

Relative merits of synthetic versus cash instruments

Efficient portfolio construction using cash-based and derivatives instruments

Malcolm Jones FFA
Chair of working party

Working party membership

- Malcolm Jones - chair
 - Clara Yan
 - Jeff Neale
 - Munawer Shafi
 - Anurag Goyal
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- Backgrounds in fund management, investment banking and investment consulting

Goals of working party

- Benefits of use of mainstream derivatives
- Focus on management of market exposures
- Risk measurement of physical and derivative portfolios
- Introduce potential measures of systemic risk

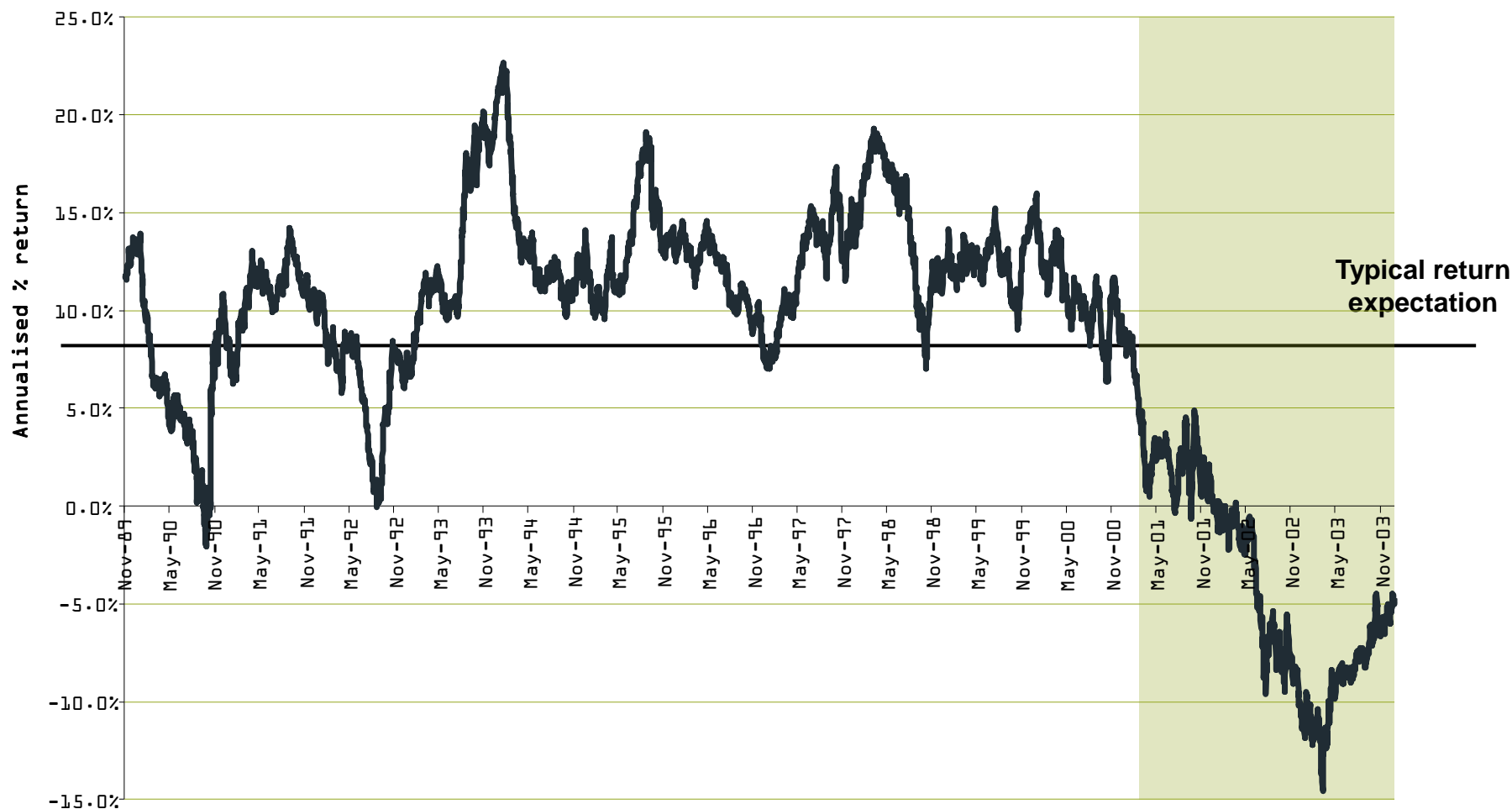
Why use derivatives at all in portfolio management?

