Peter Gunthorp, Managing Director, Research and Analytics
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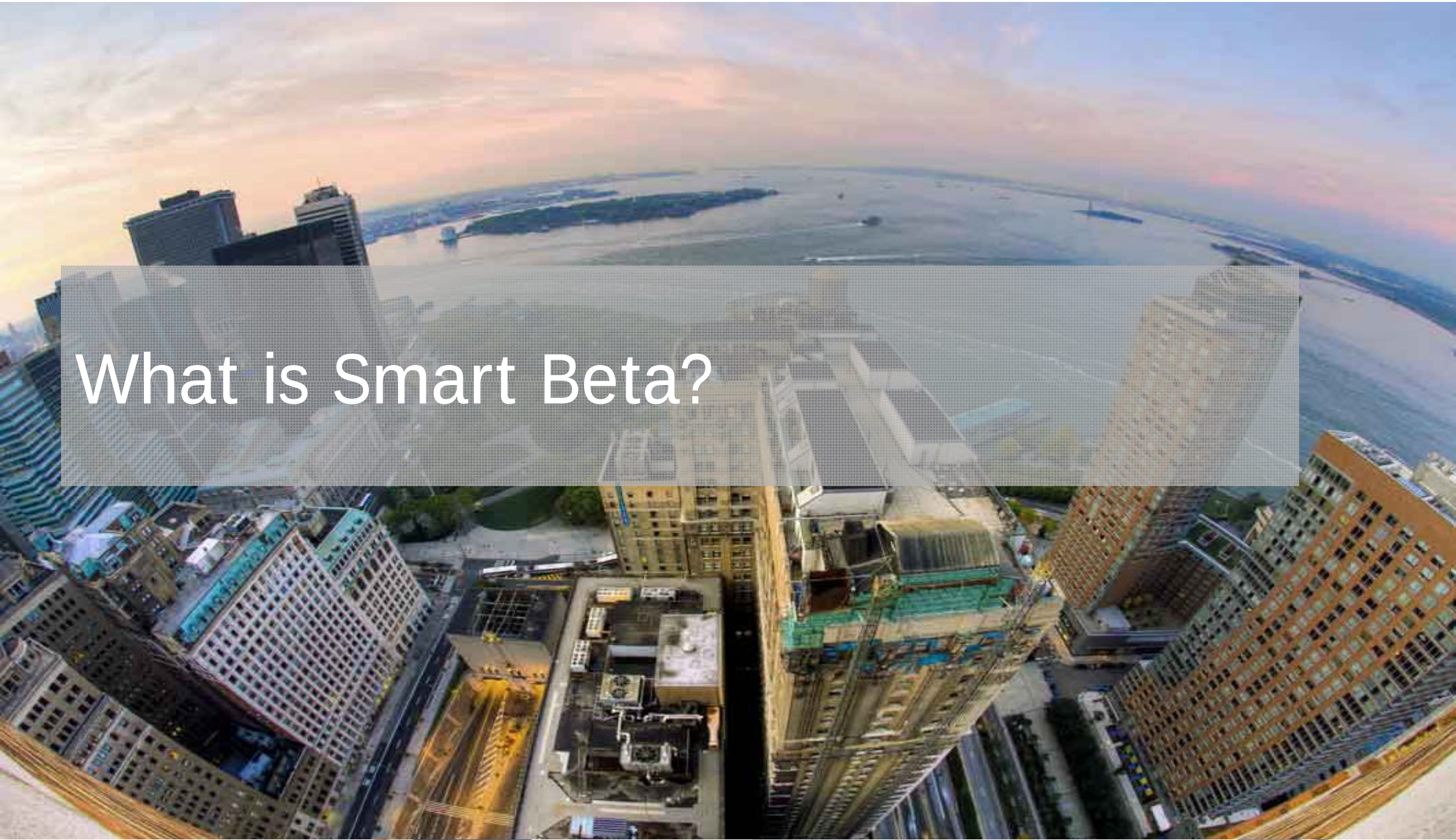
FTSE



What is Smart Beta?

Contents

1. What is Smart Beta?

“Smart Beta” is a controversial phrase used mainly by marketers and media to describe a wide variety of approaches to constructing indices.

Creating a lot of confusion and disagreement.

Key question: What is the index objective?

1. Alternatively Weighted Indices

- Variety of methodologies
- Specific index level objectives: e.g. diversification, volatility reduction
- Incidental or uncontrolled factor exposures
  - Minimum Variance: No explicit return objective in contrast to
  - Low Volatility Factor Index: Factor return is an inverse function of volatility
- Non market capitalization weights
- Index level objective + broad, diversified market exposure
- E.g. Equal Risk Contribution, Equal Weight, Min Variance, Fundamental
- Confusion: Also used to obtain factor exposures

2. Factor Indices

- Objective explicitly targets factor characteristics
- Market capitalization or alternatively weighted
- Tool for measuring factor performance
- E.g. Value, Size, Quality, Momentum
- Deliberate factor tilts – controlled factor exposure is the intention

Confusion

- Alternatively Weighted Indices are used to obtain factor exposures

FTSE

Target a specific objective e.g. Diversification, Concentration

FTSE RAFI: "Fundamentally Weighted"	• Select and weight by measures of economic size • Dynamic value tilt / contra trading • Correlated with, but independent of, market measures of size
FTSE Minimum Variance: "Optimised" or "Risk based"	• No explicit return objective • Defensive / low volatility tilt and size tilts
FTSE Equally Weighted:	• Explicit – no return consideration • Size and value tilts

Over the last 20 years, most alternative weighting schemes exhibited improved risk adjusted outcomes*

** Cass Consulting, Cass Business School Report, Evaluation of Alternative Equity Indices, 2013.*

The Surprising Alpha From Malkiel's Monkey and Upside Down Strategies, Arnott et al, JPM 2013

Specific Index Level Objectives of Alternatively Weighted Indices

Index Type	Objective	FTSE Example
Fundamental	Dynamic Value	FTSE RAFI Index Series
GDP Weighted	Diversification	FTSE GDP Weighted Index Series
Equally Weighted	Diversification	FTSE 100 Equally Weighted Index
Minimum Variance	Volatility Reduction	FTSE Global Minimum Variance Index Series
Equal Risk Contribution	Diversification	FTSE Global Equal Risk Contribution

- Performance evaluation; factor tilts and/or rebalancing gains
- Factor tilts are typically incidental – not by design
- Min Variance targets volatility reduction & incidentally captures a low volatility premium
- Should factor objectives be captured using existing Alternatively Weighted indices?

OR

- Should factor objectives be targeted directly ➔ Factor Exposure Indices?

