



ACTUARIAL
 SOCIETY
OF SOUTH AFRICA

QUANTIFYING RISK, ENABLING OPPORTUNITY

Risk Sensitive Benchmarking

Agenda

- Shortcomings of traditional benchmarking.
- Sources of alpha: Return Factors
- Alternative benchmarks suggested by William Sharpe.
- How do we apply this in South Africa?
- Comparison between approaches.
- Retirement reform.
- Potential benefits for investors.



Equity Mandate Benchmarking

- Most equity funds use either the All Share Index (ALSI) or the Shareholders Weighted Index (SWIX) as benchmark.
- A fund that is structurally exposed to small caps for example should outperform the overall market benchmarks, but at higher risk.
- Comparing returns to market benchmark will not reflect this additional risk.
- Benchmark risk must equal fund risk.



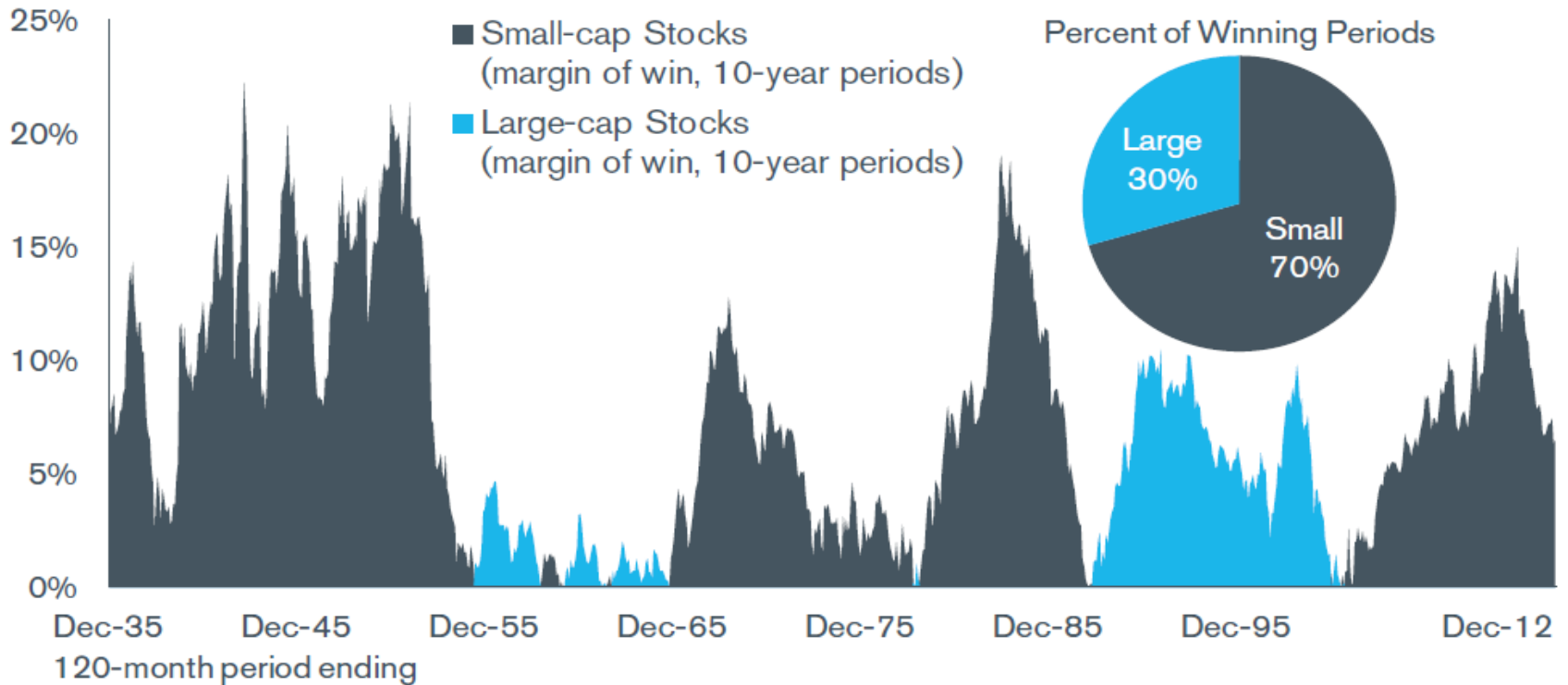
Excess Return Risk Premia

- Why does bias towards small caps provide return benefit?
 - Investor is compensated for lower liquidity, higher company risk and higher cost of equity.
- Risk is a valuable source of return
- Harvesting of various risk premia can offer returns in excess of risk free rate:
 - Credit risk
 - Liquidity risk
 - Value
 - Small Caps
 - Momentum
 - Earning surprises / revisions
 - Book to Market Value