Typical thinking

- They are 'risky'
- Bad things happen with derivatives
- Derivative strategies are hard to explain
- Portfolios with derivatives more likely to end with bad outcomes

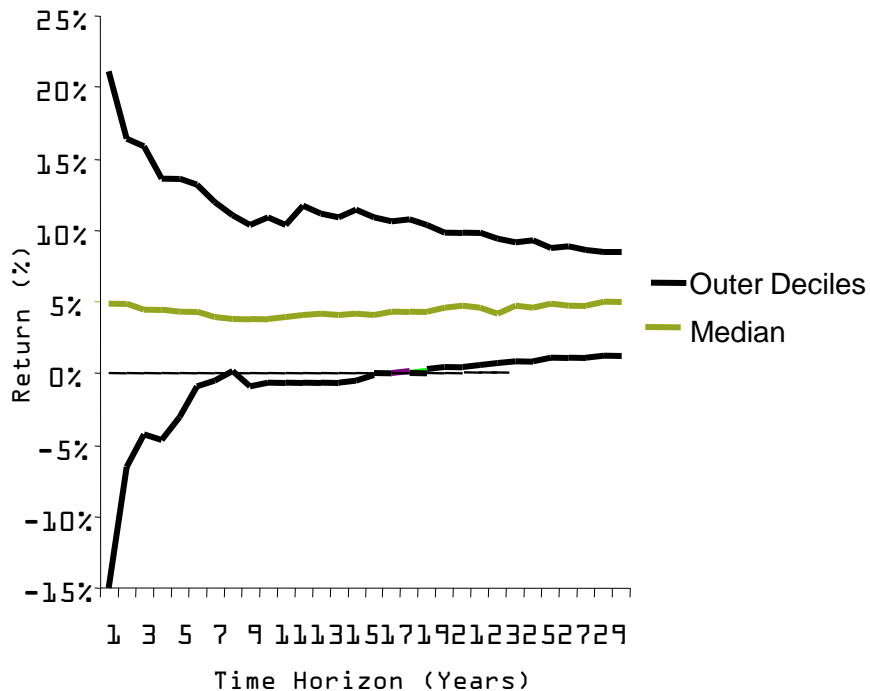
21st century - Balanced fund approach failing

Annualised rolling 3 year returns – Standard Life Balanced Fund



The unreliability of the Equity risk premium

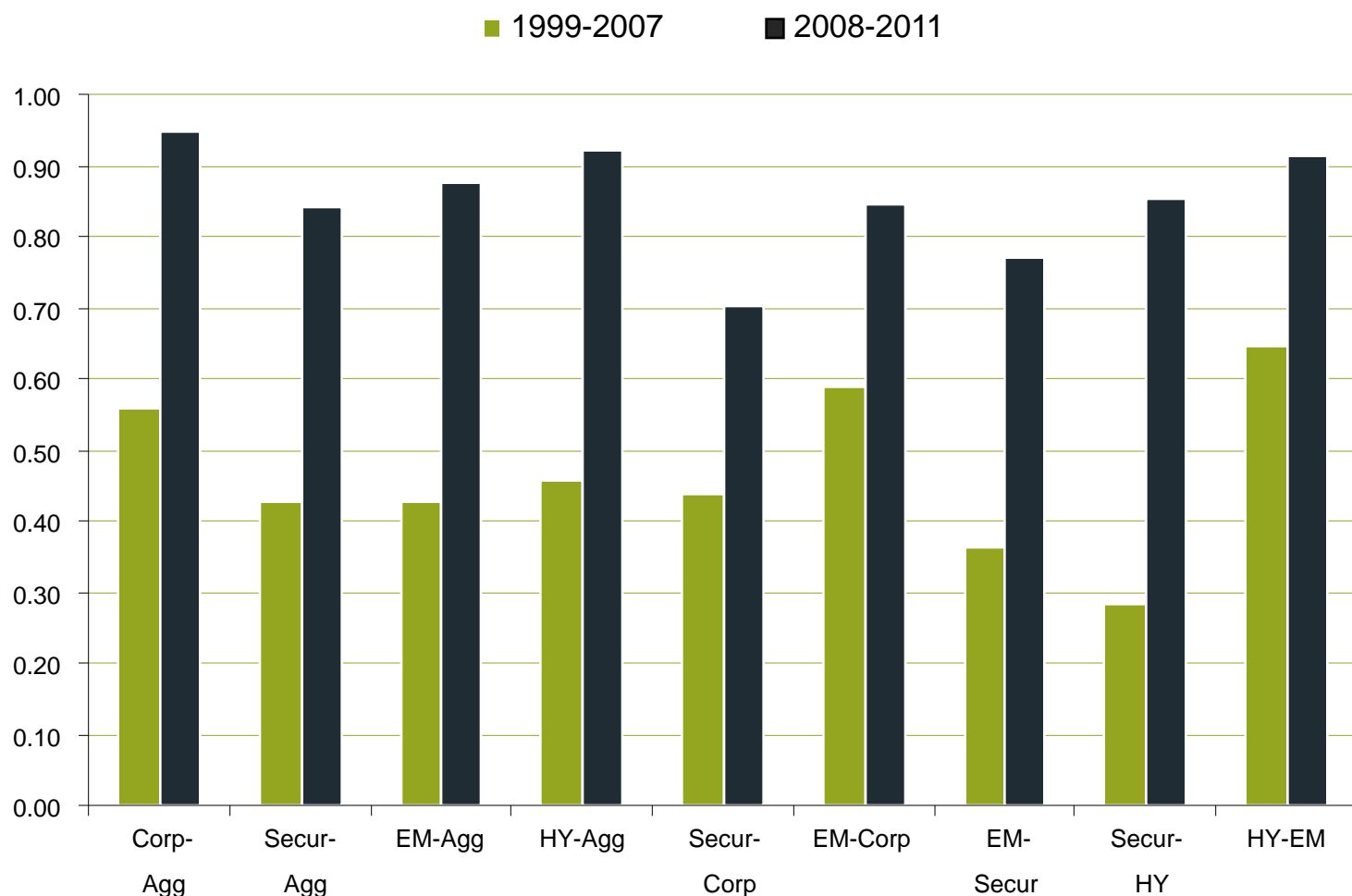
Distribution of excess returns from equities over bonds
as a function of time horizon