3. Factor Exposure Indices

Objective: **Systematic** capture of long-run factor premiums

- Intentional and controlled factor tilts: an objective of index design choices
- Are composite indices meaningful? e.g. Minimum Variance + Equal Risk Contribution?
- Mechanism to achieve single and multi-factor exposure
- A transparent, systematic approach is required
- Confusion as alternatively weighted indices used to gain factor exposure

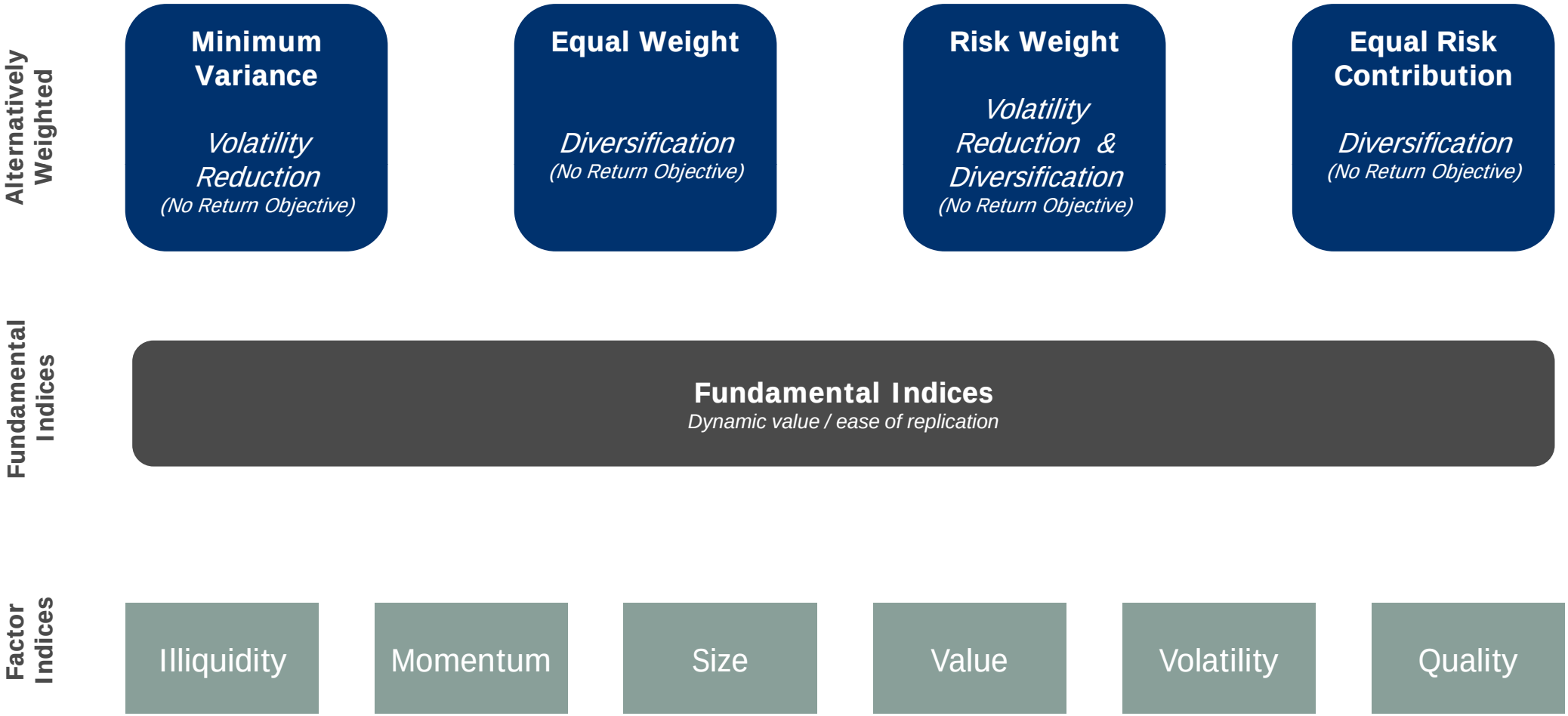
Controlled Factor Exposure is the Primary Objective

- Minimum Variance – incidental small cap and low volatility exposure
- Equally Weighted – small cap and value exposure
- Fundamental – dynamic value exposure
- Momentum – time varying market exposure and style tilts

