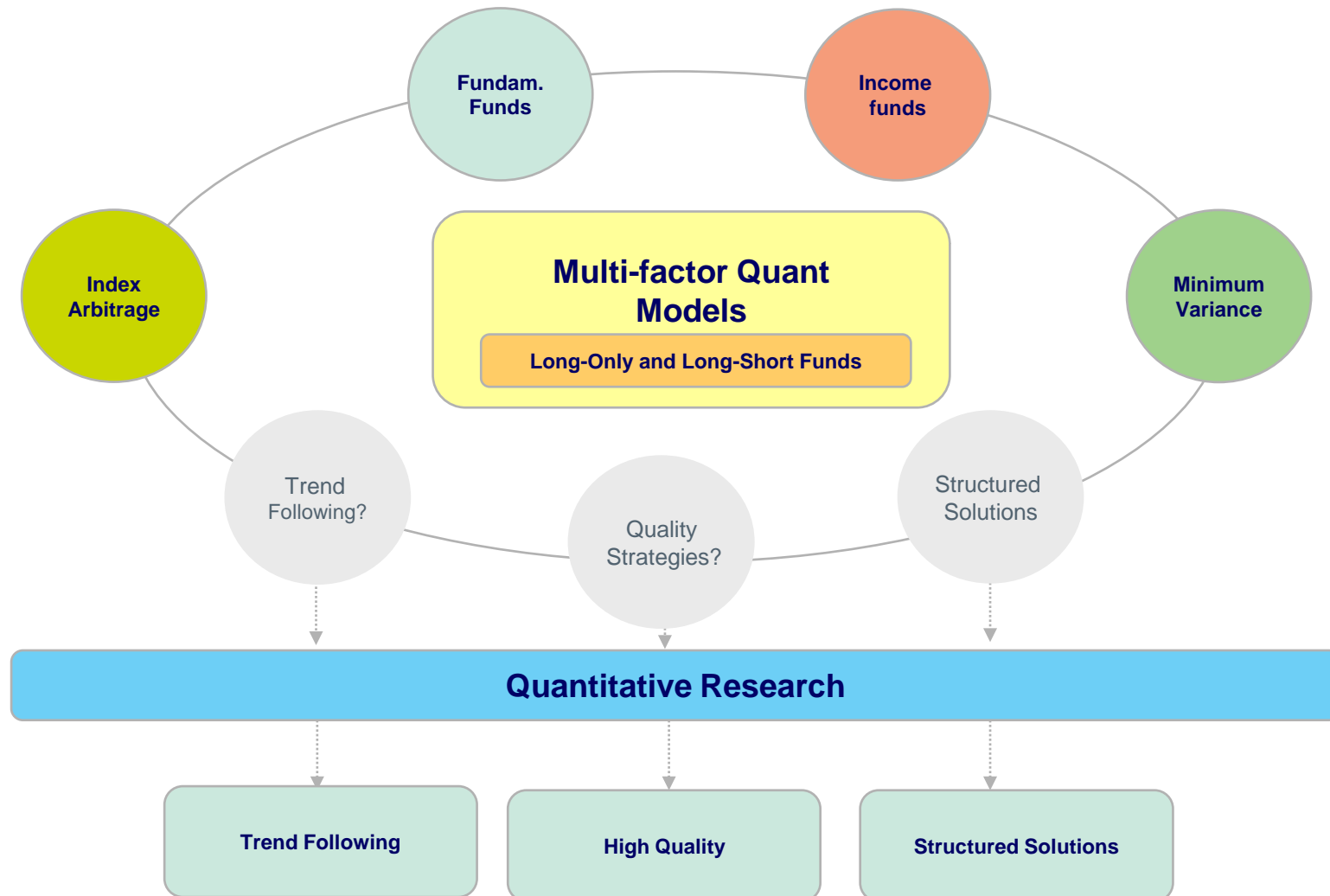
Quant will continue to develop into a multitude of decomposed alpha strategies

Decomposing multi-factor models into new products

Recap on the main points discussed today

- **Multi-factor models will continue to be the core of our proposition as quants, and each of us will continue to try to differentiate ourselves in this space**

- **But there is more to our proposition than multi-factor models. We should fight cap-weighted indexation**

- **We are the only ones that can provide a credible alternative to this trend**

- **For doing that, we should be prepared to decompose our alpha and work together with the asset allocation process**