



25 JUNE 2013

LONDON BOROUGH OF BRENT PENSION FUND

Alternatively Weighted Indices



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Topics

- Business update
- Alternatively weighted indices
- Appendix

LGIM Business update



- **Total funds under management: £441bn**
 - Index equity assets: £269bn
 - LGPS Assets - £28.3bn for 54 Funds
 - London Borough of Brent Assets – £210m as at 31/05/12
- **Annual growth: £34bn new business in 2012**
- **Product range expanded to meet client needs**
 - Alternatively-weighted equity indices (RAFI and MSCI)
 - Emerging Market Debt Funds
 - LDI - extensive range of de-risking solutions
 - Transition Management
 - Currency Overlay

LGIM internal AUM data as at 31 March 2013.



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Alternatively weighted indices

In search of better benchmarks



Advantages and disadvantages of capitalisation weighted indices

Advantages

- Clear and easily understood
- Provides, in theory, maximum diversification
- Easily traded – sufficient liquidity
- Low transaction costs
 - Self re-balancing
- As a portfolio – low cost strategy

Disadvantages

- The theory is imperfect
 - The market is not always efficient
- Always overweight overvalued shares
 - Tech stock at end 90s
 - Financial stocks in 00s
- Always underweight undervalued shares
- Can lead to concentration



Alternatives to cap. weighted indices

- Economic factor weighted
 - Re-weighted with reference to balance sheet metrics
- Risk weighted
 - Re-weighted with reference to risk or volatility metrics
- Capped
 - Restriction on the percentage any one stock represents of the index
- Equally weighted
 - Each stock represents by same percentage (e.g. 1% in each stock in FTSE100 Index)
- ESG weighted
 - Re-weighted with reference to environmental, social and governance issues



Why alternatively weighted indices

- Significant increase in interest in alternative beta investment strategies
- Provide a systematic 'active' element to a portfolio within an index profile
- Maintains key advantages of index management
 - Diversified exposure
 - High capacity
 - Transparency & index oversight
 - Clearly published rules & underlying data
 - Free-float adjusted
 - Liquidity screened



Economic scale or fundamental indices

- Weighted to mirror publicly traded economy rather than the Stock Market (*Robert Arnott, Research Affiliates*)
- Metrics employed highly correlated with capitalisation and liquidity
 - Book value, cashflow, sales, revenues, dividends, employment
- Low turnover a greater challenge
 - Cap. weighted index self rebalances as individual stocks change in value
- Most popular indices – RAFI Fundamental, MSCI Value, GWA Wealth
- Capturing active management strategies in an index