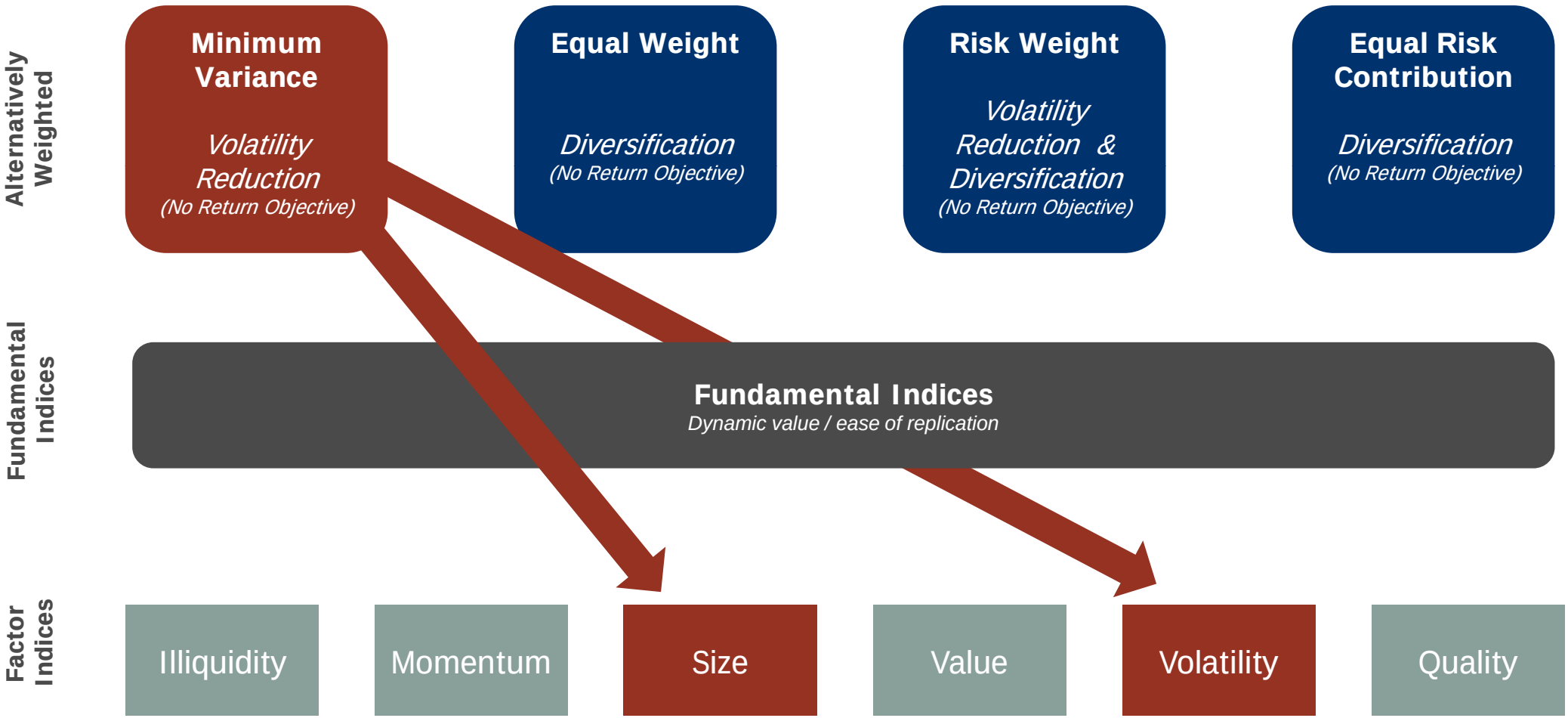
3. Factor Exposure Indices

- Factors – Risk Premiums; Allocation; Diversification
- Requires a strategic perspective
- Conservative assumptions result in a significant allocation to factors
- Interpretation of passive - replication of the market capitalization benchmark
- Broader definition of passive - active decision also concerns the benchmark or allocation to factors
- Passive or active implementation of the allocation decision / replication of factor index

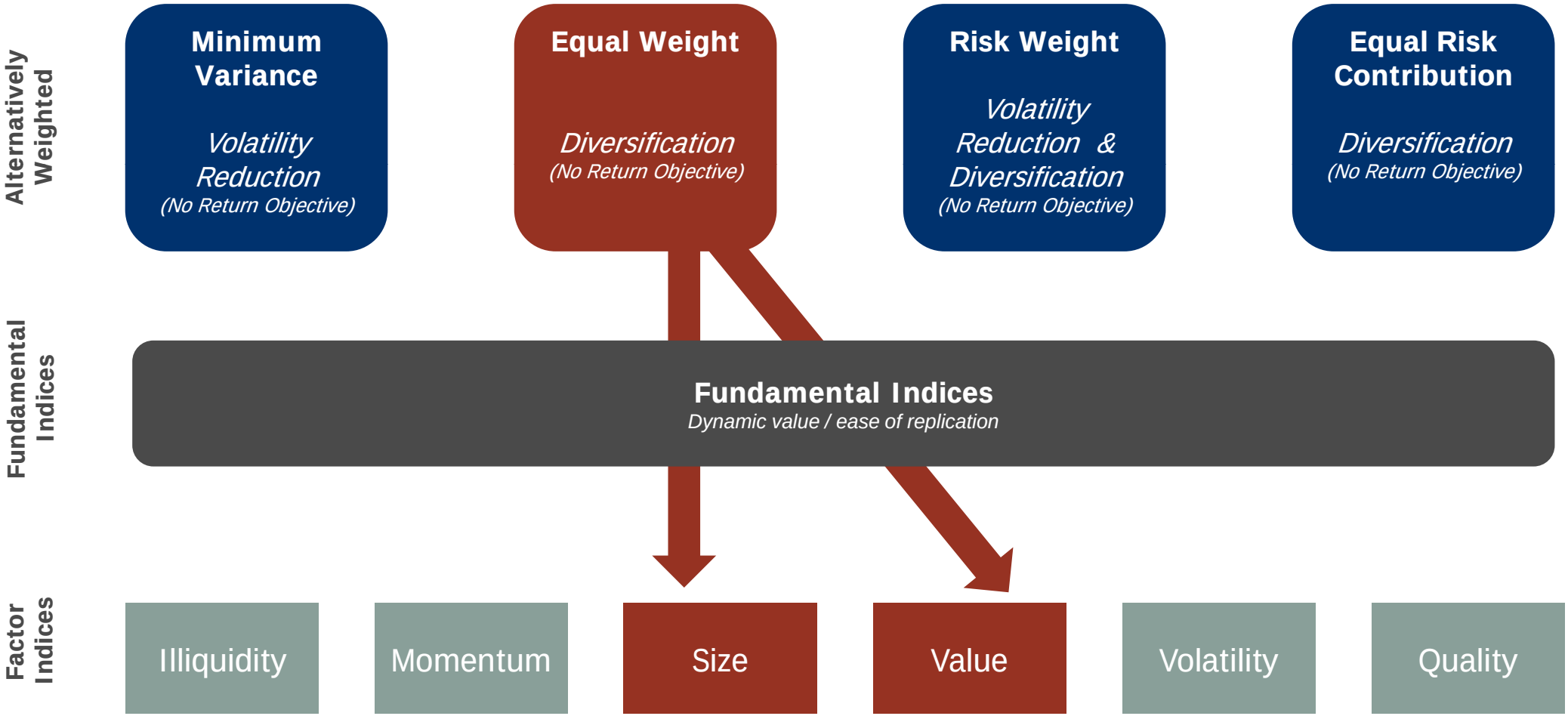
4. Factor Exposure – Alternatively Weighted and Factor Indices