Excess Return – Small Caps (USA)

10-year periods



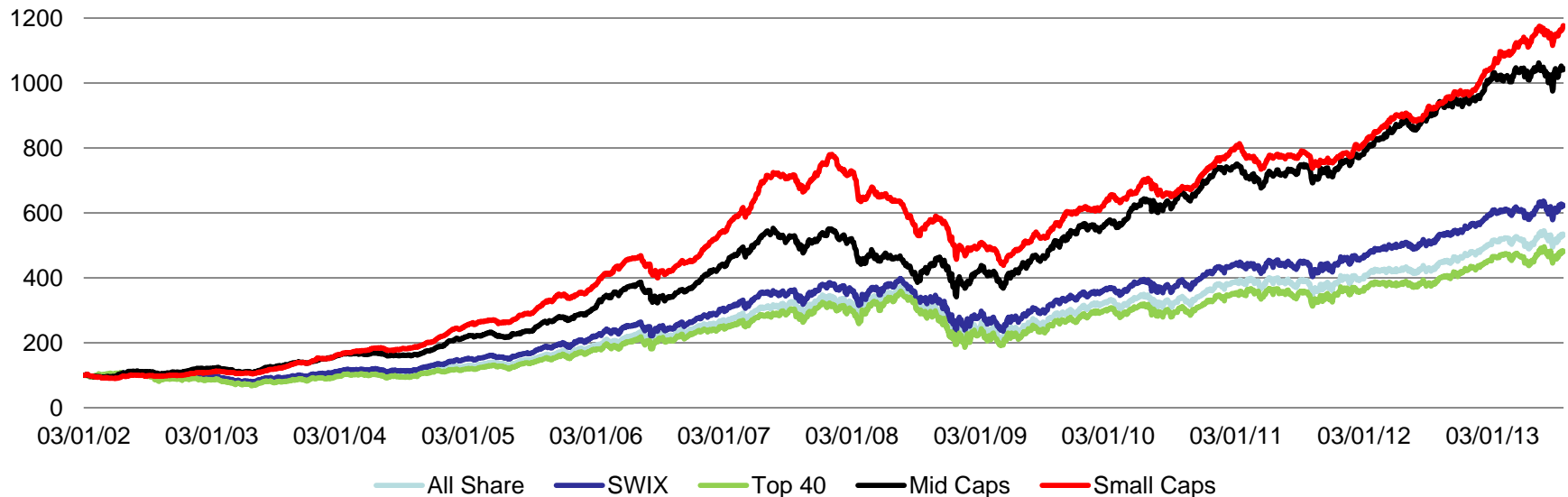
Source: 2013 Duff and Phelps Risk Premium Report