Overview of factor weighted or fundamental indices

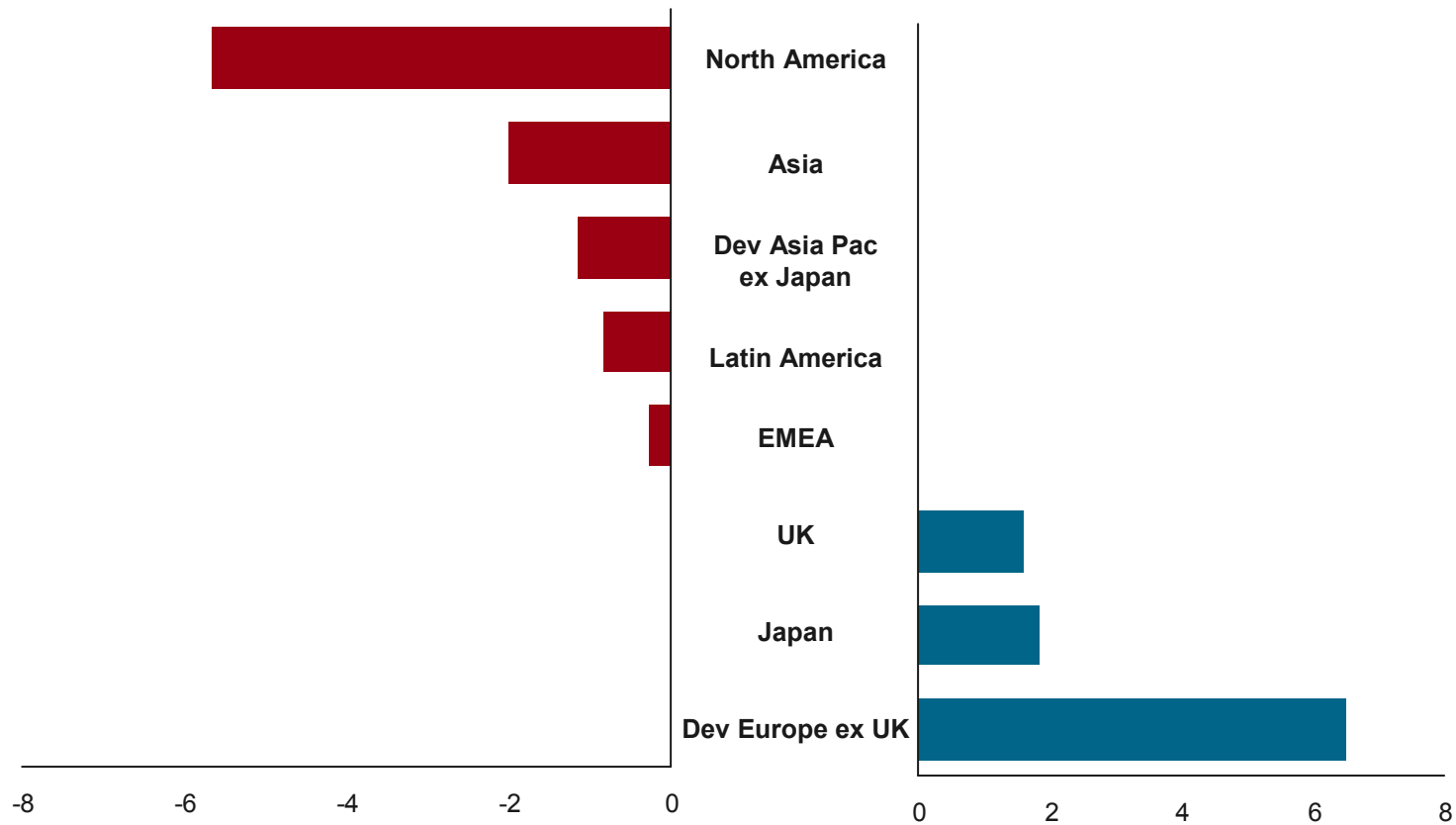
	Market Capitalisation Indices	MSCI Value Weighted	RAFI
Index Weighting Factors	Share price from the previous day x number of shares	Four factor model based on three year average data for : (i) sales (ii) cashflow (iii) book value (iv) earnings	Four factor model based on five year average data for: (i) sales (ii) cashflow (iii) book value (iv) dividends
Rebalancing Frequency	Quarterly	Semi-annual	Annual
Turnover (linked to rebalancing frequency)	Low	Medium	Medium
Universe	MSCI / FTSE	MSCI	Bespoke
Licence Fee (*)	-	3.6 bps	7.2 bps

* The licence fee represents the fee charged by the index provider and encompasses the intellectual property rights to track the index (inclusive of VAT). Investment charges are in addition.