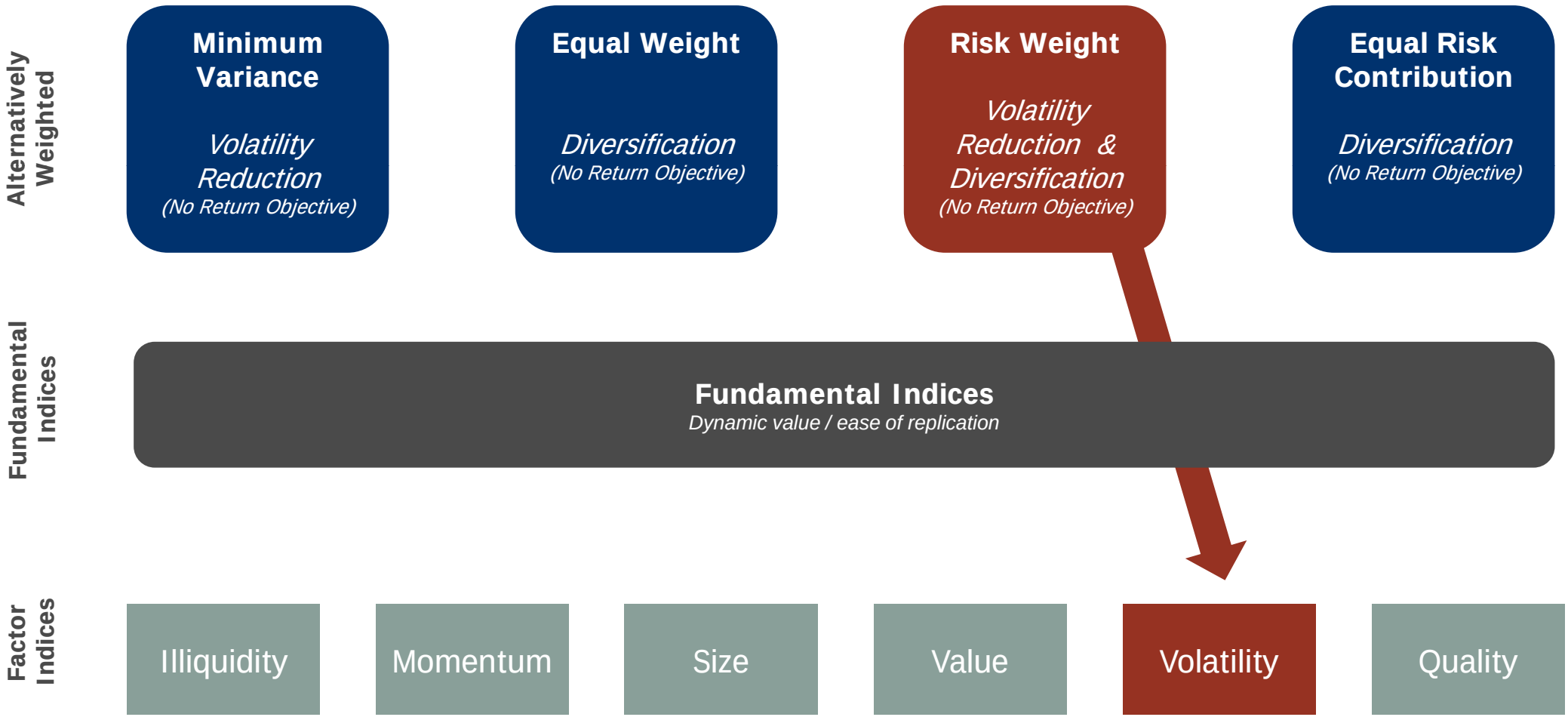
Factor Exposure – Minimum Variance



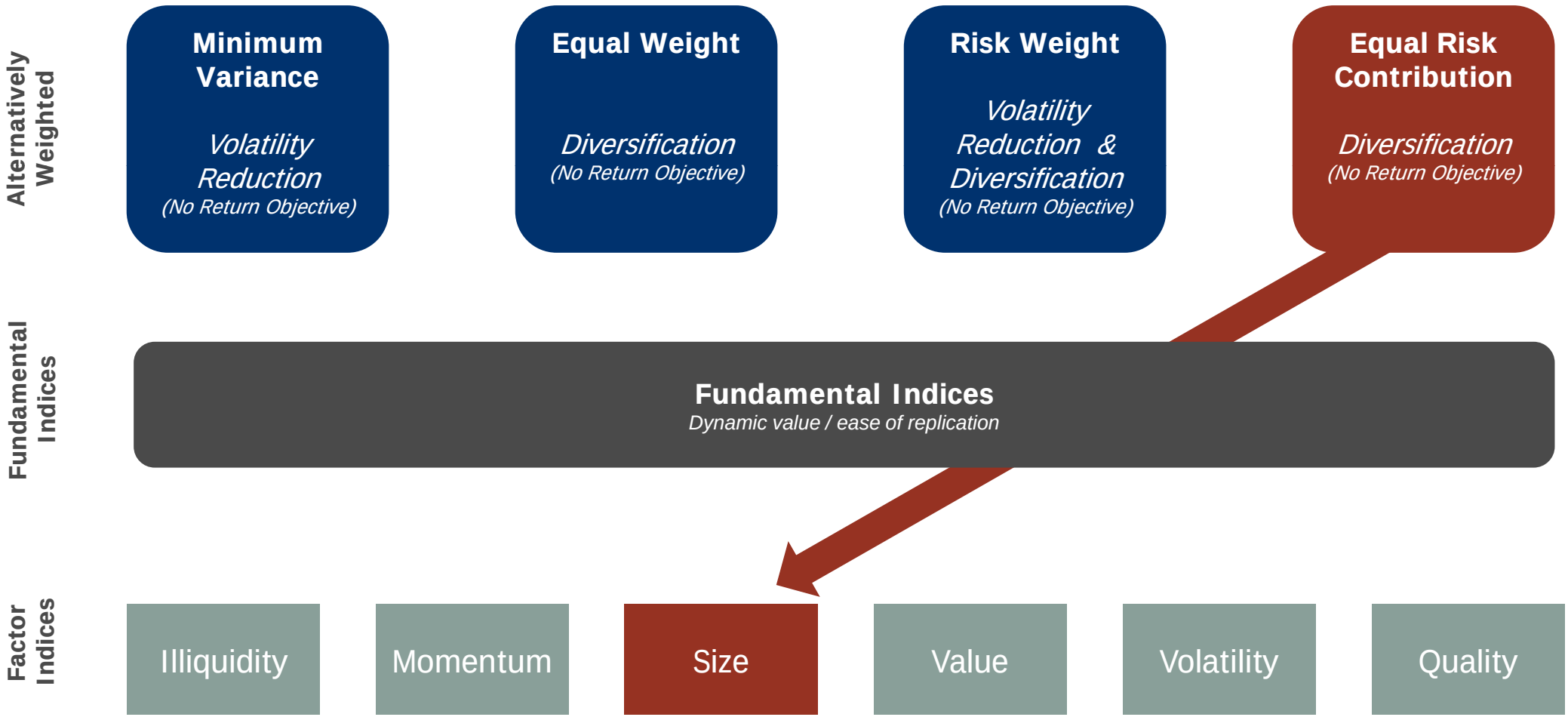
Factor Exposure – Equal Weight



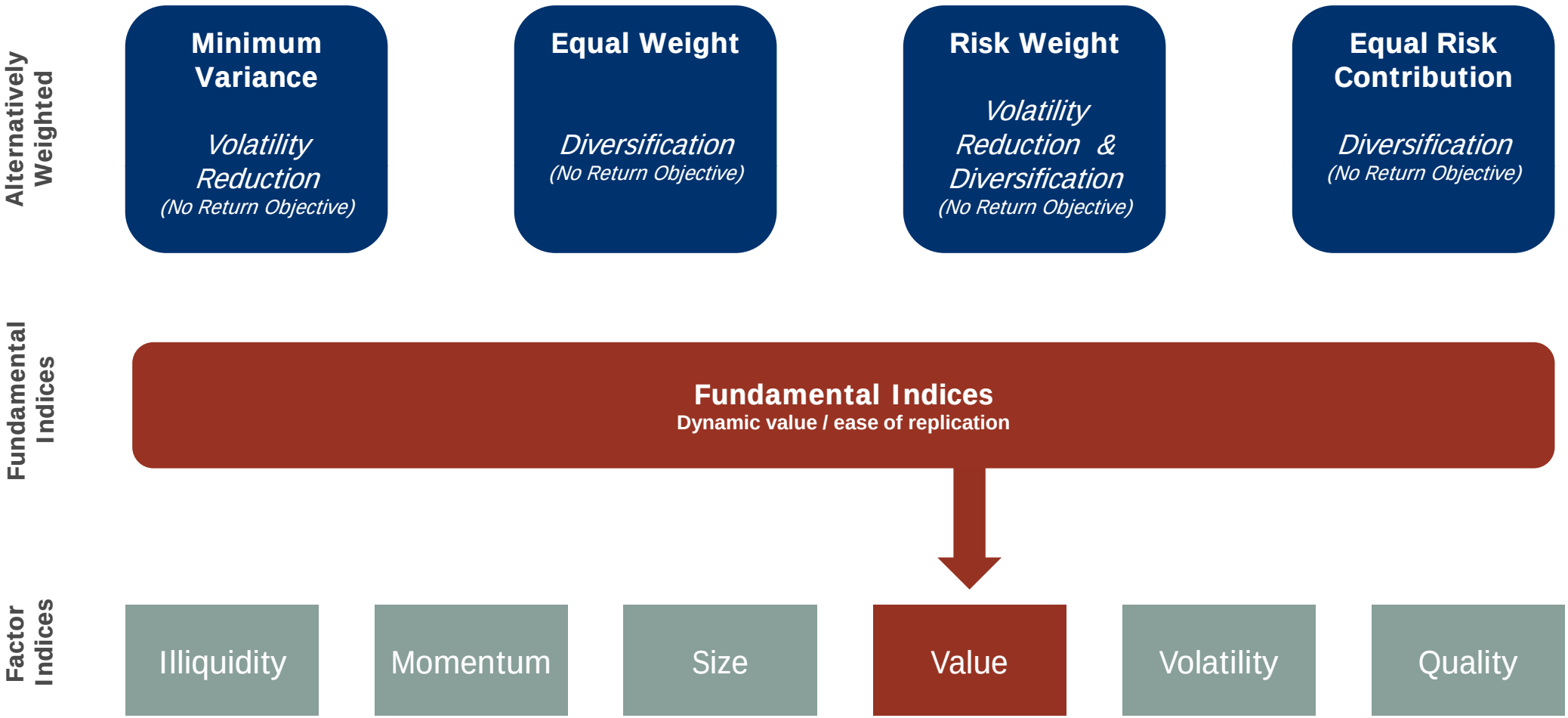
Factor Exposure – Risk Weighted



Factor Exposures – Equal Risk Contribution



Factor Exposures – Fundamental



5. FTSE's Factor Exposure Indices

Existing Factor Indices

- Selection by factor and weighting by market capitalization or factor
- A range of alternative weighting schemes and incidental factor exposure(s)

FTSE Factor Indices

- General approach; reweight (any) underlying index to achieve factor objective(s)
- Subject to capacity and diversification considerations
- Focus on implementation efficiency and flexibility
    - Transparency
    - Incorporate multiple factor objectives
    - Overlay on any underlying index structure
    - Efficient signal capture
    - Capacity and diversification considerations
    - Results in factor outcomes that are not conflated with other objectives

