PERFORMANCE IMPLICATIONS OF BLENDING LISTED & UNLISTED REAL ESTATE-PART 2: REFINING THE EQUITY ELEMENT AND EXTENDING THE DIRECT ALLOCATION OUTSIDE THE UK

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PURPOSE OF THE STUDY

- It has been established in a previous paper (Moss & Farrelly 2014) that adding a global listed real estate element (25%-30%) to an unlisted (UK) real estate portfolio could enhance returns.

- This paper takes the analysis and understanding of blended real estate portfolios further, by increasing the geographic range of the unlisted element, and examining refinements to a straight buy and hold strategy for the listed element.

PURPOSE OF THE STUDY

In particular we have undertaken three studies to answer the following questions:

1) Does the strategy work for regions other than the UK ? We examine the impact of combining a global listed element with a direct property allocation from Europe, and Asia using Transaction Based Indices.

2) Would performance be improved if different Smart Beta (Alternative Index Weighting) strategies were employed? If so which strategies (Equal weighting, High/ Low Leverage, etc) work best?

3) Is it possible to adopt a rules-based trading strategy that would enhance performance of the listed element? We look at Momentum based strategies, Trend Following, and a combination of the two, concluding that these strategies can have a significant role to play in risk reduction of the listed element of a blended portfolio.

WHY THE INTEREST IN BLENDING ?

- Liquidity
- Cost
- Ease of implementation

- One of the key challenges for both asset allocators and product developers is how to provide real estate exposure in a mixed asset portfolio with acceptably high levels of liquidity and low levels of cost.

- Clearly, a 100% exposure to unlisted funds or direct real estate would not be expected to meet this demanding criteria.

PREVIOUS FINDINGS

	UK Unlisted Funds	UK Unlisted Funds Inc Subscription Costs	70:30 UK Unlisted Funds: Global Listed Funds	70:25:05 UK Unlisted Funds: Global Listed Funds:Cash
Portfolio Allocation				
Unlisted Property Funds	100%	100%	70%	70%
Global Listed Funds	0%	0%	30%	25%
Cash	0%	0%	0%	5%
Portfolio Statistics				
Annualised Mean	6.8%	6.4%	7.7%	7.1%
Annualised Geometric Mean	6.8%	6.3%	7.5%	7.0%
Annualised Volatility	6.4%	6.5%	8.4%	8.0%
Beta vs IPD Monthly Index	0.88	0.88	0.93	0.88
Tracking Error vs IPD Monthly Index	1.3%	2.0%	5.4%	5.2%
RSq with IPD Monthly Index	0.97	0.92	0.60	0.60
Sharpe Ratio	0.67	0.60	0.62	0.58
Modified Sharpe Ratio	0.35	0.32	0.31	0.30
Information Ratio - IPD Monthly Index	-0.34	-0.42	0.08	-0.02