FTSE RAFI 3000 Index vs FTSE All-World Index

Regional analysis



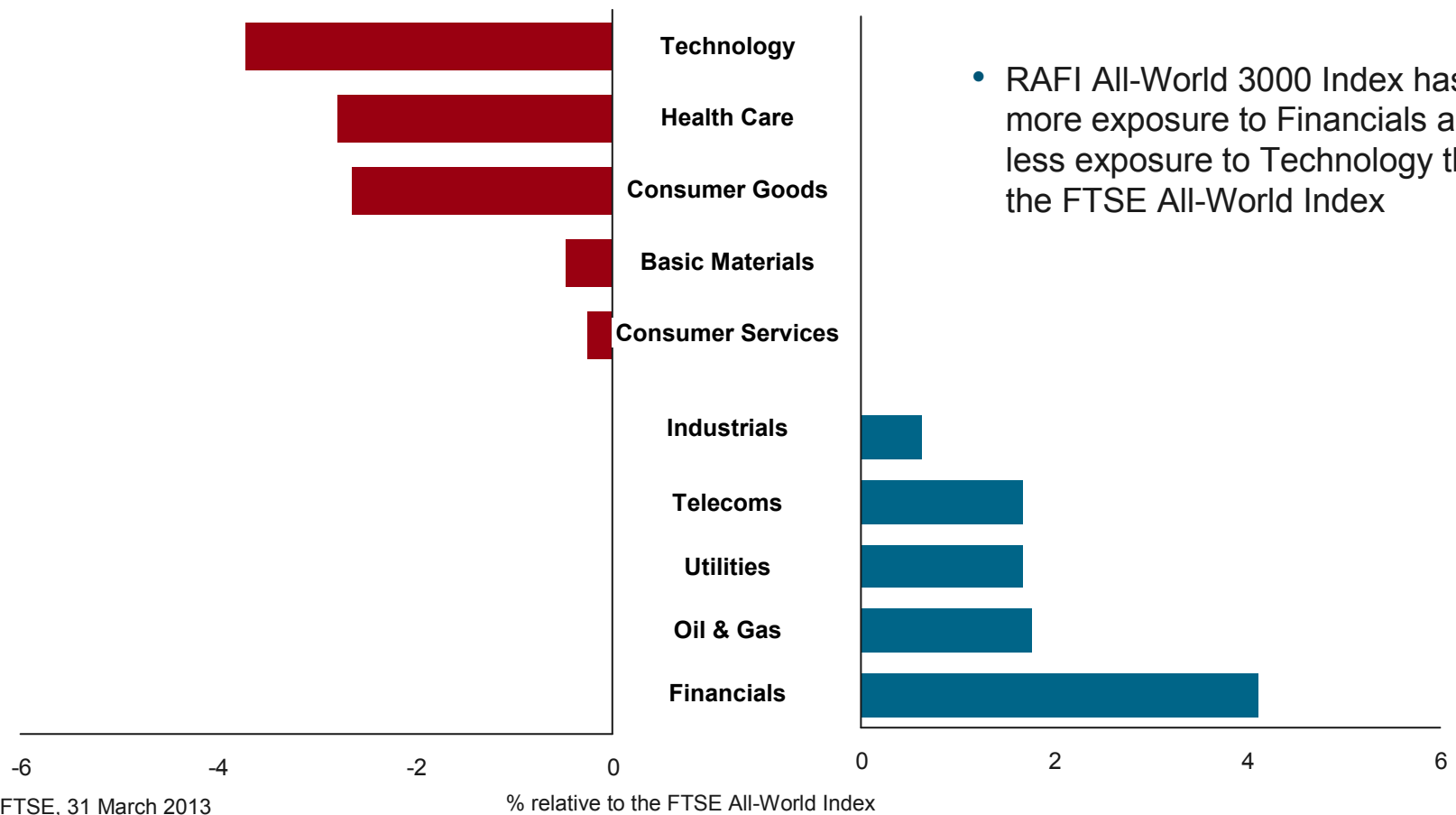
Source: FTSE, 31 March 2013

% relative to the FTSE All-World Index



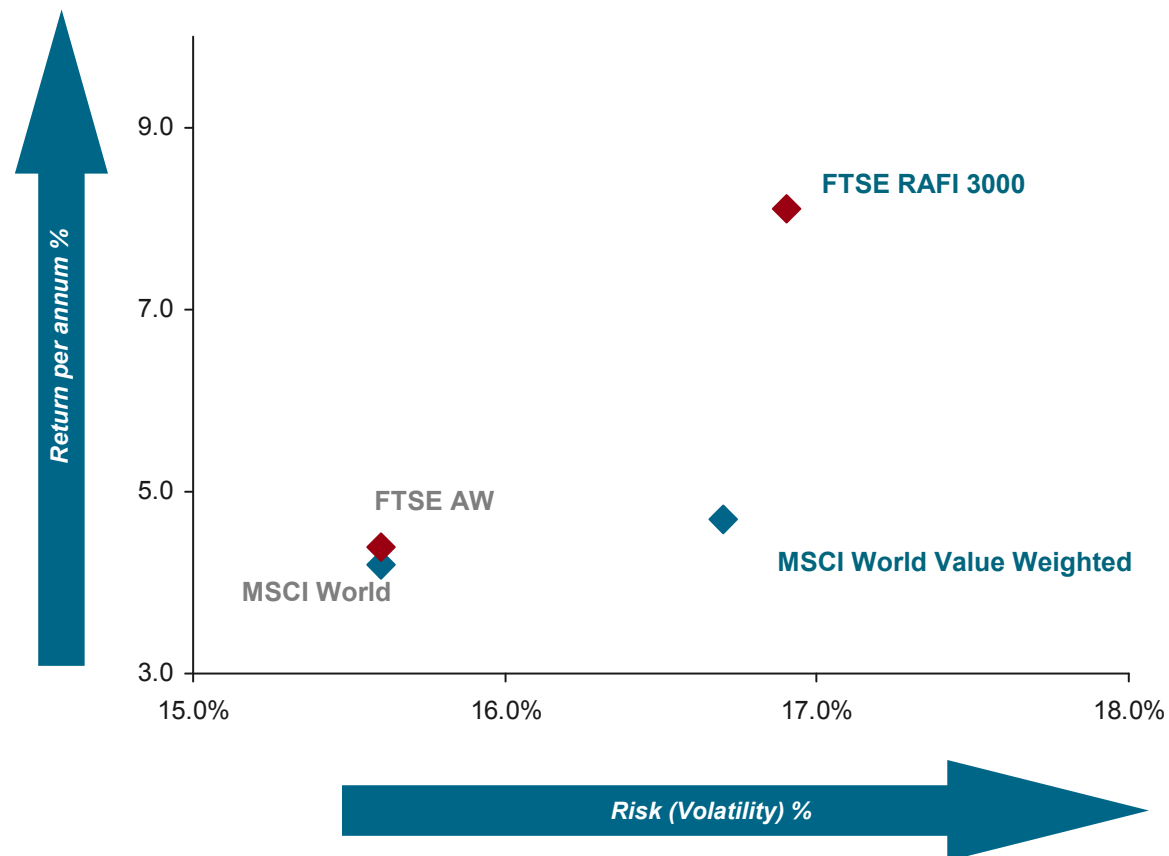
FTSE RAFI 3000 Index vs FTSE All-World Index