- Long term excess return from equities over bonds has been 5%
- How often has it been within 2% of this level over 3 year periods?
 - **less than 25% of the time**

Changing asset behaviours in bond universe

Diversification of Sector Exposures No Longer Works

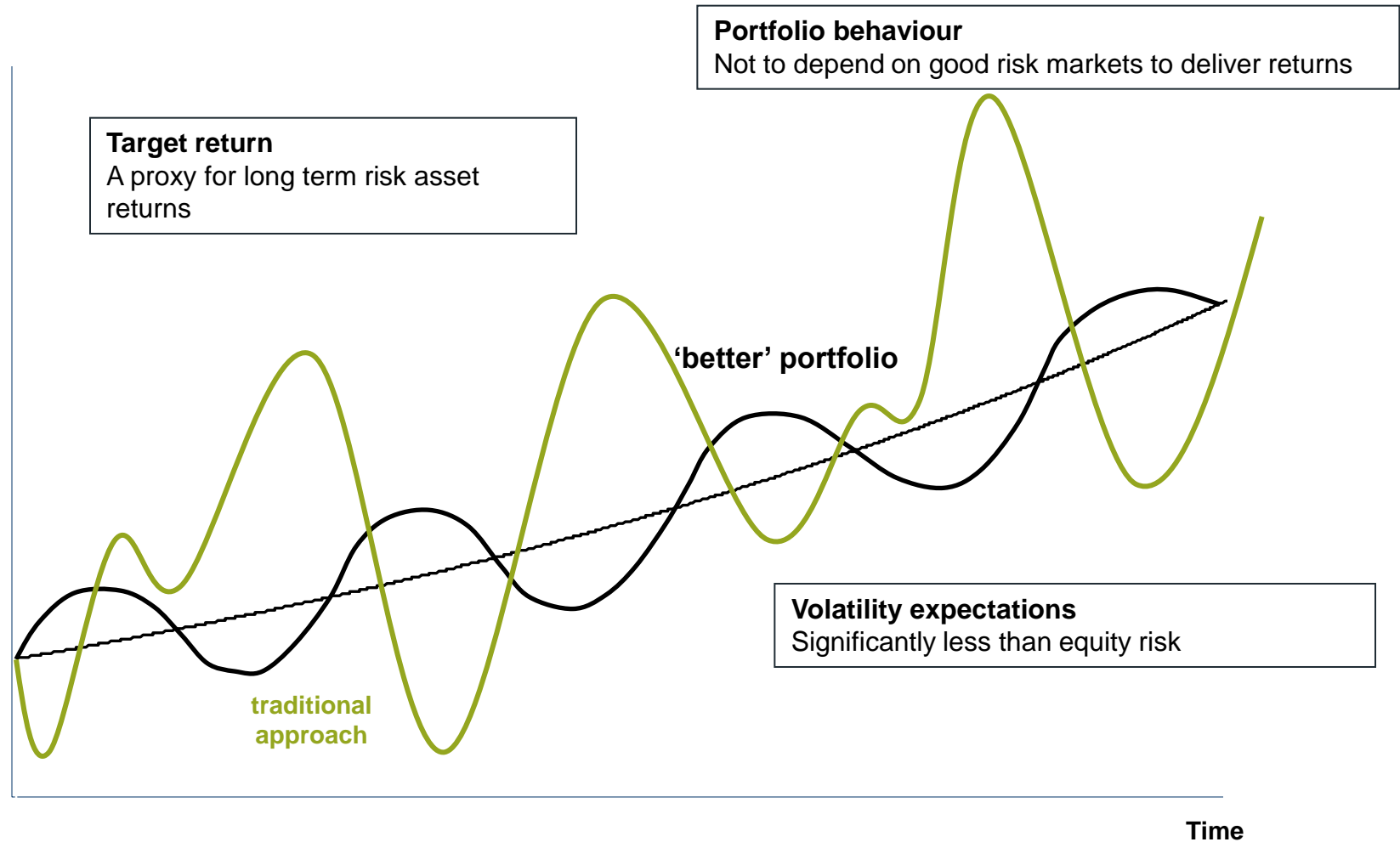


Source: Barclays Capital Global Aggregate Index, Barclays Capital Global Aggregate Corporate Index, Barclays Capital Global Securitised Index, Barclays Capital Global Corporate High Yield 2% Cap Index, Barclays Capital Global Emerging Markets Index, monthly excess returns as at 31 December 2011

Investment insights

- Traditional asset allocations unlikely to be produce positive returns on a consistent basis
- Diversification benefits are significantly less in “down market” environments
- However there are still many strategies that can provide positive return and add diversification
 - And that’s where derivatives come in

Challenges in portfolio construction



“Long” strategies that can provide positive returns in down (‘risk-off’) markets

- Interest rates / Sovereign bonds
 - Short rates / medium rates / longer term rates
- Currencies
 - Long US Dollar
- Volatility
 - Volatility rises during market stresses