STUDY 1) NEW DATA USING TBI

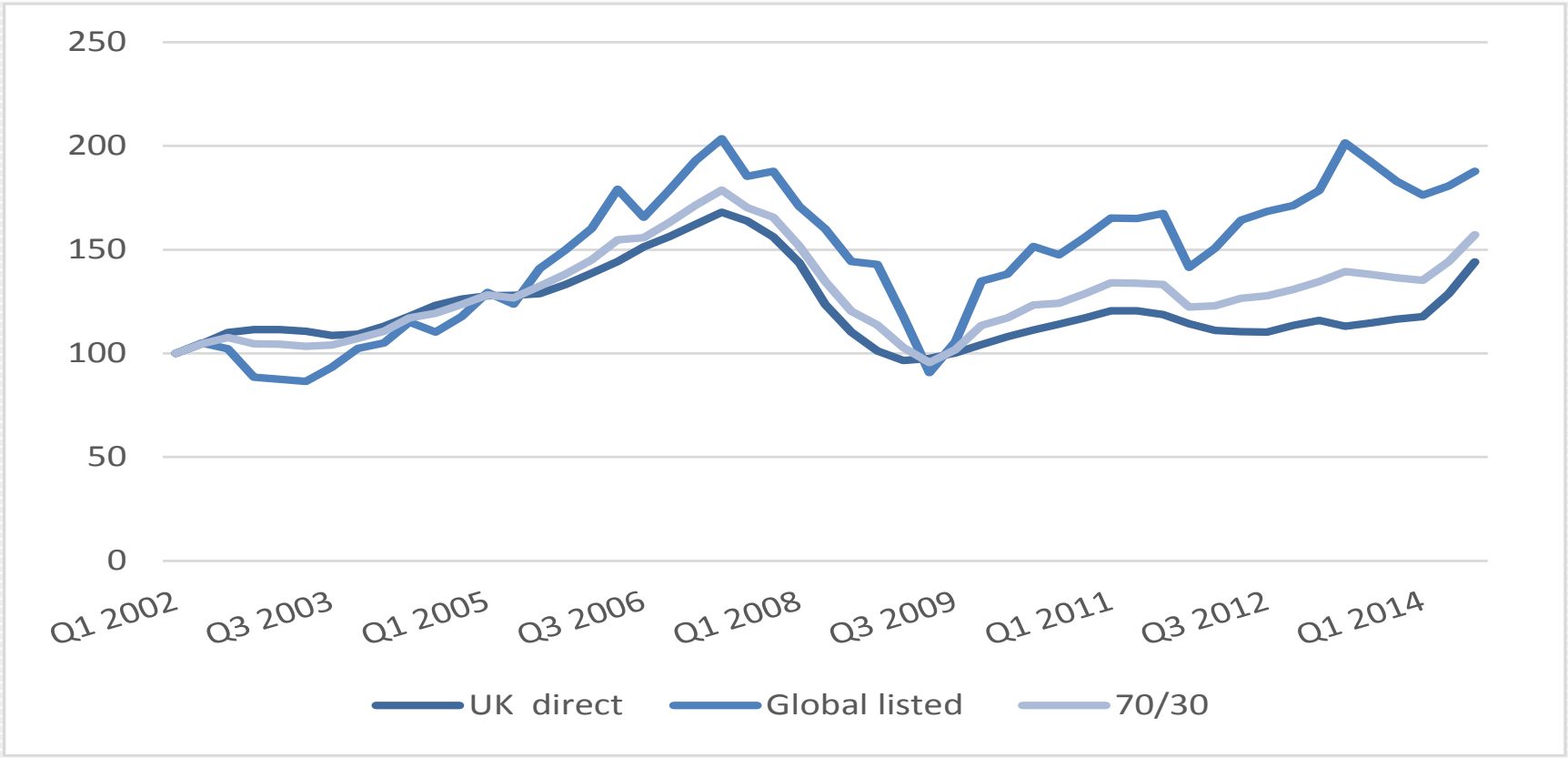
- **Listed real estate**
- Global Listed Real Estate – EPRA Global Developed Index
- UK Listed Real Estate - FTSE EPRA/NAREIT UK Index
- European Listed Real Estate - FTSE EPRA/NAREIT Developed Europe Index
- Asian Listed Real Estate -FTSE EPRA/NAREIT Developed Asia Index

- **Direct Real Estate**
- UK – DTZ TBI UK All Property Index
- Europe – DTZ TBI Europe ex UK Index
- Asia – DTZ TBI APAC Index

- **Blended Portfolio** = 70% Direct , 30% Listed
- Frequency: Monthly
- Currency: LOCAL
- Return: PRICE
- Period: 2004-2014