Sector analysis





Risk return profile



Index	Return	Risk	Return per unit of risk
MSCI World VW	4.7%	16.7%	0.28
MSCI World	4.2%	15.6%	0.27
RAFI 3000	8.1%	16.9%	0.48
FTSE AW	4.4%	15.6%	0.28

Source: FTSE, MSCI. Index data: June 2001 to March 2013

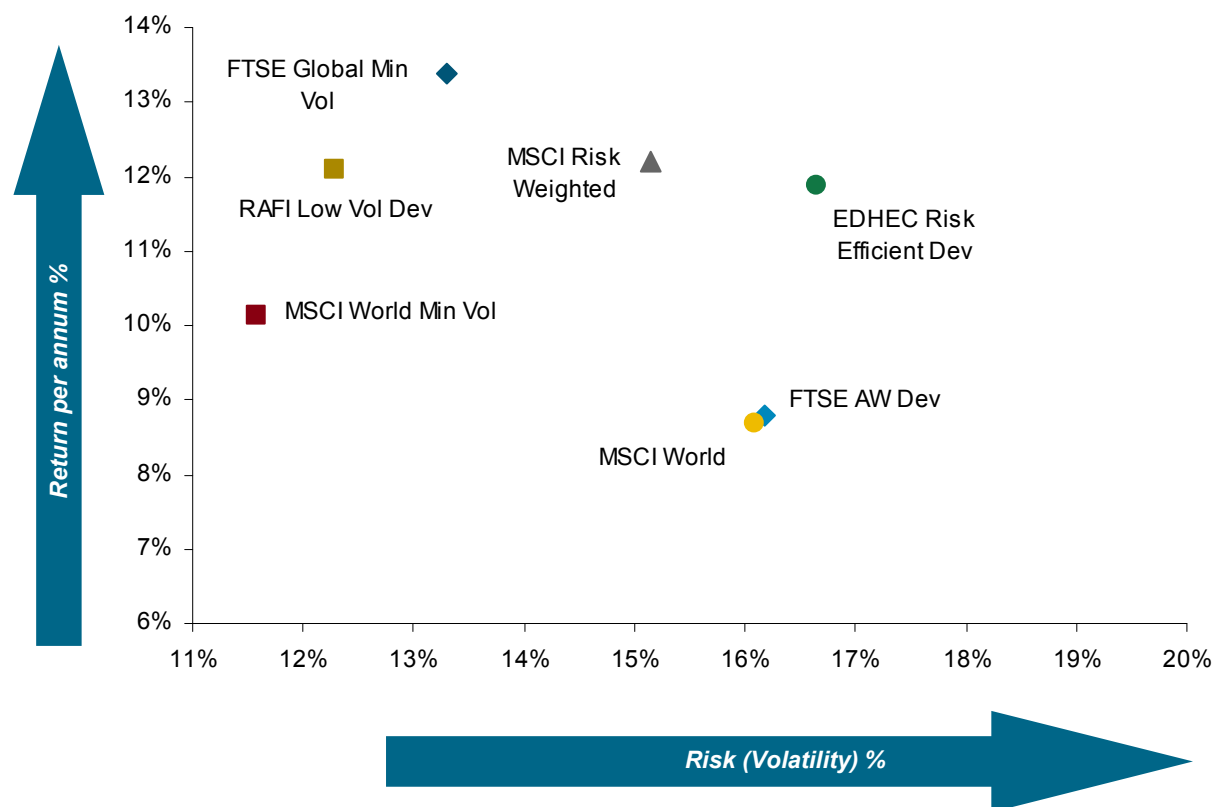


Why volatility weighted indices?