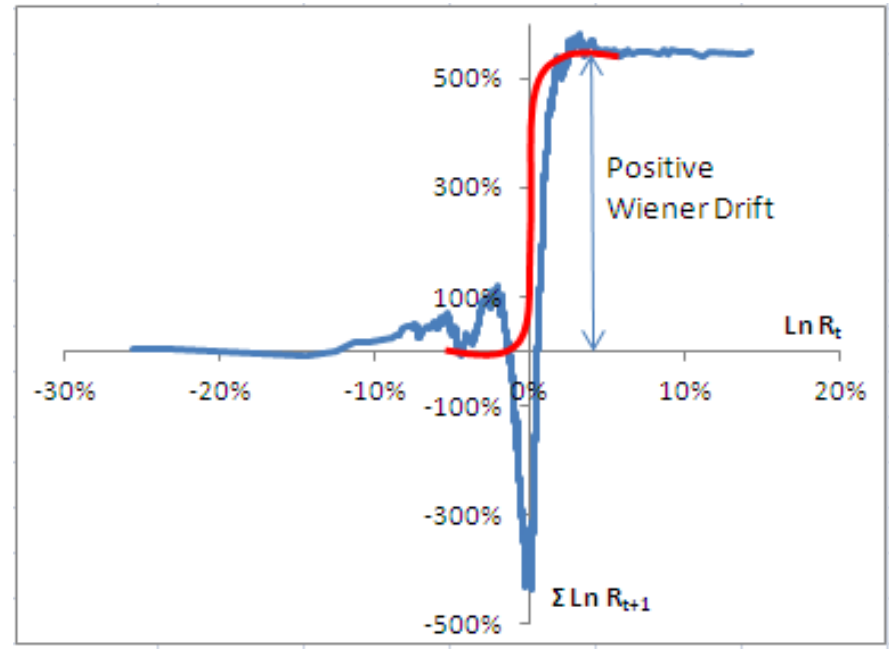
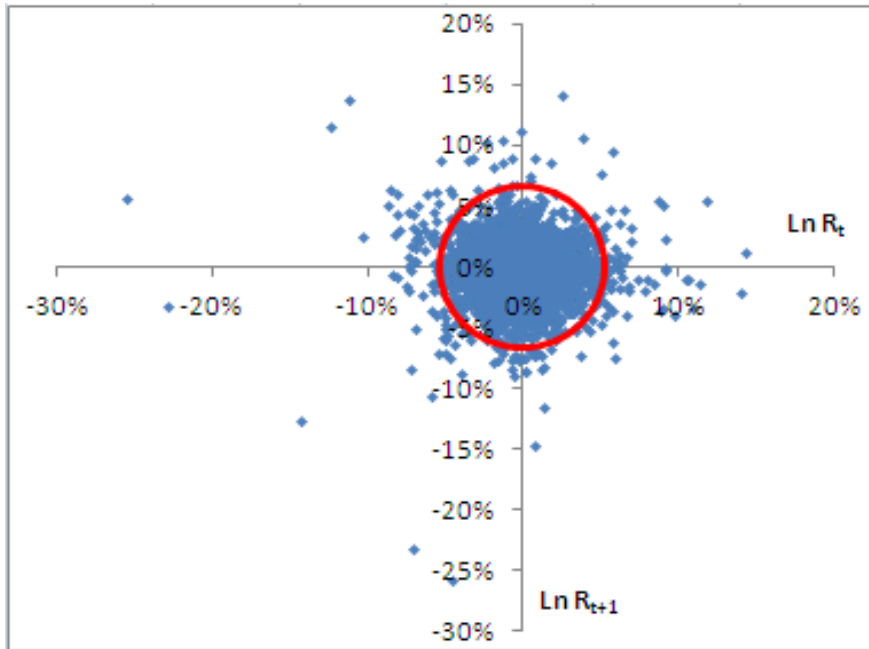
Excess Return Small and Midcaps (SA)

- Most equity portfolios use either the All Share Index (ALSI) or the Shareholders Weighted Index (SWIX) as benchmark.