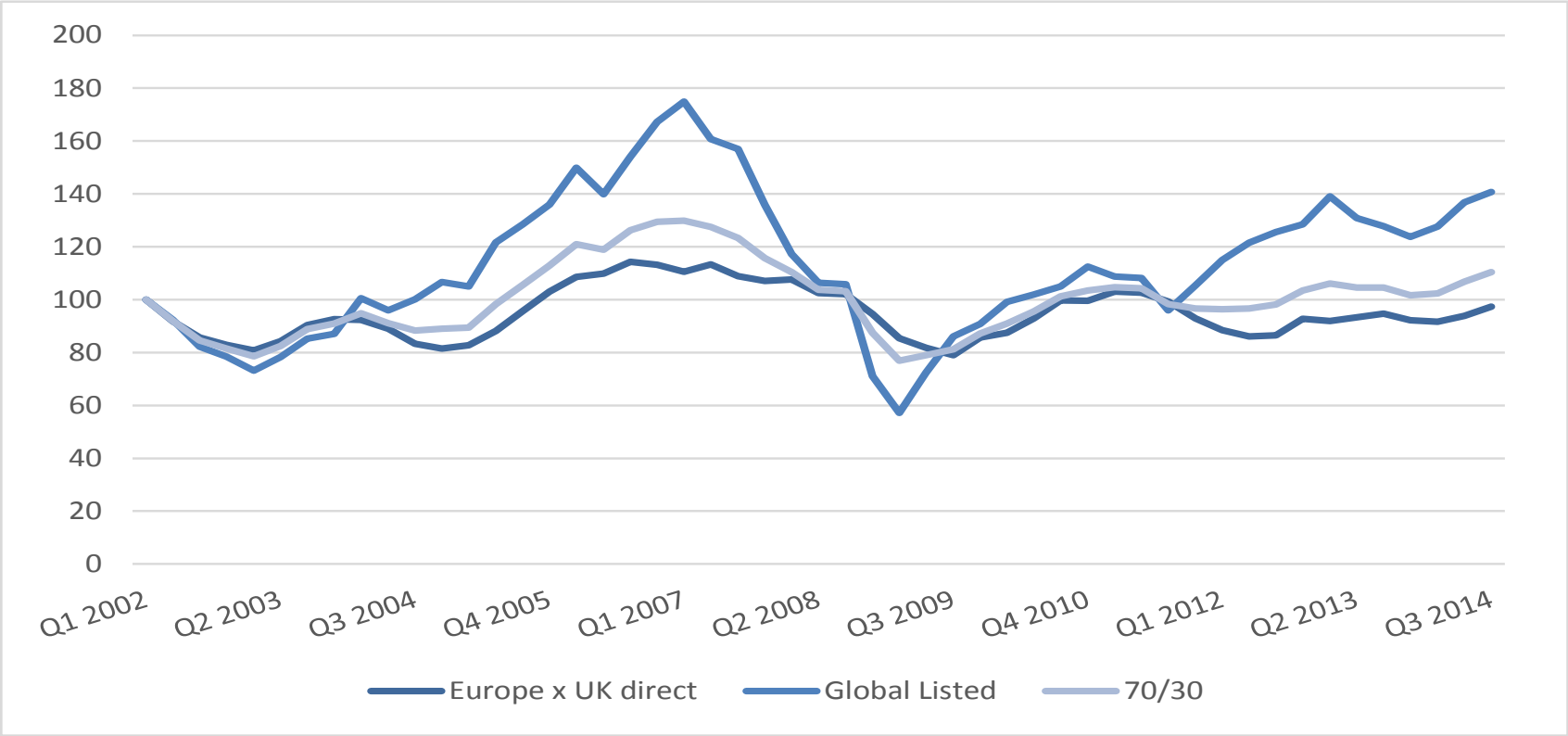
STUDY 1) DOES THE STRATEGY WORK OUTSIDE THE UK

- The UK experience – clear benefit for holding 70/30 portfolio



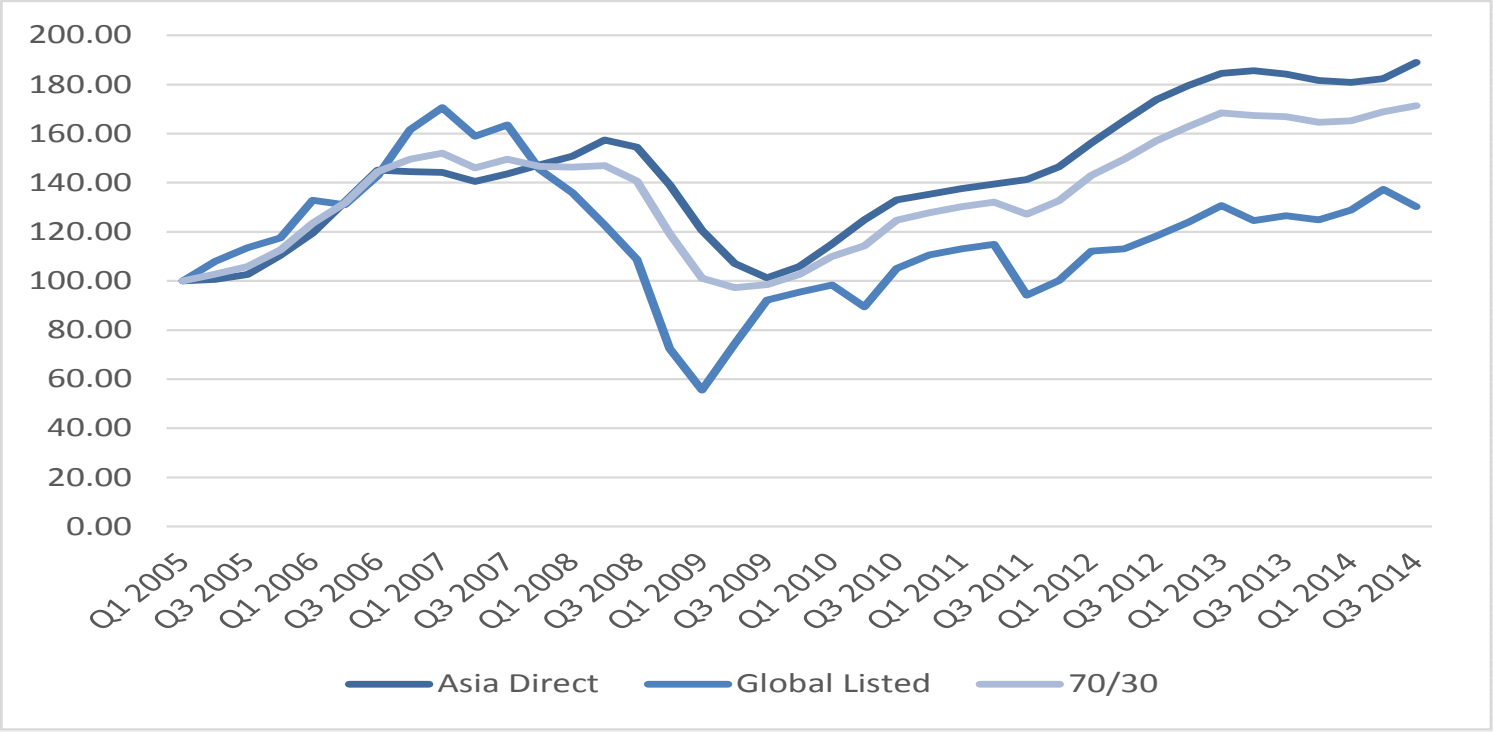
STUDY 1) DOES THE STRATEGY WORK OUTSIDE THE UK