- Empirical evidence has shown low-volatility investing has outperformed broader market over a long-term investment horizon with less realized volatility.
- Introduce controlled level of risk in risk constrained portfolios/investment objectives
- Exhibits risk reducing qualities while maintaining market diversification
- Align with an LDI strategy
- Generally uncorrelated with other investments
- Lower chances of outlier returns
- Reduction in maximum drawdown (Peak to trough)
- Two basic approaches – mean variance optimized and heuristic or rules based.

Alternatively weighted indices

Risk return profile



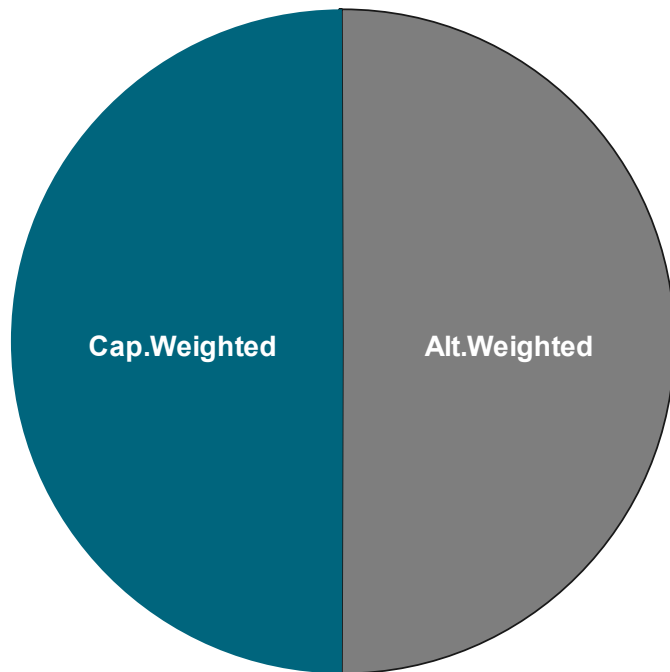
Fund	Return	Risk	Return per unit of risk
FTSE Global Min Vol	13.4%	13.3%	1.01
MSCI World Min Vol	10.1%	11.6%	0.88
MSCI Risk Weighted	12.2%	15.1 %	0.81
RAFI Low Vol Dev	12.1%	12.29%	0.99
Edhec Risk Efficient	11.9%	16.6 %	0.71
FTSE AW Dev	8.8%	16.2%	0.54
MSCI World	8.7 %	16.1%	0.54

Source: FTSE, MSCI, RAFI, LGIM, Datastream, Index data: USD Total Return: 1 January 2003 to 29 March 2013