Range of derivative instruments

- Equity index futures and options
 - Equity index variance swaps
 - Gilts futures and total return swaps
 - Gilt repo
 - Interest rate swaps
 - Credit default swaps
 - Currency forwards
-
- Conventional derivative contracts highly liquid

Implementing an investment strategy

“Reduce my equity exposure”

- Sell physical equities
 - Sell equity index futures
 - Buy equity index put options
 - Sell equity index call options
 - Buy equity index variance swaps
-
- A wider range of choices to implement an idea
 - Differing implications for the portfolio

Implementing an investment strategy

“Hedge my interest rate exposure”

- Buy gilts
- Buy gilt futures
- Receive fixed on interest rate swaps
- Use the gilt repo market
- **Greater choice of strategy selection to achieve the investment objective**

Derivatives and risk management

- Exchange Traded v Over The Counter
 - Market risk
 - Liquidity risk
 - Counterparty credit risk
 - Operational risk
-
- Sufficient infrastructure to support significant derivative usage

Sophisticated v non-sophisticated funds

- Risk tools have to be consistent with fund sophistication
- Non-sophisticated
 - Strategies used for Efficient Portfolio Management (EPM)
- Sophisticated
 - Using derivatives is core
 - Use of leverage
 - Derivatives necessary to meet investment objectives

Portfolio risk management

Combining physical and derivative holdings

- Risk-based portfolio construction
 - Size of each position
 - Volatility of each position
- Ensures consistency
 - Some assets physically invested others by derivatives
 - Different asset classes have different volatility

Stand-alone risk

- **Stand-alone risk** measures the risk any of any one investment strategy
- US Equity has volatility: 20.3%
- Portfolio allocates 10% investment to US equities
- Stand-alone risk of US equities to portfolio is 2.03%

Sizing an investment strategy

Which of these investment strategies is the most risky?