Europe shows a similar benefit , although the direct market peal and troughs are shallower than for the UK. 2008-2012 benefits were not as significant as for UK.



STUDY 1) DOES THE STRATEGY WORK OUTSIDE THE UK

For Asia we only have data back to 2005, and our initial findings show that the benefits may be more time-variant due tot he different cycle of asian direct real estate.



STUDY 1) FINDINGS - QUARTERLY, ROLLING 12M and ANNUAL ENHANCEMENTS

	UK	Europe	Asia
Q2 2002	0.11%	4.56%	
Q3 2002	-2.31%	-0.27%	
Q4 2002	-4.48%	-2.36%	
Q1 2003	-0.29%	-0.61%	
Q2 2003	-0.16%	-3.32%	
Q3 2003	2.93%	-0.05%	
Q4 2003	2.75%	1.93%	
Q1 2004	-0.24%	0.74%	
Q2 2004	1.57%	5.70%	
Q3 2004	-2.65%	0.55%	
Q4 2004	1.35%	1.97%	
Q1 2005	2.57%	1.50%	
Q2 2005	-1.36%	-2.44%	2.18%
Q3 2005	3.97%	2.21%	1.01%
Q4 2005	0.89%	-0.64%	-1.32%
Q1 2006	0.81%	0.17%	1.52%
Q2 2006	2.36%	2.69%	-3.87%
Q3 2006	-3.74%	-3.22%	-0.23%
Q4 2006	1.40%	3.33%	4.01%
Q1 2007	1.29%	3.31%	1.88%
Q2 2007	0.50%	0.61%	-1.41%
Q3 2007	-1.89%	-1.25%	0.21%
Q4 2007	1.77%	-0.23%	-4.46%
Q1 2008	-0.27%	-4.18%	-2.65%
Q2 2008	2.26%	-2.71%	-3.94%
Q3 2008	0.29%	-2.63%	-2.37%
Q4 2008	2.17%	2.03%	-5.46%
Q1 2009	-3.87%	-6.91%	-1.79%
Q2 2009	-7.21%	-4.63%	7.42%
Q3 2009	4.11%	9.04%	6.75%
Q4 2009	7.09%	3.15%	-0.29%
Q1 2010	-0.33%	0.98%	-1.61%
Q2 2010	1.97%	0.94%	-4.72%
Q3 2010	-1.56%	-1.38%	2.59%
Q4 2010	0.91%	0.95%	0.91%
Q1 2011	0.91%	1.09%	0.13%
Q2 2011	-0.02%	-0.89%	0.09%
Q3 2011	0.91%	0.85%	-5.03%
Q4 2011	-3.54%	-1.50%	0.56%
Q1 2012	2.80%	4.40%	1.22%
Q2 2012	2.80%	3.55%	-1.18%
Q3 2012	0.89%	1.58%	-0.12%
Q4 2012	-0.37%	-1.19%	0.33%
Q1 2013	0.58%	0.93%	0.63%
Q2 2013	4.61%	2.03%	-1.25%
Q3 2013	-1.85%	-2.22%	0.55%
Q4 2013	-1.91%	0.09%	0.01%
Q1 2014	-1.36%	-0.74%	0.81%
Q2 2014	-2.07%	0.17%	1.32%
Q3 2014	-2.43%	1.09%	-2.12%