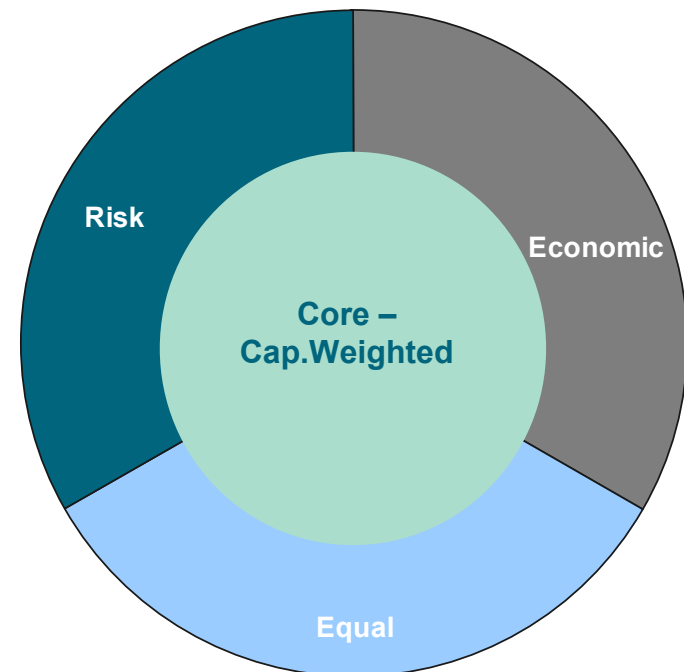


Implementing diversified beta

Hedging your bets – a 50/50 approach



Core/Satellite approach





LGIM alternatively weighted index funds

Fund	Index	AUM £m
FTSE RAFI 3000 Equity Fund	FTSE RAFI 3000 Index	2,201
FTSE RAFI 3000 Equity Fund – GBP Hedged	FTSE RAFI 3000 Index – GBP Hedged	410
FTSE RAFI 1000 Developed Equity Fund	FTSE RAFI 1000 Developed Index	859
FTSE RAFI Emerging Markets Equity Fund	FTSE RAFI Emerging Markets Index	474
FTSE RAFI 3000 North America Equity Fund	FTSE RAFI 3000 North America Index	135
FTSE RAFI 3000 Europe Equity Fund	FTSE RAFI 3000 Europe Index	85
MSCI Value Weighted Developed Equity Fund	MSCI Value Weighted World Index	23
MSCI Value Weighted Developed Equity Fund – GBP Hedged	MSCI Value Weighted World Index – GBP Hedged	102
MSCI Value Weighted Emerging Markets Equity Fund	MSCI Value Weighted Emerging Markets Index	Awaiting seed money
MSCI World Risk Weighted Developed Fund	MSCI World Risk Weighted Index	Awaiting seed money
UK Equity Carbon Optimised Index Fund	UK All-Share Carbon Optimised Index	119

As at 31 March 2013

Index fund management our approach



- Responsible and value-enhancing approach
 - Pragmatic Replication: minimising tracking error whilst maximising returns
 - Significant crossing opportunities created by LGIM's large pooled fund daily flows
- Maximising returns
 - Index changes
 - Stocklending
 - Dividend enhancement
 - Corporate actions



Conclusions

- Capitalisation weighted indices are tried and tested benchmarks

- Long history
- Wide range
- Understood throughout the world

but

- Prone to concentration risk
- Overweight expensive stocks, underweight undervalued stocks

- Alternatively weighted (thematic) indices becoming increasingly popular

- Backed by significant academic research
- Avoid concentration risks and minimise volatility

but

- More complex than traditional indices
- Added costs
- No proven long-term record of outperformance