Overlaying Factors on an Underlying Index

- Transparent general methodology; applicable to factors, themes, tilts and composite factors
- Underlying index is typically capitalization weighted
- Applicable to any underlying index – equal weighted, risk weighted etc

Weighting Scheme

- Normalize factor scores and truncate extremes – Z Scores
- Map Z Scores to 0-1 using a symmetric mapping
- Mapped scores are combined with underlying index weights
- Mechanism avoids concentrated outcomes in stocks with extreme Z Scores

Long Only Factor Indices

- Achieve a factor tilt in either direction by reversing the sign on the Z-Score
- Long / short factor index – long a positively tilted index & short a negatively tilted index
- Increased efficiency
  - Diversification, index capacity and exposure targets
- Application of multiple tilts

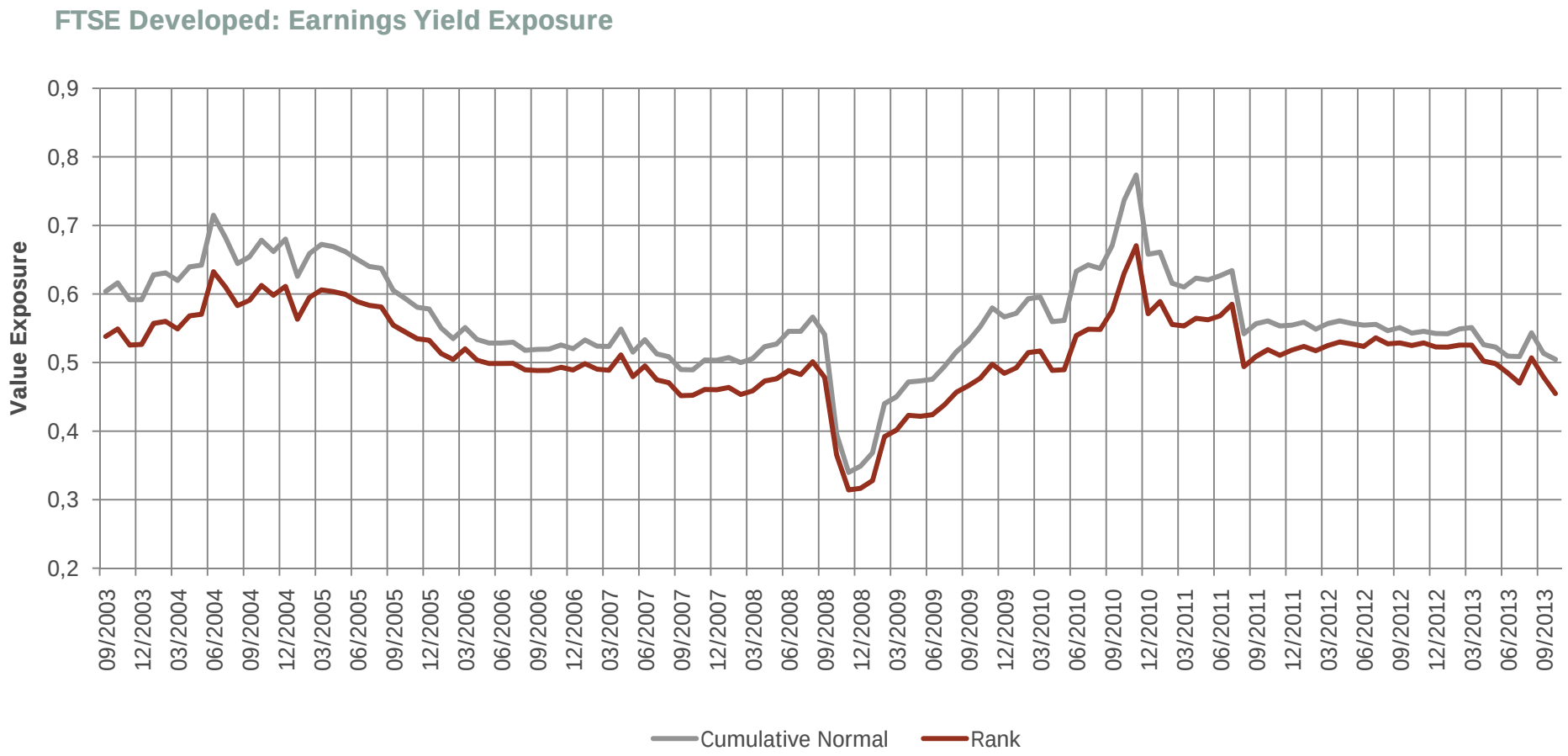
Composite Indices, Composite Factors & Multiple Tilts