	UK	Europe	Asia
Q1 2003	-7.18	-2.31	
Q2 2003	-7.05	-2.13	
Q3 2003	-2.14	-0.49	
Q4 2003	4.53	-0.21	
Q1 2004	4.70	6.48	
Q2 2004	6.69	4.84	
Q3 2004	1.25	7.25	
Q4 2004	-0.13	9.92	
Q1 2005	2.86	4.75	
Q2 2005	-0.33	8.79	
Q3 2005	6.47	4.57	
Q4 2005	6.21	0.36	
Q1 2006	4.60	4.06	4.00
Q2 2006	9.40	-3.60	-3.13
Q3 2006	0.01	0.13	-5.01
Q4 2006	0.62	4.75	2.08
Q1 2007	1.22	5.53	2.50
Q2 2007	-1.03	4.17	4.50
Q3 2007	1.19	2.48	4.61
Q4 2007	1.68	-5.21	-3.85
Q1 2008	-0.02	-12.28	-8.36
Q2 2008	1.75	-9.20	-11.38
Q3 2008	3.42	-10.08	-13.45
Q4 2008	3.83	-12.64	-13.30
Q1 2009	0.58	-9.73	-10.89
Q2 2009	-7.92	-3.60	-1.87
Q3 2009	-6.35	1.22	4.45
Q4 2009	-3.23	9.04	10.16
Q1 2010	1.87	15.83	13.42
Q2 2010	15.09	7.49	0.81
Q3 2010	8.01	-1.32	-4.92
Q4 2010	1.14	2.40	-3.33
Q1 2011	2.78	-2.65	-1.23
Q2 2011	0.22	-1.41	3.98
Q3 2011	3.41	-2.59	-4.15
Q4 2011	-2.45	0.10	-4.60
Q1 2012	-0.31	6.19	-3.71
Q2 2012	2.86	8.89	-5.26
Q3 2012	2.92	12.82	0.55
Q4 2012	7.57	7.23	0.27
Q1 2013	5.15	6.07	-0.37
Q2 2013	7.97	-0.32	-0.49
Q3 2013	3.91	-3.00	0.25
Q4 2013	1.56	-1.14	-0.08
Q1 2014	-1.06	-3.07	0.12
Q2 2014	-10.45	1.47	2.66
Q3 2014	-11.63	2.73	0.05

	UK	Europe	Asia
2003	4.53	-0.21	
2004	-0.13	9.92	
2005	6.21	0.36	
2006	0.62	4.75	2.08
2007	1.68	-5.21	-3.85
2008	3.83	-12.64	-13.30
2009	-3.23	9.04	10.16
2010	1.14	2.40	-3.33
2011	-2.45	0.10	-4.60
2012	7.57	7.23	0.27
2013	1.56	-1.14	-0.08

STUDY 1) CONCLUSIONS

- The findings of this study are consistent with our previous work in the UK , showing that combining global listed real estate exposure with a regional direct allocation to Europe or Asia can enhance performance in absolute terms.
- The impact for Asian portfolios is less consistent, illustrating the different performance dynamics and cycles relative to US, and UK/Europe.
- The benefit is noticeable at different stages of the cycle from the UK.
- By using transaction based indices we have significantly reduced the lag effect , which potentially reduces the observed benefits of blending in nominal rather than actual terms
- We believe that the next steps in the evolution of this integrated approach will be to perform a more detailed analysis of the resultant risk metrics to provide risk adjusted returns for the blended portfolio, as well as comparing results with those using an appraisal based index.

STUDY 2) CAN SMART BETA STRATEGIES ENHANCE PERFORMANCE

- What Smart Beta strategies can be developed to provide the investment solutions and risk/return profiles currently required by asset allocators?

- Is it possible to devise automated trading strategies (with a low turnover) which will enhance performance?

- Are there likely to be more Smart Beta products for REITs ? Currently we are aware of the Kempen Fundamental Index strategy and the Dow Jones Townsend Core REIT Index.