Performance comparison



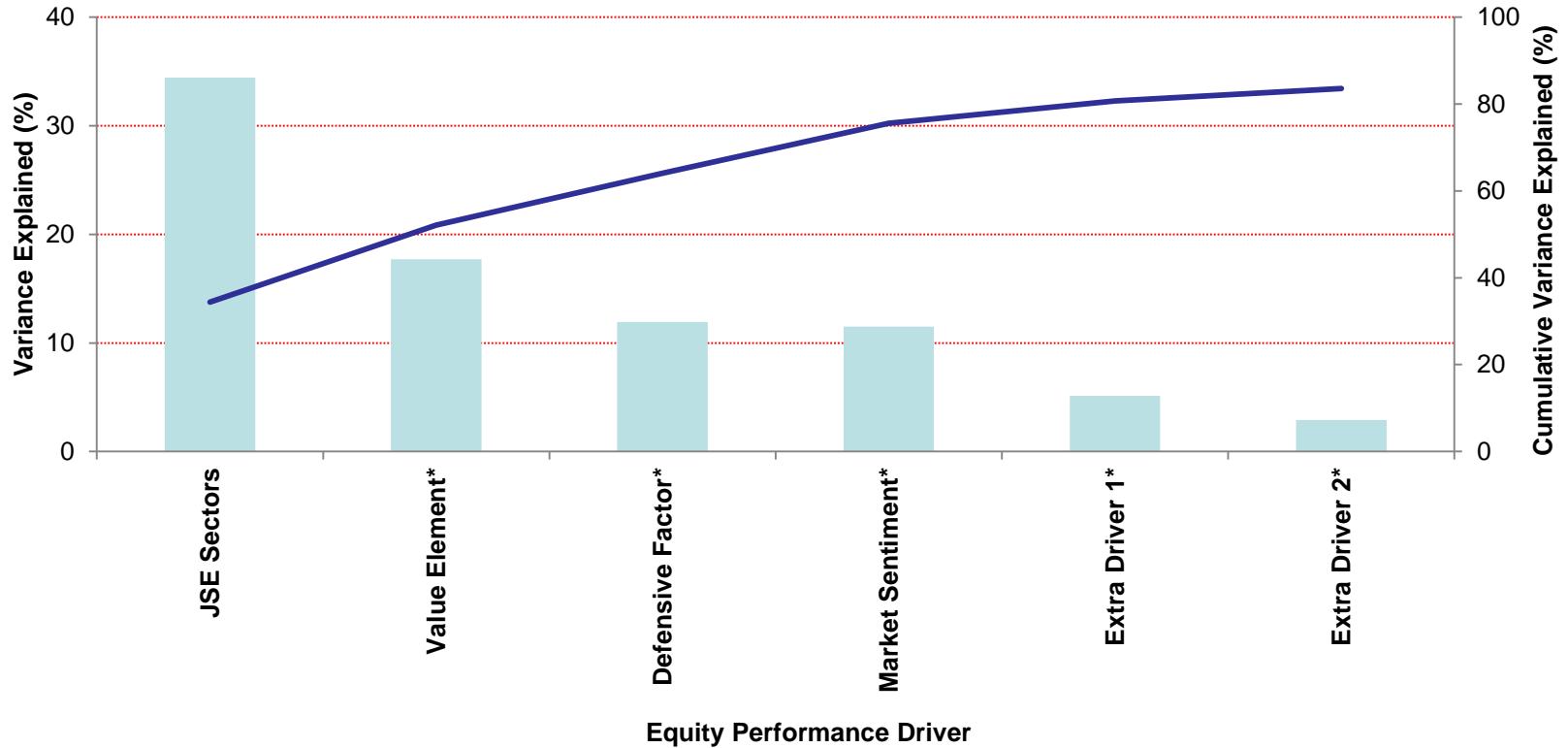
Excess Return - Rationale



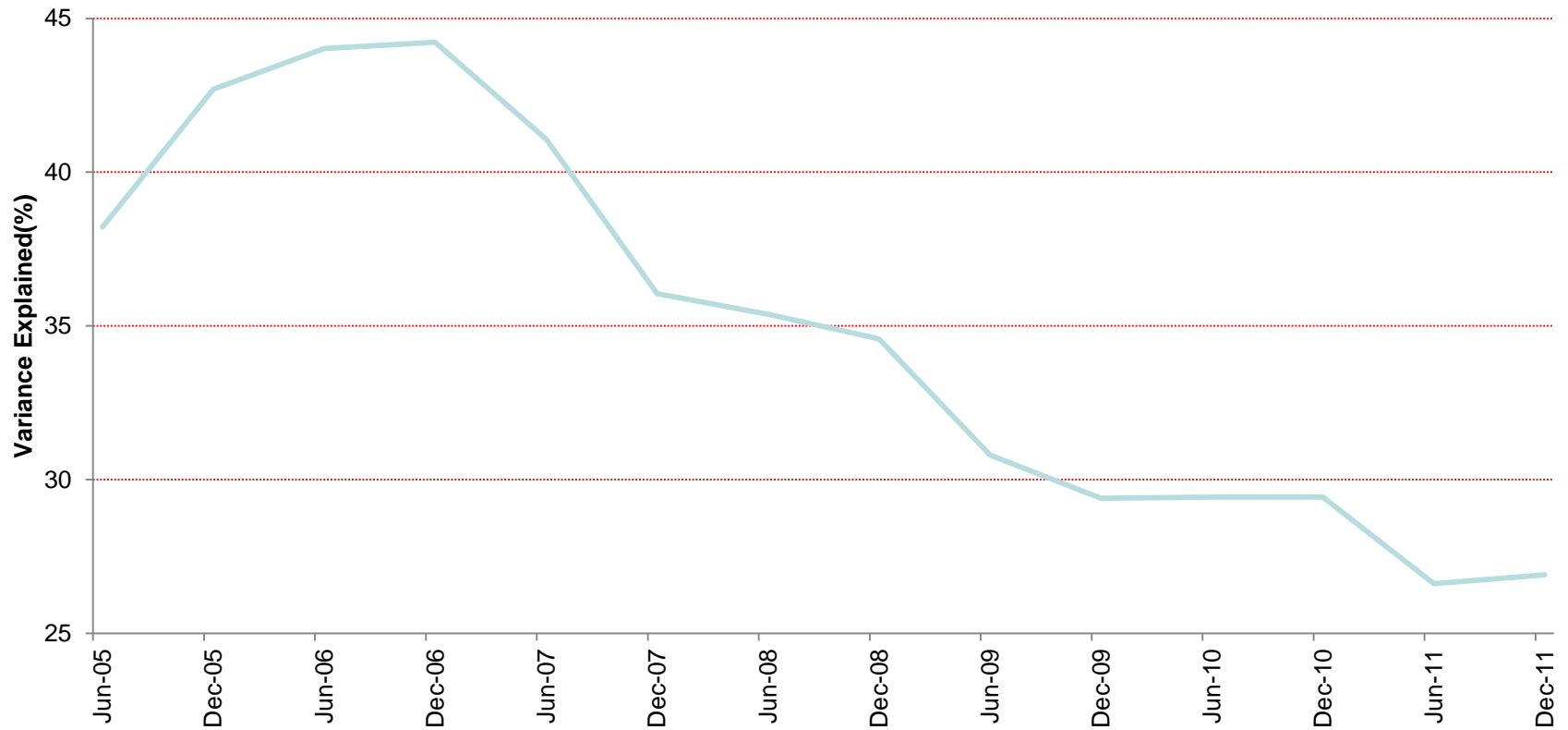
- Expectation that Log Returns are normally distributed
- Daily returns on the Dow Jones since 1900 suggest a dependency exists on price returns
- Shares below -2.2% suggest a non random mean reversion (Value Component)
- Strong Momentum or market sentiment (both positive and negative) exists
- Other constructs such as statistical minimum variance or defensive excess returns exist



Principal Component Analysis



Principal Component Analysis – Sector Component



Factor Identification

- In choosing style driven Factors ideally one should:
 - Choose style constructs are as independent of one another as possible – mutually exclusive
 - That are uncorrelated with one another
 - As exhaustive as possible
 - Have returns that differ
- As a driver of out performance in the SA equity market we identify
 - Value – FTSE/JSE dividend plus index as proxy
 - Momentum – Barclays Capital South African Momentum Index
 - Defensive – Fundamental Free Cash Flow construct (could do with further refinement with an additional filter on minimum volatility)
 - Property (high yield/carry proxy) – FTSE/JSE Property Index
- Excess Return Series (extract SWIX total Return) shows general negative correlation

	Value (Dividend Plus)	Property (Property Index)	Defensive (Free Cash Flow)	Momentum (Barcap)
DIVI +	1.00	-0.20	-0.11	-0.25
Property Index	-0.20	1.00	-0.47	0.76
FCF	-0.11	-0.47	1.00	-0.47
Mom	-0.25	0.76	-0.47	1.00



Factor Models in Modern Finance

- Multi Factor linear models have become extremely popular in Model Financial Engineering
- These models have become very popular in Risk Management, Portfolio Construction, Fundamental Research and Asset Management