- Several approaches to achieving composite factor exposure:
  - Combine the weightings of individual factor indices
  - Combine individual factor Z-Scores can to create a composite Z-Score
  - Sequential tilts on each factor
- Latter approach provides greater control
  - Composite index approach may result in offsetting tilts
  - Composite factor approach suitable for positively correlated factors
  - Sequential tilt ensures exposure to all factors – negatively correlated factors

Tilting Improves Factor Exposure

5.1 Efficiency of Signal Capture – Earnings Yield

- Tilting - consistently greater factor exposure compared to a ranking approach



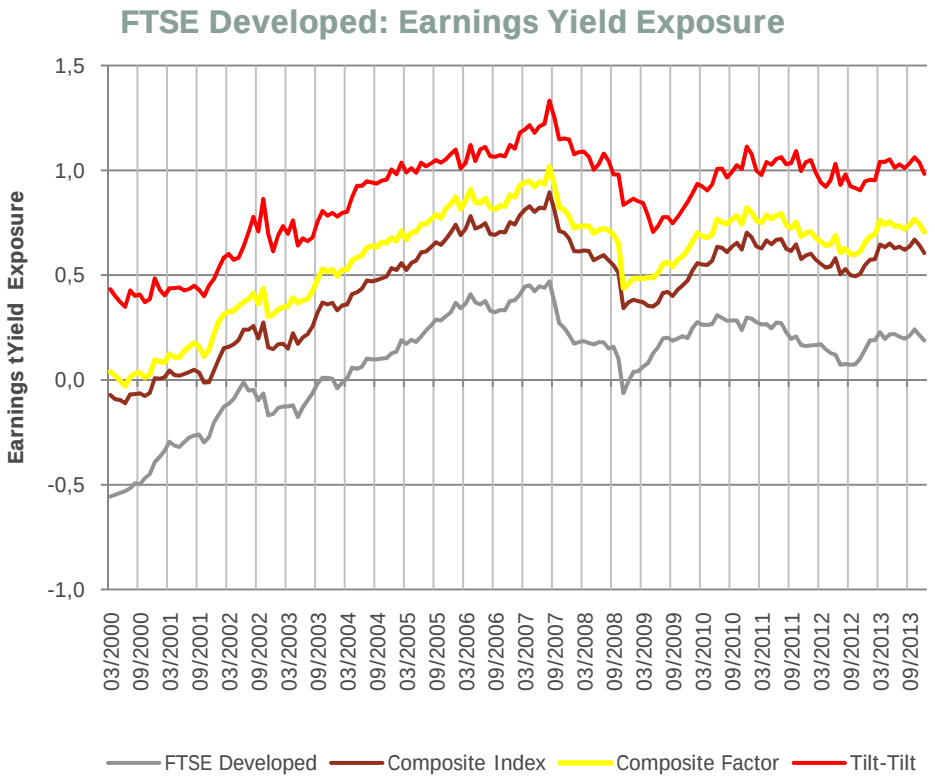
FTSE Developed, EY Factor, September 2003-September 2013

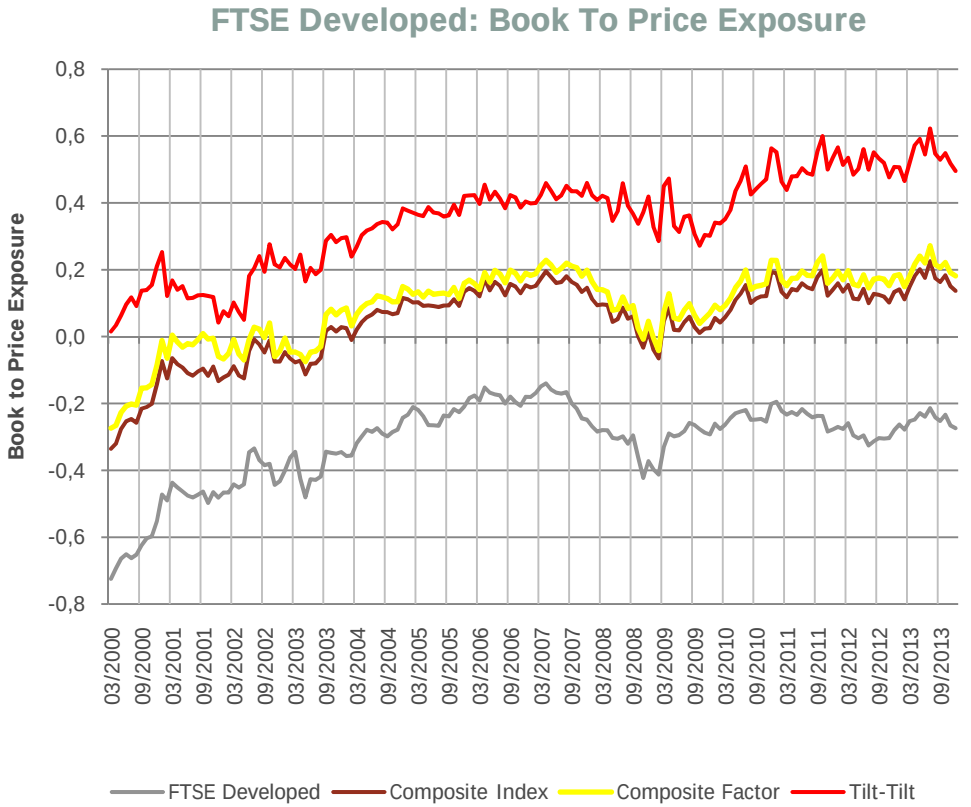
Source: FTSE Group. Data as at Sep. 2013. Past performance is no guarantee of future results. Returns shown may reflect hypothetical historical performance. See slide 26 for legal disclosures.