2) CAN SMART BETA STRATEGIES ENHANCE PERFORMANCE

In this study we are interested in discovering whether the free float market capitalisation weighted global benchmark would have consistently underperformed a Smart Beta strategy utilising the following factors :

1) Gross Assets
2) Equal Weighting
3) Gearing - Loan to Value (Low and High) - EW
4) Valuation - Price to Book Value (Low and High) - EW
5) Size – Gross Assets (Small and Large) - EW

STUDY 2) CAVEATS

- No transaction costs are taken into account
- Portfolios are only rebalanced at calendar year ends and then held for the next 12 month period
- No constraints such as minimum liquidity , maximum number of portfolio constituents etc have been applied
- No account has been taken of resultant regional weightings

STUDY 2) DATA

- EPRA Global Developed Index constituents
- COMPUSTAT for fundamental data
- Bloomberg and CRSP for share price and total returns data

- Frequency: Annual
- Currency: US$ (Unhedged)
- Return: Total Return

- Period: 2004-2014

STUDY 2) METHODOLOGY

- Key metrics used: Loan to Value (LTV) , Gross Assets (GA), Price to Book Value (PBV)
- Establish benchmark constituents on an annual basis – this is the initial selection criteria
- Determine annual returns for all constituents
- Determine fundamental data (LTV, GA, PBV) for all benchmark constituents
- Sort by quartile (if appropriate)
- Apply weighting criteria (EW, Gross Assets)
- Calibrate portfolio annual return

STUDY 2) RESULTS

	Mean	Geo Mean
FTSE EPRA/NAREIT Developed Index TR	12.34%	8.92%
Equal Weight	16.96%	13.03%
Total Asset Weighted	18.09%	13.20%
Equal Weight Low LTV Quartile	17.66%	12.48%
Equal Weight High LTV Quartile	18.08%	13.97%
Equal Weight Low BTM Quartile	14.57%	12.07%
Equal Weight High BTM Quartile	23.49%	17.25%
Equal Weight Low Total Assets Quartile	16.96%	13.72%
Equal Weight Hightotal Assets Quartile	16.47%	11.50%

STUDY 2) FINDINGS

- Promising initial results
- Simple Smart Beta strategies can create material performance differentials vs the index
- Next Steps:
  - Make use of higher frequency and longer time series data
  - Explore additional strategies – fundamental and technical
  - Incorporate additional filters such as liquidity and regional constraints
  - Include transaction costs – measure 'real' investor level returns
  - Assess regional level strategies
  - Factor model, risk and diversification potential (within real estate and multi-asset levels) analysis
  - Explore whether there is a cyclical dimension to the various strategies which is predictable

3) RULES BASED TRADING STRATEGIES

In this study we are interested in discovering whether :

1) Adding Global REITs to a multi-asset portfolio enhances performance

2) Adopting a trend following strategy can improve this performance

3) Using individual country allocations rather than a global index weighting affects performance

4) There is a preferred strategy for optimising risk adjusted performance

STUDY 3) CAVEATS

- Trend following requires selling an asset and holding US treasuries for certain periods
- Under certain circumstances the optimum portfolios may be 100% in one asset class (e.g. US treasuries)
- Not all fund mandates would permit this
- No transaction costs are taken into account
- Portfolios have to be rebalanced each month

STUDY 3) DATA

- Index data for four asset classes:
- Developed Market Equities: MSCI World Index
- Global Bonds : Citigroup World Government Bond Index
- Commodities: Bloomberg Commodity Index
- Global REITs : EPRA Developed Markets Index

- REIT country data: Australia, Belgium, Canada, France, Germany, Hong Kong, Italy, Japan, Netherlands, Norway, Singapore, Sweden, Switzerland, UK, US.

- Frequency: Monthly
- Currency: US$
- Return: Total Return
- Period: 1991-2014

STUDY 3) METHODOLOGY

- Key metrics used: Annualised Returns, Annualised Volatility, Sharpe Ratio, Maximum Drawdown and Skew

- Establish asset level returns across the 4 asset classes (B/E/C/R)
- Determine portfolio level returns of different combinations of the 4 asset classes, using 1) Equal weighting and 2) Risk Parity
- Apply Trend Following (Absolute) strategy , and compare results at Asset and Portfolio level
- Disaggregate Global REIT Index to company level
- Apply Momentum based (Relative) strategy
- Combine strategies to determine optimum outcome for adding REITs to a Multi Asset Portfolio

STUDY 3) METHODOLOGY

- **Risk parity**
- Methodology employed by Asness et al (2011)
- Portfolio weights are proportional to inverse of observed 12 month volatility. This is repeated each month.
- **Trend following**
- Methodology employed by Faber(2007)
- If the price of the asset class index is above its 10 month moving average classified as an uptrend, and asset purchased if not already held.
- If the price is below , classified as a downtrend, and asset sold with proceeds invested in US Treasury Bills.
- Repeated each month.
- No short-selling is permitted and no transaction costs are deducted