2.8% investment in Russian Equities



7.8% investment in US \$ vs €

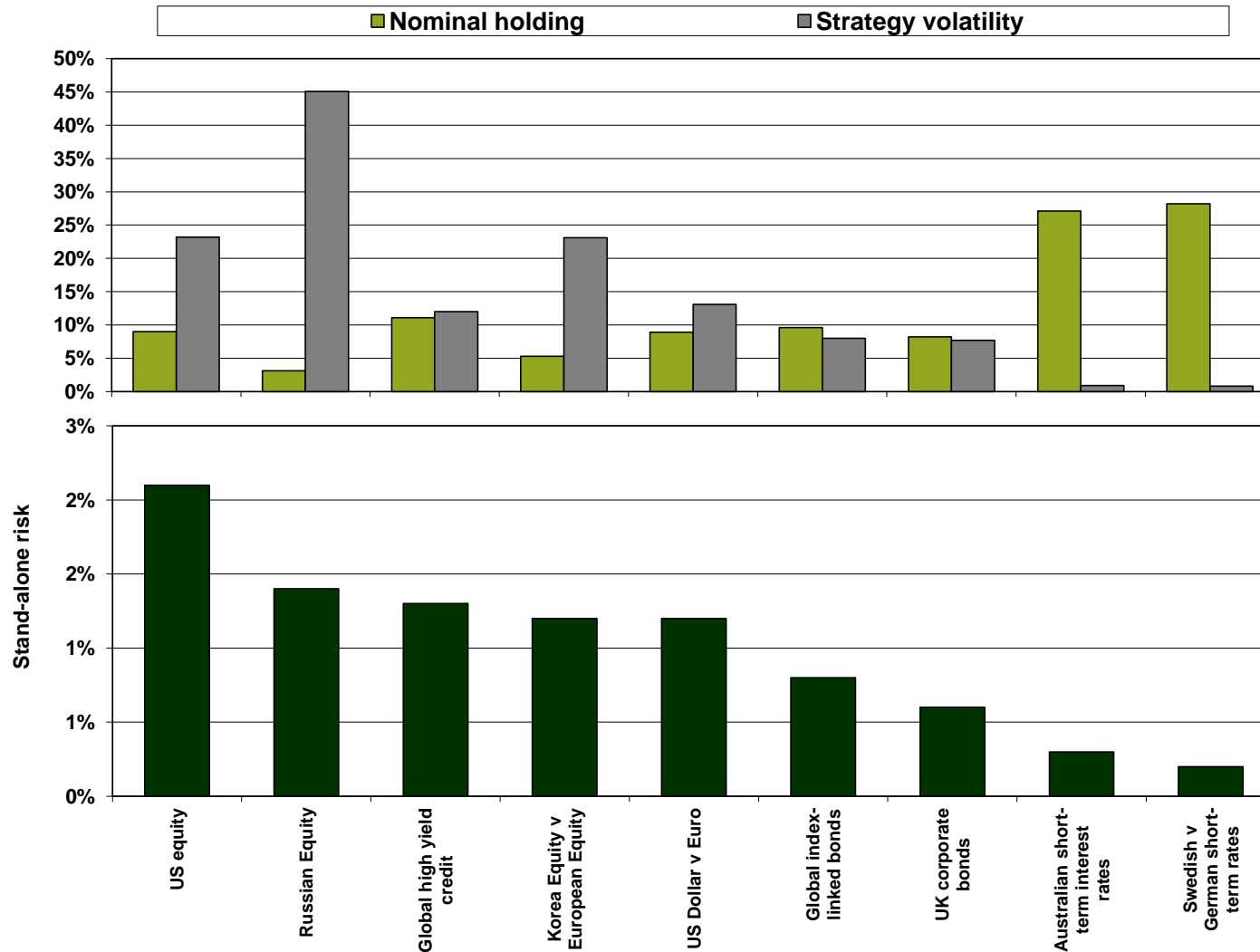


9.8% investment in US Equity Large Cap vs Small Cap

They are all the same! Stand-alone risk of 1%

Stand-alone risk as a common measure

Linking strategy size and volatility



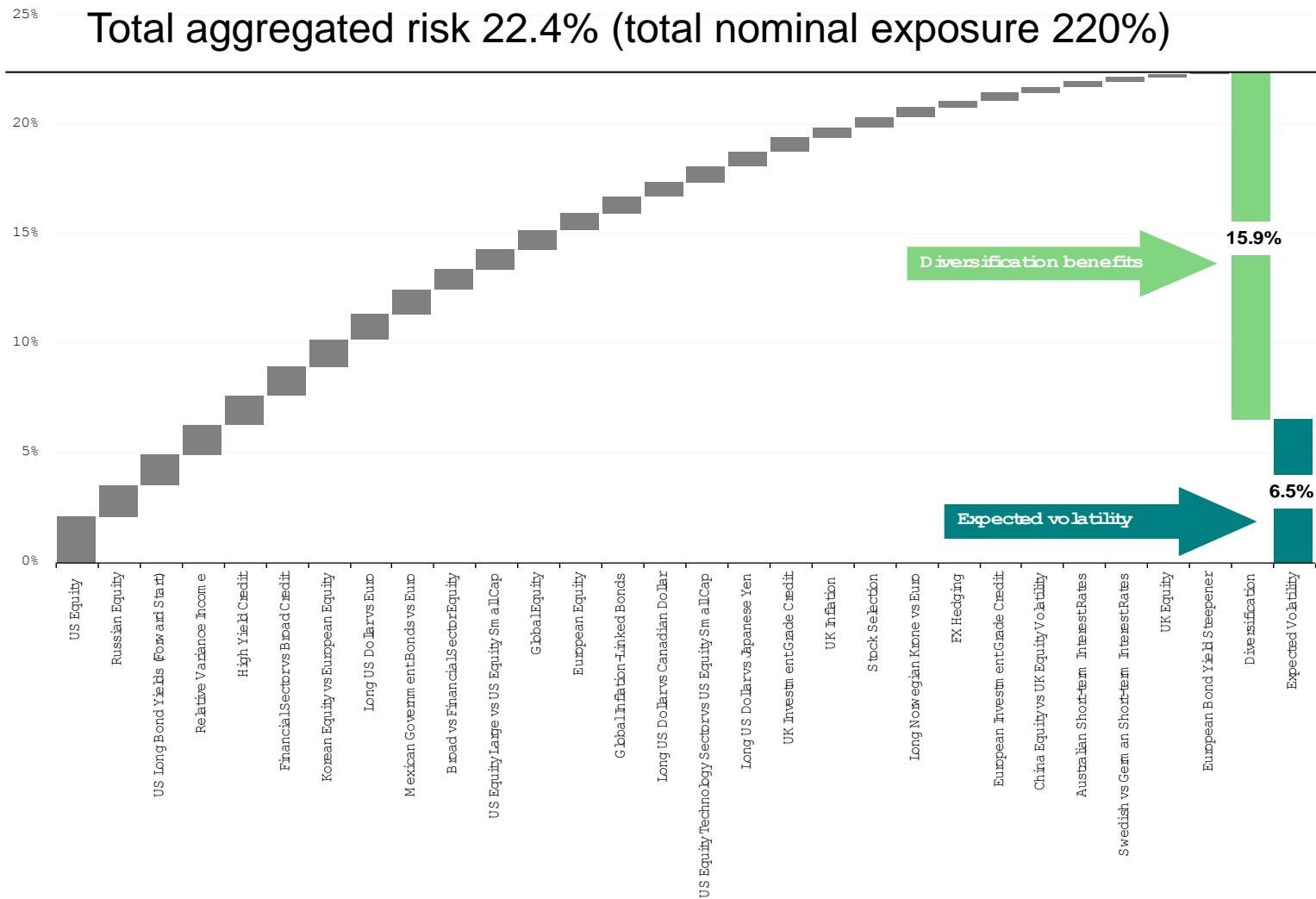
Leverage and portfolio risk

Portfolio	Leverage factor	Strategy volatility	Portfolio risk
US equity	1.0	20.3%	20.3%
UK corporate bonds	3.0	7.7%	23.1%
Australian short-term interest rates	10.0	0.9%	9.3%

- In theory lowest risk portfolio is the most leveraged
- However, actual outcome is driven by the behaviour of only ONE factor
- Leveraged credit is a strategy that failed in the GFC