Tilting Twice Increases Factor Exposures

5.2 Efficiency of Signal Capture – Multiple Factors

- Composite value factor – Earnings Yield & Book To Price
- Multiple tilts provide consistently greater factor exposure compared to composite approaches
- Turnover & capacity considerations?





FTSE Developed, EY+BPR Factor, March 2000-September 2013

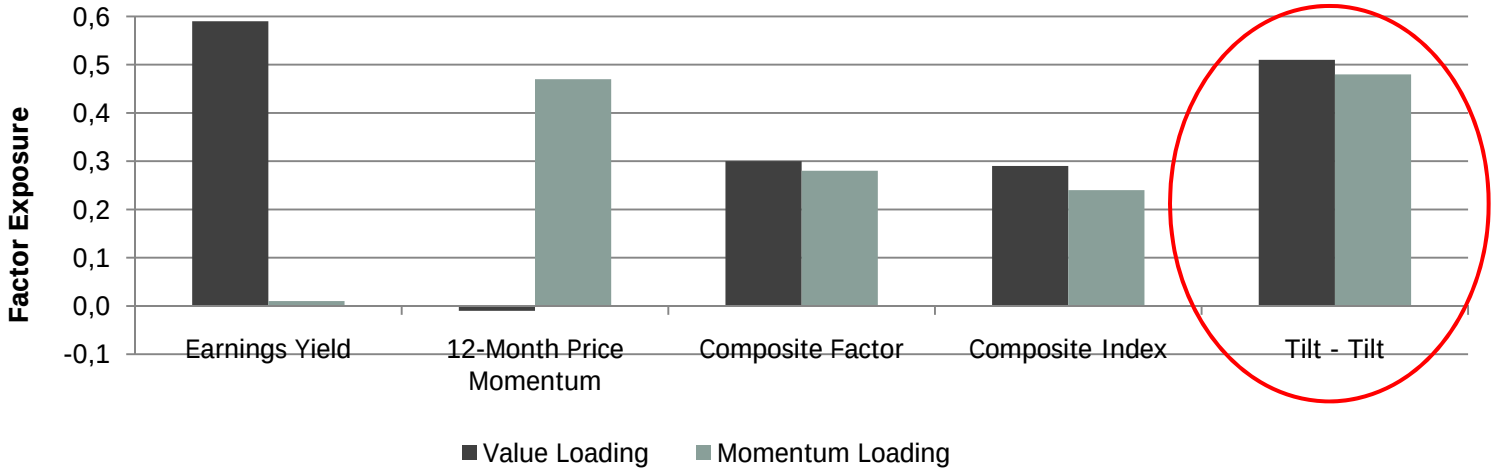
Source: FTSE Group. Data as at Sep. 2013. Past performance is no guarantee of future results. Returns shown may reflect hypothetical historical performance. See slide 26 for legal disclosures.

Tilting Twice Increases Factor Exposure – Negatively Correlated Factors

5.3 Efficiency of Signal Capture - Negatively Correlated Factors (Earnings Yield and Price Momentum)

- Multiple tilts - consistently greater factor exposure compared to composite approaches
- Important for negatively correlated factors

Off-setting Factor Exposure



Note: A monthly rebalance frequency is used for illustration. FTSE Developed, EY and 12 Month Price Momentum Factors, October 2000-September 2013.

- Tilt index results in a genuine two factor index: approximately double the exposure
  - Similar to double sorting; identify stocks displaying **both** characteristics

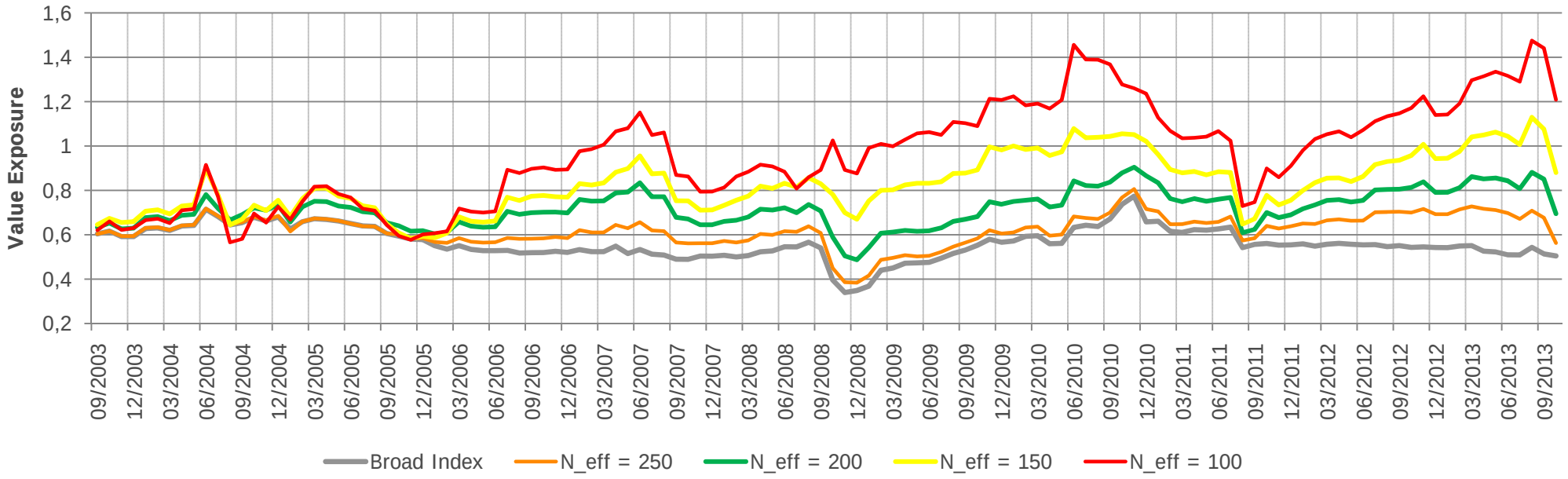
Source: FTSE Group. Data as at Sep. 2013. Past performance is no guarantee of future results. Returns shown may reflect hypothetical historical performance. See slide 26 for legal disclosures.

Balancing Factor Exposure, Diversification & Capacity

5.4 Capacity & Diversification Constraints To Form A Narrow Index (Earnings Yield)

- Application of tilt results in a broad index containing all underlying index constituents
- Remove constituents that do not contribute to factor objective subject to:
  - Diversification Limits
  - Capacity Constraint

Improved Factor Exposure



Note: A monthly rebalance frequency is used for illustration.
FTSE Developed, EY Factor, October 2000-September 2013.