STUDY 3) METHODOLOGY

- **Momentum**
- Effect of buying “winners” and selling “Methodology employed by Jegadeesh and Titman(1993,2011)
- Calculate return of asset in prior period and rank them, then adjust by taking into account volatility (Ilmanen 2011) – otherwise most volatile assets always at top or bottom
- Calculate by dividing prior 12m total return by realised volatility , then rank and rebalance monthly
- Formed portfolios based on Top3 (out of 15) and Top 5
- In the case of one sector best to use relative momentum measure, as all countries could be similar directionally , limiting the use of an absolute trend following strategy
- Clare (2014) found that Trend following has higher risk adjusted returns with Momentum higher absolute returns
- Faber (2010) ap Gwilym (2010) Antonacci (2012) show that combining the two methods can deliver higher risk adjusted returns than either individually

STUDY 3) METHODOLOGY

- **Combining Trend Following and Momentum**
- Momentum based initial sort with a Trend Following overlay
- If the asset is classed as a momentum winner , AND, the trend is also positive a long position is taken , otherwise the allocation (33.3% Top 3, 20% Top 5) is invested in treasury Bills
- Therefore if all the winners are in a downtrend then 100% invested in Treasury Bills for that month

RESULTS- BASE ASSET AND PORTFOLIO LEVEL RETURNS

Table 1

Asset Class Returns with Equal Weight and Risk Parity Portfolios Formed using these Assets

A. Asset Class Returns	Equity	Bonds	Commodities	REITs
Annualized Return (%)	8.00	5.94	3.14	9.38
Annualized Volatility (%)	14.77	6.61	14.81	18.22
Sharpe Ratio	0.35	0.47	0.02	0.36
Maximum Drawdown (%)	53.65	8.96	54.75	67.20
Skew	-0.74	0.12	-0.51	-0.71

B. Equal Weight Portfolios	E/B	E/B/C	E/B/R	E/B/C/R
Annualized Return (%)	7.27	6.09	8.17	7.09
Annualized Volatility (%)	8.68	9.09	11.17	10.54
Sharpe Ratio	0.51	0.36	0.48	0.40
Maximum Drawdown (%)	29.22	36.78	44.31	43.31
Skew	-0.52	-0.87	-0.71	-1.00

C. Risk Parity Portfolios	E/B	E/B/C	E/B/R	E/B/C/R
Annualized Return (%)	6.73	6.25	7.49	6.84
Annualized Volatility (%)	7.16	7.54	8.79	8.66
Sharpe Ratio	0.54	0.45	0.53	0.46
Maximum Drawdown (%)	20.50	25.33	31.69	32.88
Skew	-0.31	-0.52	-0.67	-0.86

- Note High Maximum Drawdown numbers, and improvement in risk-adjusted (but not raw return)measures using risk parity

RESULTS – TREND FOLLOWING STRATEGY

Table 2

Trend Following Asset Class Returns with Equal Weight and Risk Parity Portfolios Formed using these Assets

A. Asset Class Returns	Equity	Bonds	Commodities	REITs
Annualized Return (%)	9.52	5.13	4.61	9.85
Annualized Volatility (%)	10.00	5.91	10.63	12.01
Sharpe Ratio	0.67	0.39	0.17	0.58
Maximum Drawdown (%)	14.10	12.43	31.31	16.84
Skew	-0.55	0.07	-0.26	-0.05

B. Equal Weight Portfolios	E/B	E/B/C	E/B/R	E/B/C/R
Annualized Return (%)	7.46	6.65	8.38	7.56
Annualized Volatility (%)	6.19	5.99	7.11	6.43
Sharpe Ratio	0.74	0.63	0.78	0.73
Maximum Drawdown (%)	6.94	11.56	7.39	11.13
Skew	-0.30	-0.17	-0.14	-0.13

C. Risk Parity Portfolios	E/B	E/B/C	E/B/R	E/B/C/R
Annualized Return (%)	6.71	6.39	7.38	6.93
Annualized Volatility (%)	5.57	5.39	6.12	5.72
Sharpe Ratio	0.69	0.66	0.74	0.71
Maximum Drawdown (%)	8.22	8.12	7.01	8.38
Skew	-0.09	-0.01	-0.30	-0.23

- Reduces asset level volatility, and most significantly maximum drawdown.