Risk-based portfolio construction

Seek a number of different risks



Risk-based portfolio guidelines

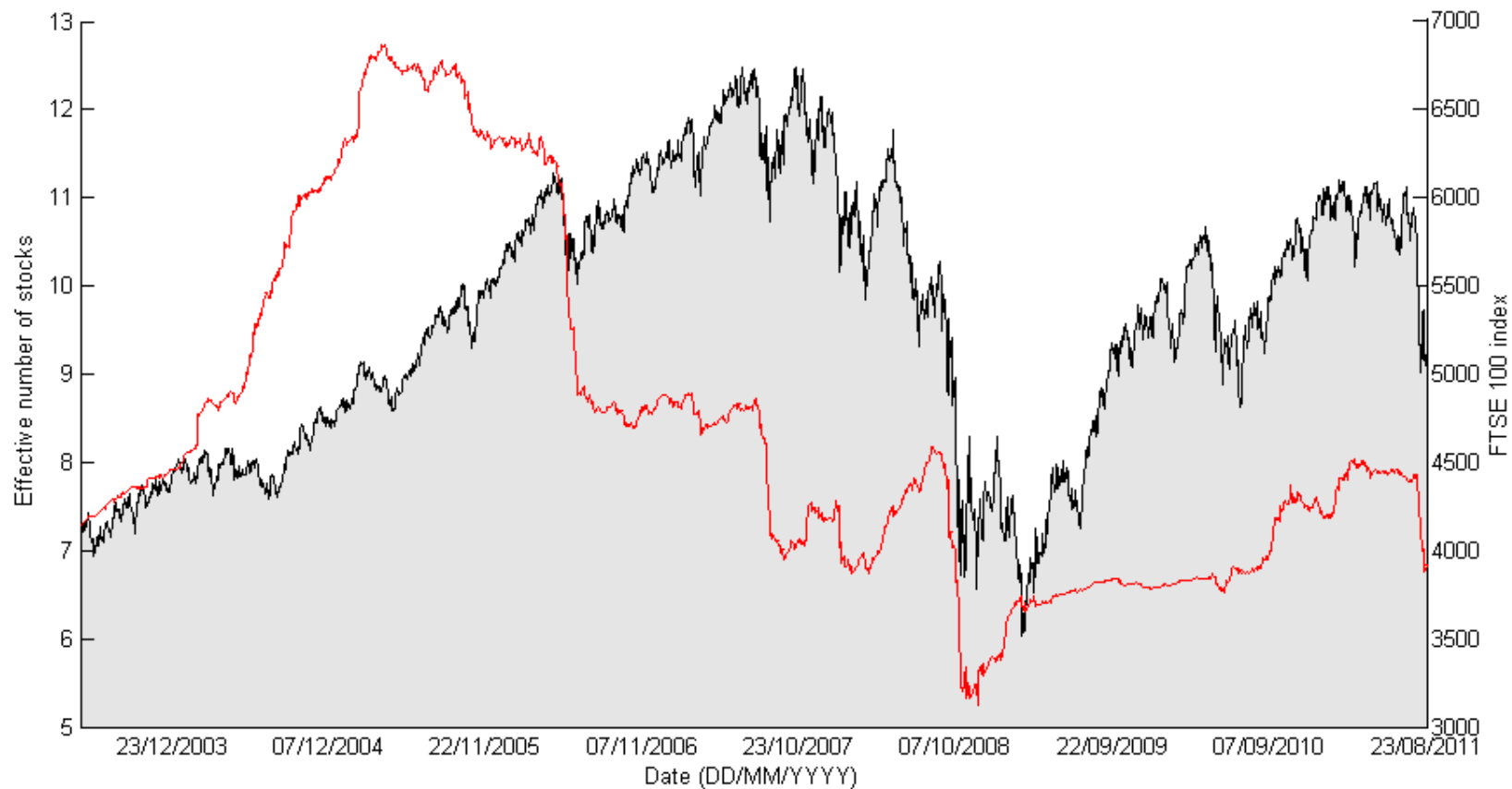
- Limit the amount of risk allocated to any one broad asset group
 - Eg equities, interest rates, credit etc.
- Limit the total aggregate risk that can be taken
 - Risk models underestimate volatility and overestimate diversification benefits in stressed markets
- Continuous monitoring of portfolio's actual risk behaviour versus what is expected

How can we measure diversification potential of any investment strategy / universe?

- No single measure of diversification
- Growing academic literature on measures of systemic risk
- Principal components analysis provides insights
 - Absorption ratio
 - Effective factor analysis