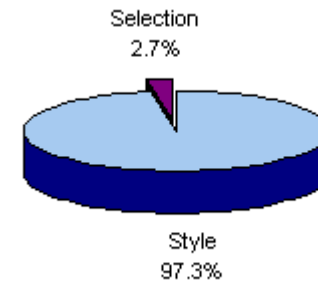
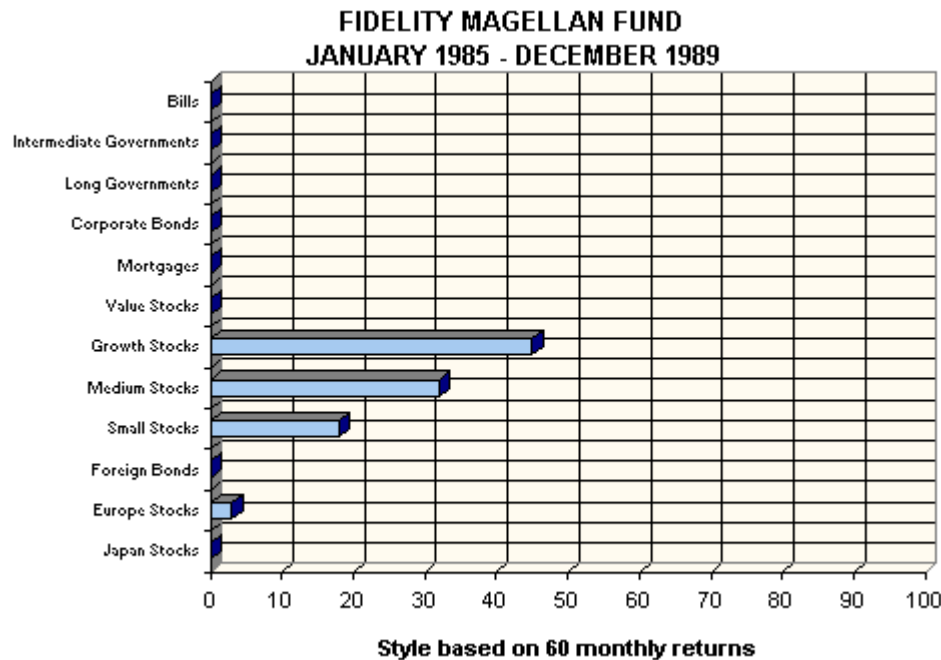
- $$\tilde{R}_i = [b_{i1}\tilde{F}_1 + b_{i2}\tilde{F}_2 + \dots + b_{in}\tilde{F}_n] + \tilde{e}_i \quad (1) \quad (\text{Sharpe 1992})$$

- Where:
 - R_i = Return of a specific investment
 - F_{1-n} = Represents the Factor
 - $b_{i(1-n)}$ = Represents the weighting
 - e_i = Residual Error Term
- In an asset class factor model describing returns $\sum b_i = 1$
- Sharpe solved for $\tilde{e}_i = \tilde{R}_i - [b_{i1}\tilde{F}_1 + b_{i2}\tilde{F}_2 + \dots + b_{in}\tilde{F}_n]$ in the mutual fund space
- This developed a style based analysis and a overall risk comparative benchmark
- Used out of sample R^2 analysis as an indicator of “goodness of fit” and explanation of residual style component of manager
- Sharpe suggests using a quadratic convex optimization approach over mean variance and gradient decent methods



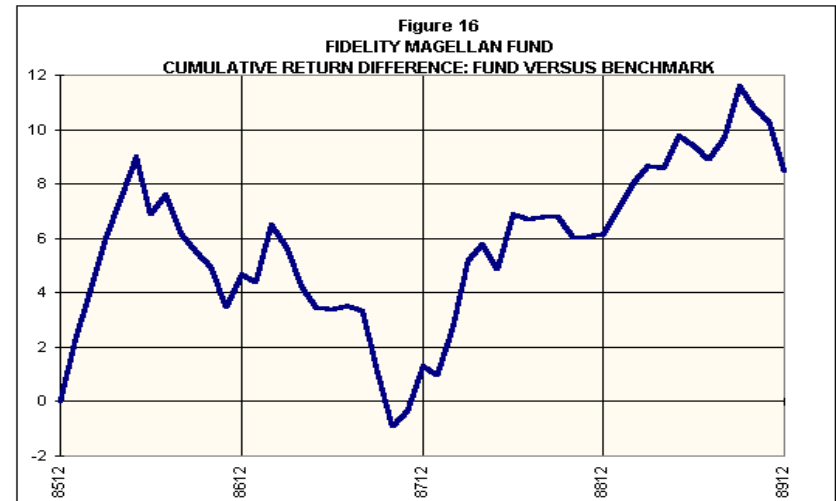
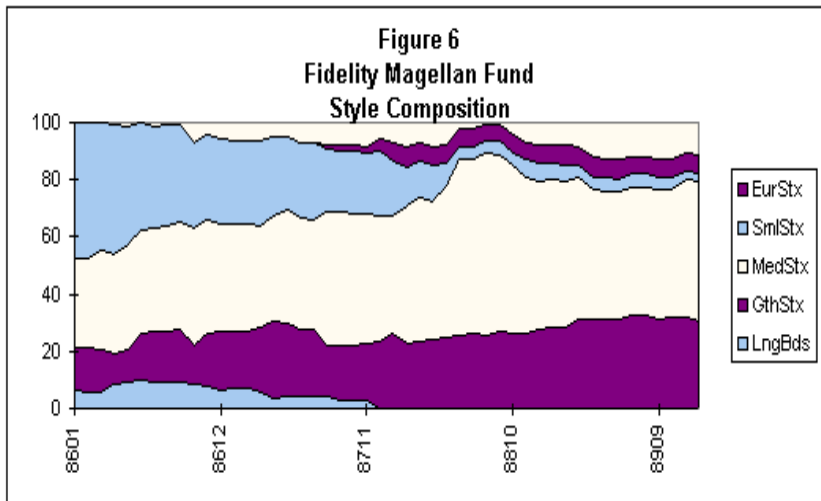
Factor Models in Modern Finance