Source: FTSE Group. Data as at Sep. 2013. Past performance is no guarantee of future results.
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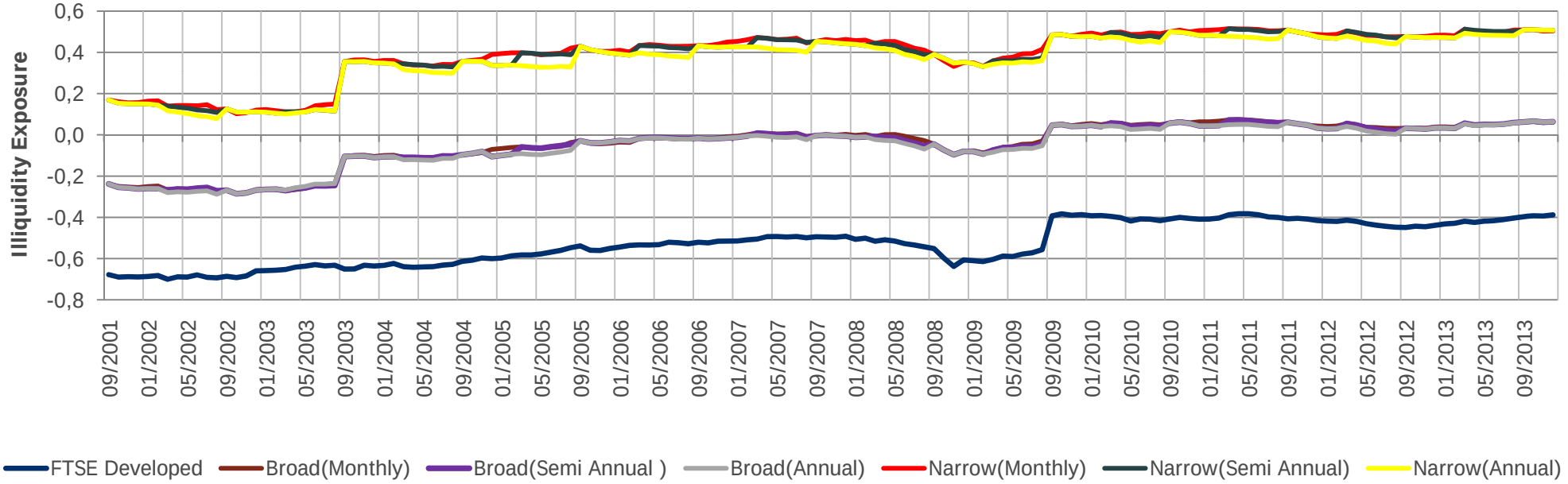
Rebalancing Frequency Varies by Factor

5.5 Illiquidity Exposure Degradation – FTSE Developed

Factor Exposure – Rebalance Frequency, Broad Versus Narrow



FTSE Developed September 2001 to December 2013

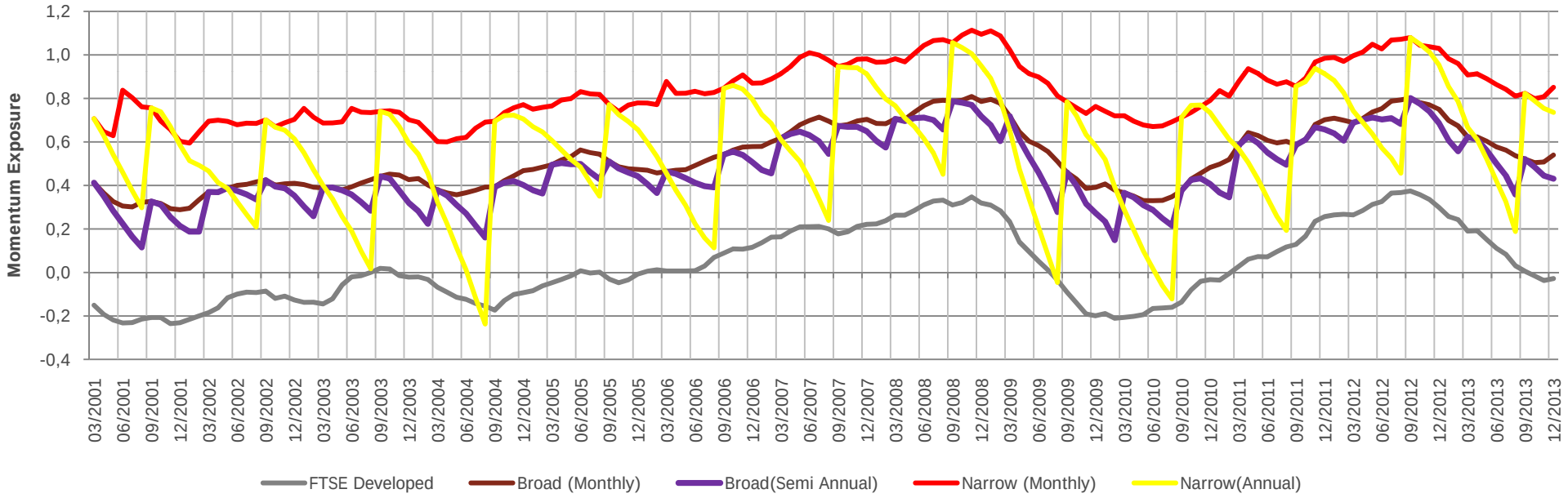
- Exposure improvements
- Slow exposure degradation – no advantage to increased rebalance frequency
- Narrow index improves exposure outcomes
- Risk adjusted outcomes and turnover insensitive to rebalance timing

Source: FTSE Group. Data as at Sep. 2013. Past performance is no guarantee of future results. Returns shown may reflect hypothetical historical performance. See slide 26 for legal disclosures.

Rebalancing Frequency Varies by Factor

5.6 Momentum Exposure Degradation – FTSE Developed

Factor Exposure – Rebalance Frequency, Broad Versus Narrow



FTSE Developed September 2001 to December 2013

- Exposure improvements – increase rebalance frequency or narrow index?
- Rapid exposure degradation – narrow annually rebalanced or broad semi-annually rebalanced index?
- Narrow annual suffers rapid exposure decay; Latter, a superior means of maintaining exposure
  - Similar average, but more stable exposure
  - Lower turnover, higher capacity & diversification

Source: FTSE Group. Data as at Sep. 2013. Past performance is no guarantee of future results.
Returns shown may reflect hypothetical historical performance. See slide 26 for legal disclosures.

Closing Thoughts

1. Alternatively Weighted

- Specific index level objective
- Indirect factor exposure outcomes

2. Strategic Factor Exposure

- Within asset class risk premiums
- Diversification across factors
- Subsidiary allocation decision at factor level
- Broad, diversified indices
- Common factor indices may be replicated

3. Tactical Factor Exposure

- Exaggerated exposure to factor at the expense of diversity
- Simple and easy to replicate
- Tactically alter factor exposure of a portfolio

4. Benchmarking

- Factor exposure is not a skill
- Factor timing is a skill
- Relevant benchmark for active managers
- Highlight managers with genuine skill

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