Effective number of stocks in FTSE 100

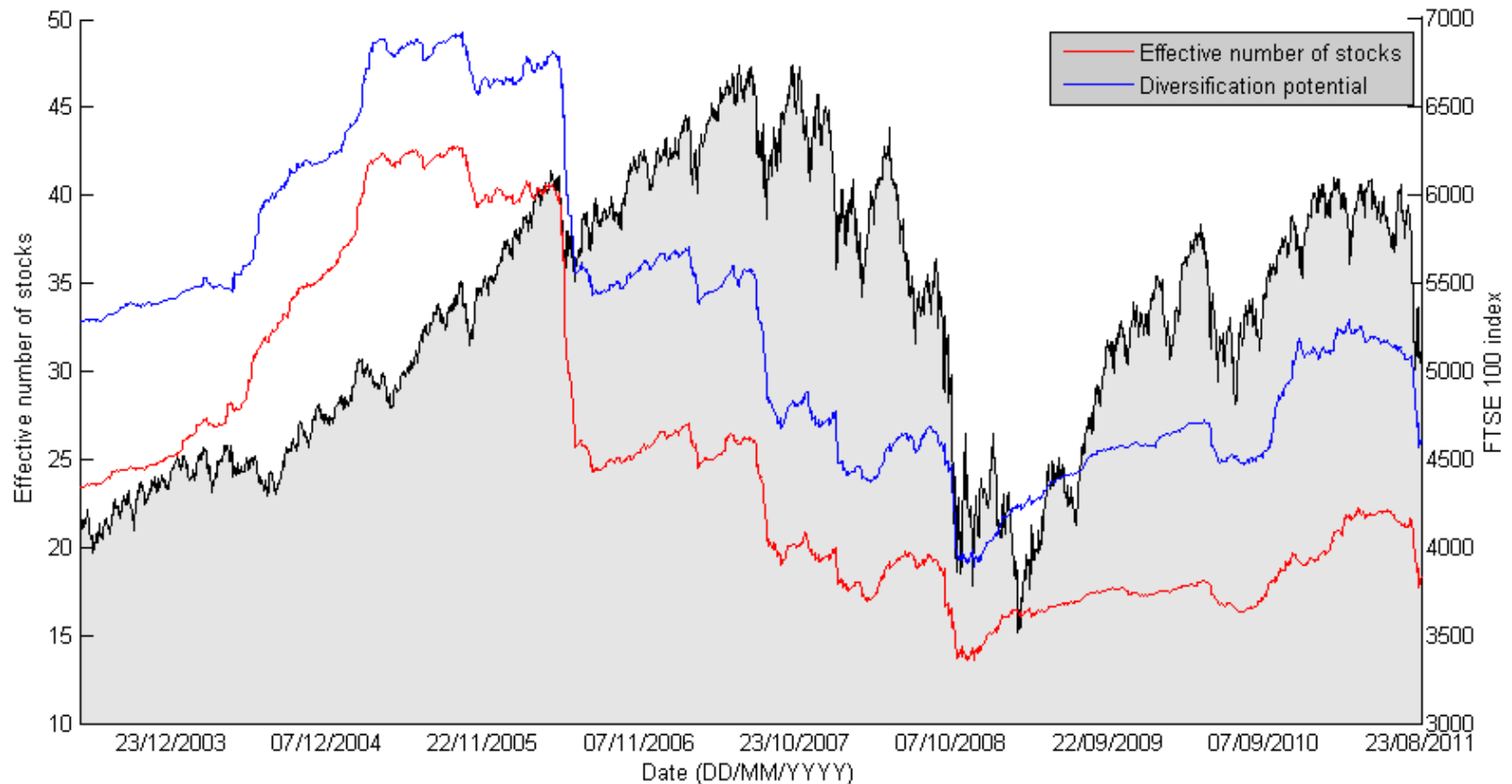
Market cap weighted



Effective number of stocks has stayed low despite market recovery

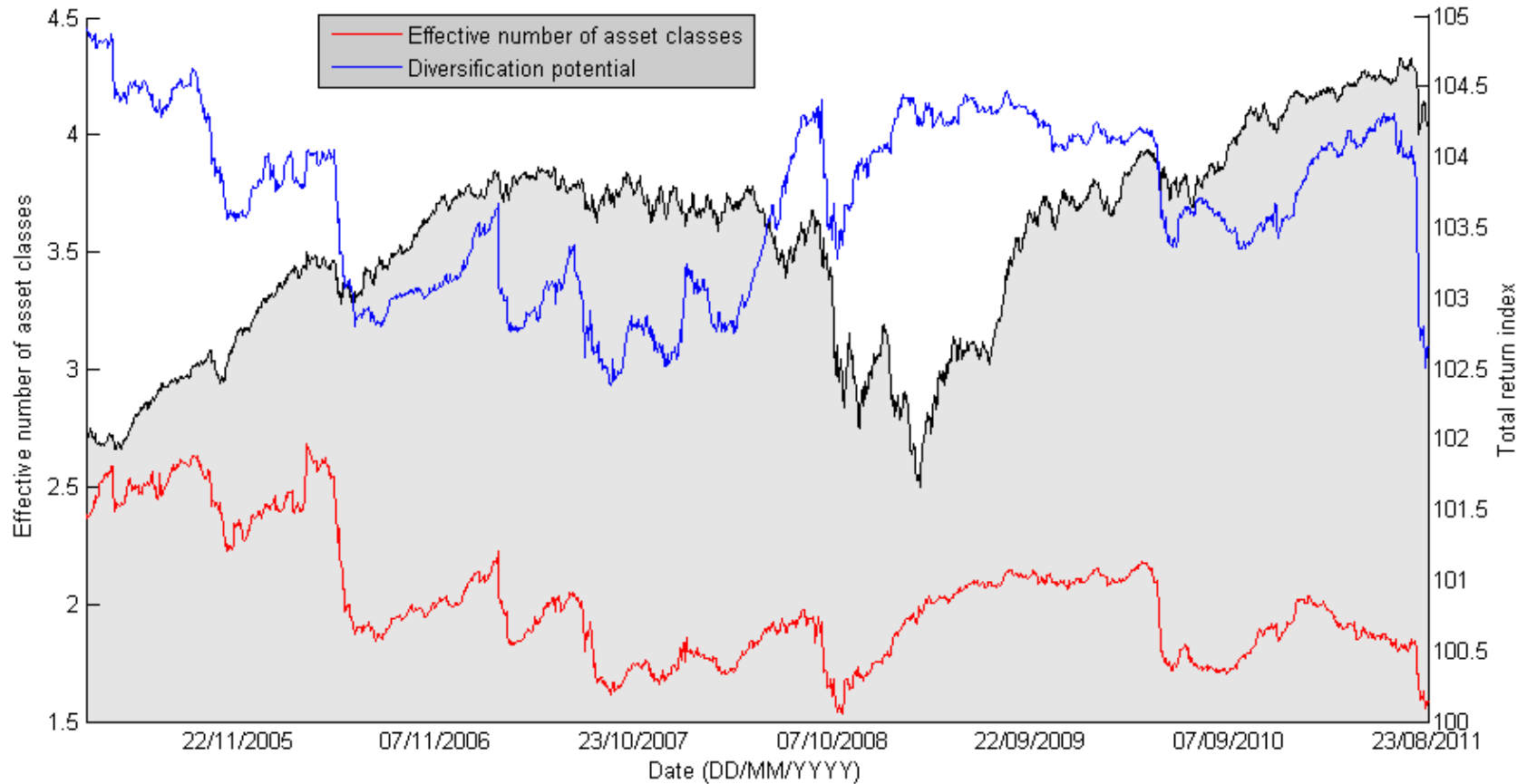
Effective number of stocks in FTSE 100

Equally weighted



Effective number of stocks higher than market capped index

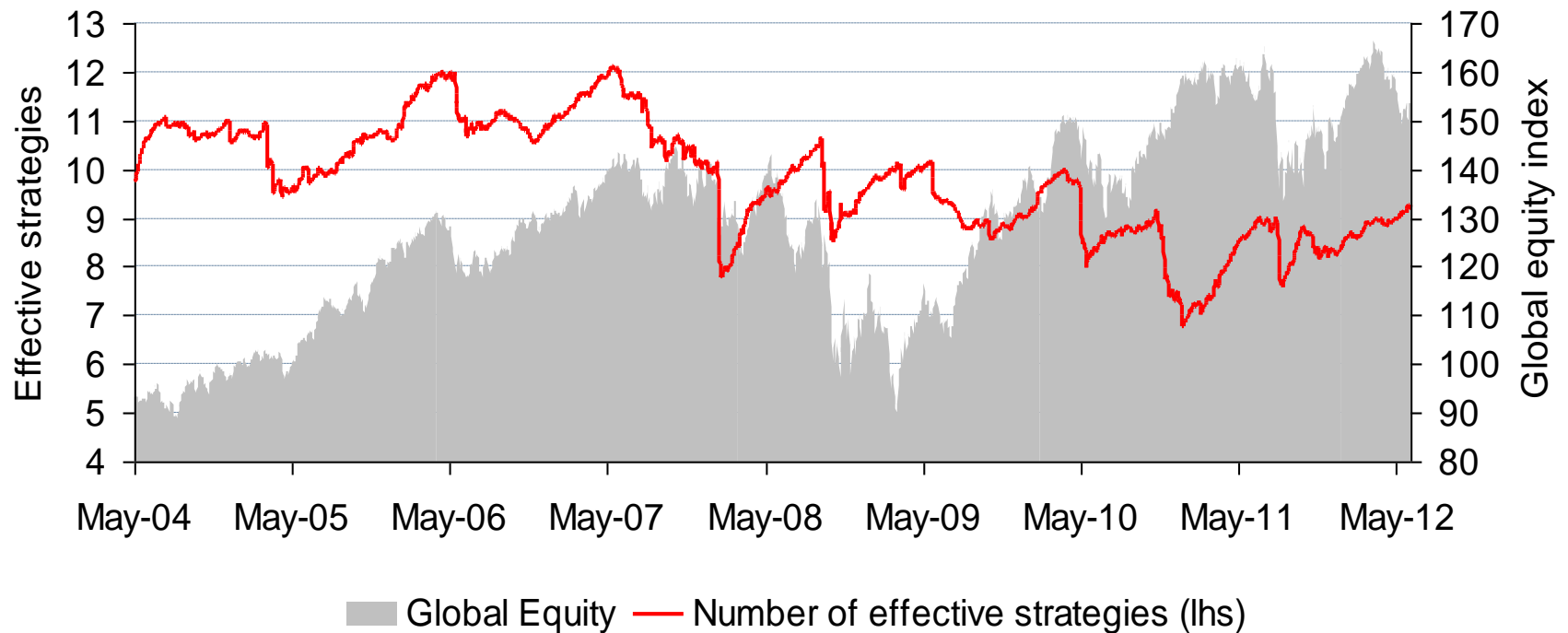
Effective number of assets in UK pension portfolio



Low number of effective assets reflects dominance of equity and interest rate risk

Effective factors for multi-strategy portfolio

Number of Effective Strategies for unconstrained multi-asset portfolio



Portfolio's greater number of 'moving parts' allows for more return consistency

Summary

- Traditional multi-asset funds offer insufficient diversification opportunities
- Derivatives significantly broaden the range of investment strategies that a portfolio can utilise
- Combining traditional assets with derivative-implemented strategies produces more risk efficient portfolios
- Increase the likelihood of 'good' outcomes for your portfolio
- Actuaries well placed to add value in understanding and communicating investment diversification

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