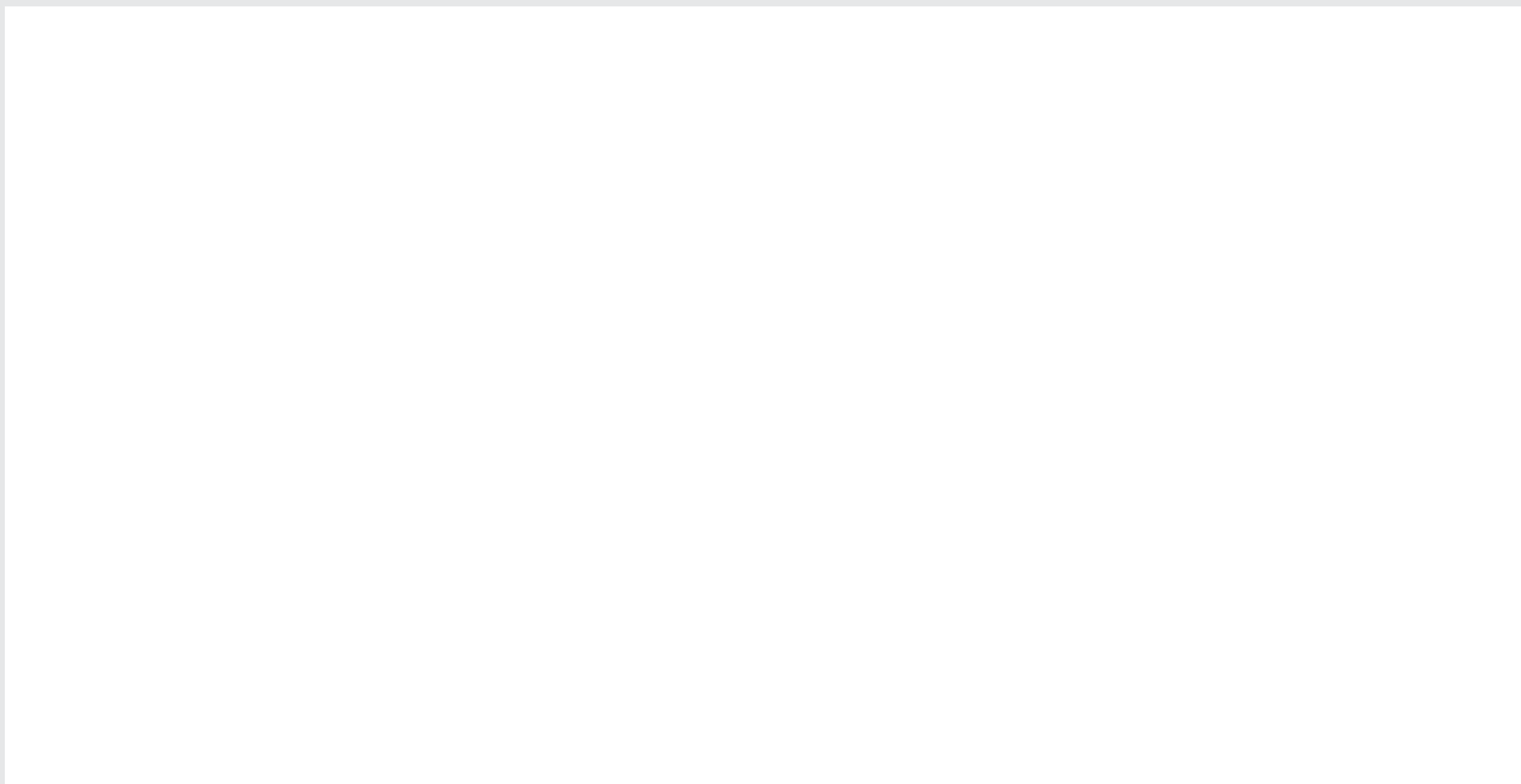
Beware of Emperor's New Clothes



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Appendix





Valuation and activity – Last 12 Months

Investment Fund	Mid Value at 01 Jun 2012		New Money	Encashments	Switches Out	Switches In	Mid Value at 03 Jun 2013	
	GBP	%	GBP	GBP	GBP	GBP	GBP	%
UK Equity Index	-	-	63,810,052	-	-	-	80,918,449	38.5
World (ex UK) Dev Equity Index	110,845,860	100.0	-	(12,141,348)	-	-	129,121,806	61.5
Total	110,845,860	100.0	63,810,052	(12,141,348)	-	-	210,040,255	100.0

Investment performance to 30th May 2013

Investment Sector Fund	3 months			12 months			Since Inception		
	Fund %	Index %	Dev %	Fund % p.a.	Index % p.a.	Dev % p.a.	Fund % p.a.	Index % p.a.	Dev % p.a.
UK Equity Index*	+5.0	+5.0	+0.0	+30.2	+30.1	n/a	+11.6	+11.5	+0.1
World (ex UK) Dev Equity Index**	+5.7	+5.7	+0.0	+30.5	+30.4	+0.1	+13.1	+13.0	+0.1
Total Assets	+5.4	n/a	n/a	+29.1	n/a	n/a	+11.8	n/a	n/a

Inception dates: * 24th November 2010; ** 1st December 2010



Tracking performance for flagship equity index funds

	Mar 2008 to Mar 2009 %	Mar 2009 to Mar 2010 %	Mar 2010 to Mar 2011 %	Mar 2011 to Mar 2012 %	Mar 2012 to Mar 2013 %	3yrs % p.a.	5yrs % p.a.	10yrs % p.a.	Target TE % p.a.	Info Ratio 5 yrs
UK	+0.21	+0.69	+0.16	+0.12	+0.10	+0.12	+0.23	+0.13	±0.25%	1.81
North America	+0.14	+0.32	+0.05	+0.04	+0.11	+0.06	+0.13	+0.12	±0.50%	1.63
Europe (ex UK)	+0.47	+0.40	+0.34	+0.23	+0.17	+0.25	+0.34	+0.29	±0.50%	2.02
Japan	+0.19	+0.26	+0.22	+0.09	+0.11	+0.15	+0.18	+0.24	±0.50%	0.69
Asia Pacific (ex Japan) Dev.	+0.77	+1.15	+0.42	+0.07	+0.21	+0.22	+0.51	+0.55	±0.75%	2.59
Emerging Markets	+1.31	+0.45	+0.16	+0.10	+0.19	+0.15	+0.53	-	±1.50%	1.00
World (ex UK)	+0.26	+0.43	+0.16	+0.08	+0.12	+0.12	+0.20	+0.20	±0.50%	2.49

All comparisons before fees. Annual performance for rolling 12 months ending 31 March. Cumulative performance to 31 March 2013. Performance is against the funds' benchmarks. More details available on request.