RESULTS – DISAGGREGATING GLOBAL INDEX TO COUNTRY LEVEL

Table 3 Equal Weight and Risk Parity Portfolios Formed using Individual Country REITs		
	Equal Weight	Risk Parity
Annualized Return (%)	8.24	8.61
Annualized Volatility (%)	17.40	16.00
Sharpe Ratio	0.31	0.36
Maximum Drawdown (%)	65.72	61.30
Skew	-0.51	-0.74

Global REITs comparison: Annualised return 9.38%
Volatility 18.22%
Sharpe Ratio 0.36
Max Drawdown 67.20%

- No material improvement so we need to adopt a relative rules based strategy to determine weightings

RESULTS – MOMENTUM BASED STRATEGY

Table 4		
12-Month Volatility-Adjusted Momentum Portfolios Formed using Individual Country REITs		
	Top 3	Top 5
Annualized Return (%)	11.48	10.55
Annualized Volatility (%)	16.45	16.29
Sharpe Ratio	0.52	0.47
Maximum Drawdown (%)	55.45	57.62
Skew	-0.78	-0.73

- Note the significant improvement in returns (10.6% and 11.5%) vs 8.2% of EW strategy in Table 3 and 9.4% in broad index in Table 1
- Sharpe Ratio also improved

RESULTS – COMBINING MOMENTUM AND TREND FOLLOWING

Table 5				
Trend Following Overlays to Portfolios Formed using Individual Country REITs				
	Equal Weight	Risk Parity	Mom Top 3	Mom Top 5
Annualized Return (%)	9.58	9.98	11.39	10.69
Annualized Volatility (%)	8.73	8.21	13.35	12.64
Sharpe Ratio	0.77	0.87	0.64	0.62
Maximum Drawdown (%)	10.62	9.32	19.50	18.66
Skew	-0.04	-0.04	-0.09	-0.07

- Returns are little affected , the key difference is to reduce volatility significantly for EW and Risk Parity portfolios

RESULTS – REITS IN BROADER ASSET ALLOCATION

Table 6

Adding REIT Strategies to Equal Weight Portfolios of Equities, Bonds and Commodities

	EW	RP	Mom3	Mom5	TF EW	TF RP	TF Mom3	TF Mom5
Annualized Return (%)	6.77	6.83	7.58	7.33	7.03	7.13	7.54	7.35
Annualized Volatility (%)	10.51	10.22	9.97	10.11	8.15	8.07	8.87	8.91
Sharpe Ratio	0.37	0.39	0.47	0.44	0.51	0.53	0.53	0.50
Maximum Drawdown (%)	42.48	41.71	38.79	39.74	28.75	28.84	28.85	29.48
Skew	-0.95	-1.03	-1.09	-0.97	-0.64	-0.63	-0.52	-0.43

- Global Index results (Table1)
- Annualised Return 7.09 6.84
- Annualised Volatility 10.54 8.66
- Sharpe Ratio 0.40 0.46
- Maximum Drawdown 43.31 32.88
- Skew -1.00 -0.86

- We show above the result of the 8 strategies, where a Global Index has been replaced with individual country indices for E/B/C/R portfolios(compare to Table 1 b and Ic)
- No appreciable benefit from the EW and RP strategies at the country level, but adding Momentum strategies leads to slightly higher returns and volatility
- Main improvements are found when the broad index is replaced with one of the four trend following strategies.

CONCLUSIONS

In this paper we have tried to answer whether:

1) Adding Global REITs to a multi-asset portfolio enhances performance
Yes in absolute terms , but not in risk adjusted terms (Tables 1b, 1c)

2) Adopting a trend following strategy can improve this performance
Yes, by significantly reducing maximum drawdown from up to 44% to 7% (tables 1b&c, 2b&c)

3) Using individual country allocations rather than a global allocations affects performance
No material benefit without a rules based strategy (Table 3)

4) There is a preferred strategy for optimising risk adjusted performance
Yes, combining Trend Following and Momentum strategies using individual country weightings improves raw and risk adjusted returns and dramatically reduces maximum drawdown (Table 6)

SUMMARY AND INITIAL CONCLUSIONS

1)Does the strategy work for regions other than the UK ?

Yes , but less consistently than for the UK

2) Would performance be improved if different Smart Beta (Alternative Index Weighting) strategies were employed?

Yes, High BTM provides best results

3) Is it possible to adopt a rules-based trading strategy that would enhance performance of the listed element?

Yes, using a combination of Momentum and Trend following strategies

NEXT STEPS: *Apply strategies in 2) and 3) to blended portfolios throughout the cycle*

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