Tracking performance for flagship bond index funds

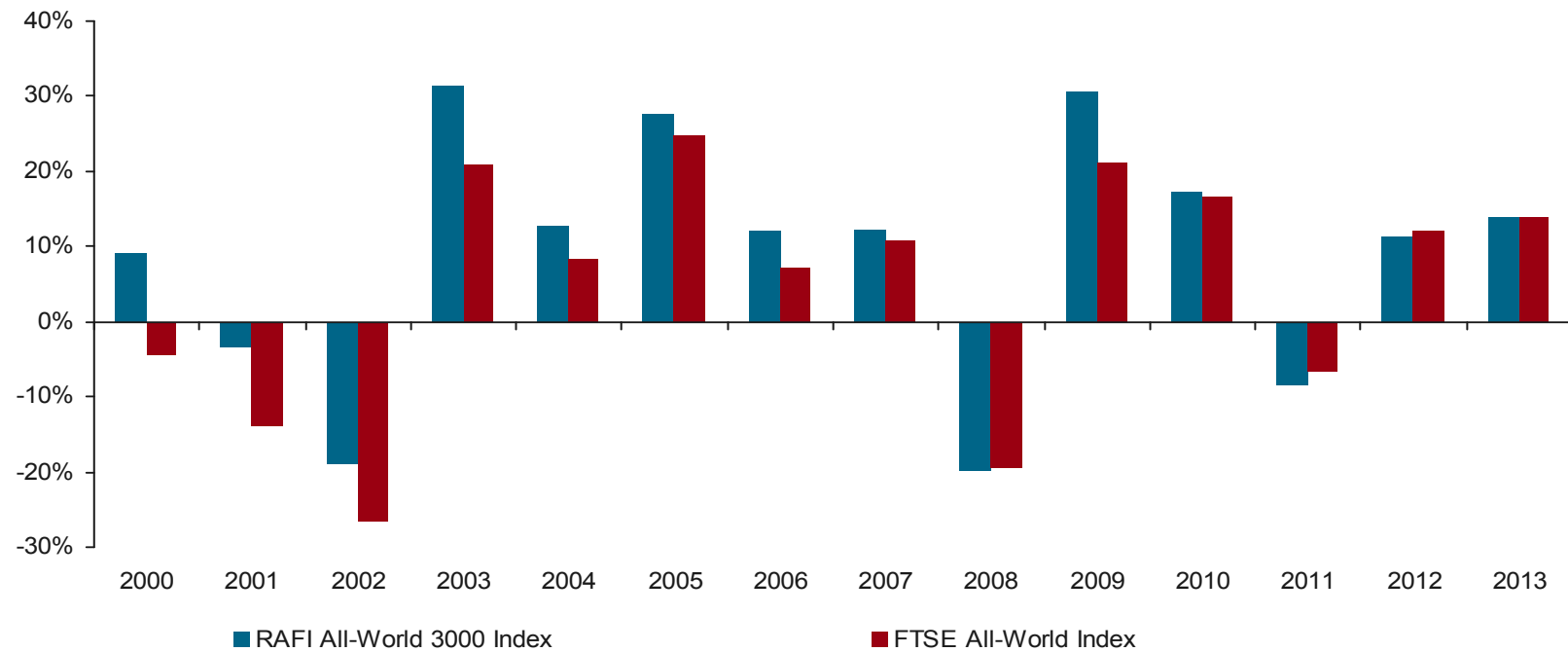
	Mar 2008 to Mar 2009 %	Mar 2009 to Mar 2010 %	Mar 2010 to Mar 2011 %	Mar 2011 to Mar 2012 %	Mar 2012 to Mar 2013 %	3yrs % p.a.	5yrs % p.a.	10yrs % p.a.	Target % p.a.
Over 15 Year Gilts	+0.06	+0.02	+0.04	+0.02	-0.01	+0.02	+0.03	+0.01	±0.25%
All Stocks Gilts	+0.06	-0.01	+0.02	-0.01	-0.03	-0.01	+0.00	+0.02	±0.25%
Over 5 Year Index-Linked Gilts	-0.01	+0.07	+0.07	+0.02	+0.05	+0.05	+0.04	+0.04	±0.25%
All Stocks Index-Linked Gilts	-0.09	+0.03	+0.05	+0.03	+0.06	+0.04	+0.02	+0.03	±0.25%
Investment Grade All Stocks*	+0.28	-0.09	+0.02	+0.13	+0.25	+0.13	+0.13	-	±0.50%
AAA-AA-A All Stocks	+0.28	-0.25	+0.04	+0.15	+0.19	+0.12	+0.09	+0.10	±0.50%
AAA-AA-A Over 15 Years	+0.47	+0.03	+0.13	+0.38	+0.12	+0.22	+0.23	+0.16	±0.50%

All comparisons before fees. Annual performance for rolling 12 months ending 31 March. Cumulative performance to 31 March 2013. * 5 yrs only available. Performance is against the funds' benchmarks. More details available on request.



FTSE RAFI 3000 Index vs FTSE All-World Index

Annual performance



Source: FTSE, 31 March 2013



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