- Sharpe fitted 60 months of data to a given managers returns, residual accounts for style.



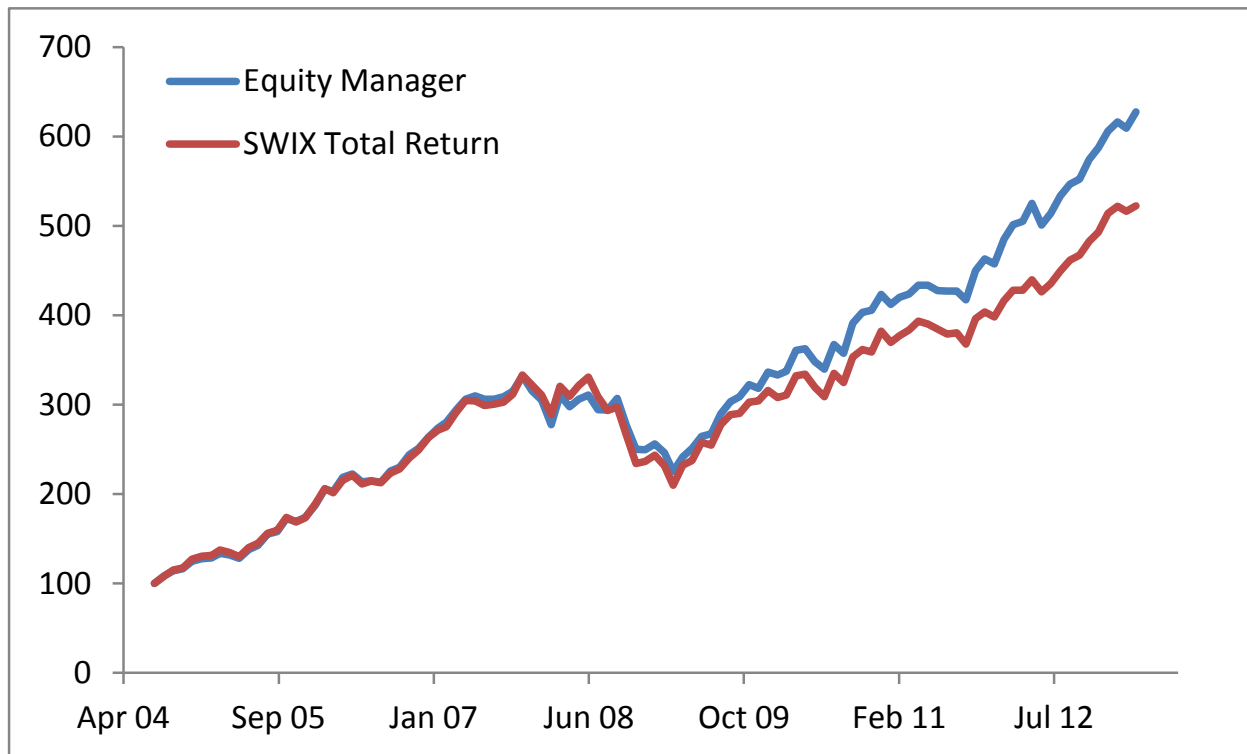
Factor Models in Modern Finance

- By generating rolling periods one is able to gauge what specific risks the manager is taking
- Furthermore this gives a more consistent benchmark than a general index as is cognisant of the inherent risks that the manager is taking
- Here the manager began to take more exposure to large stocks and less to small stocks as a result of growth of AUM
- A comparison of performance versus the risk benchmark shows excellent management



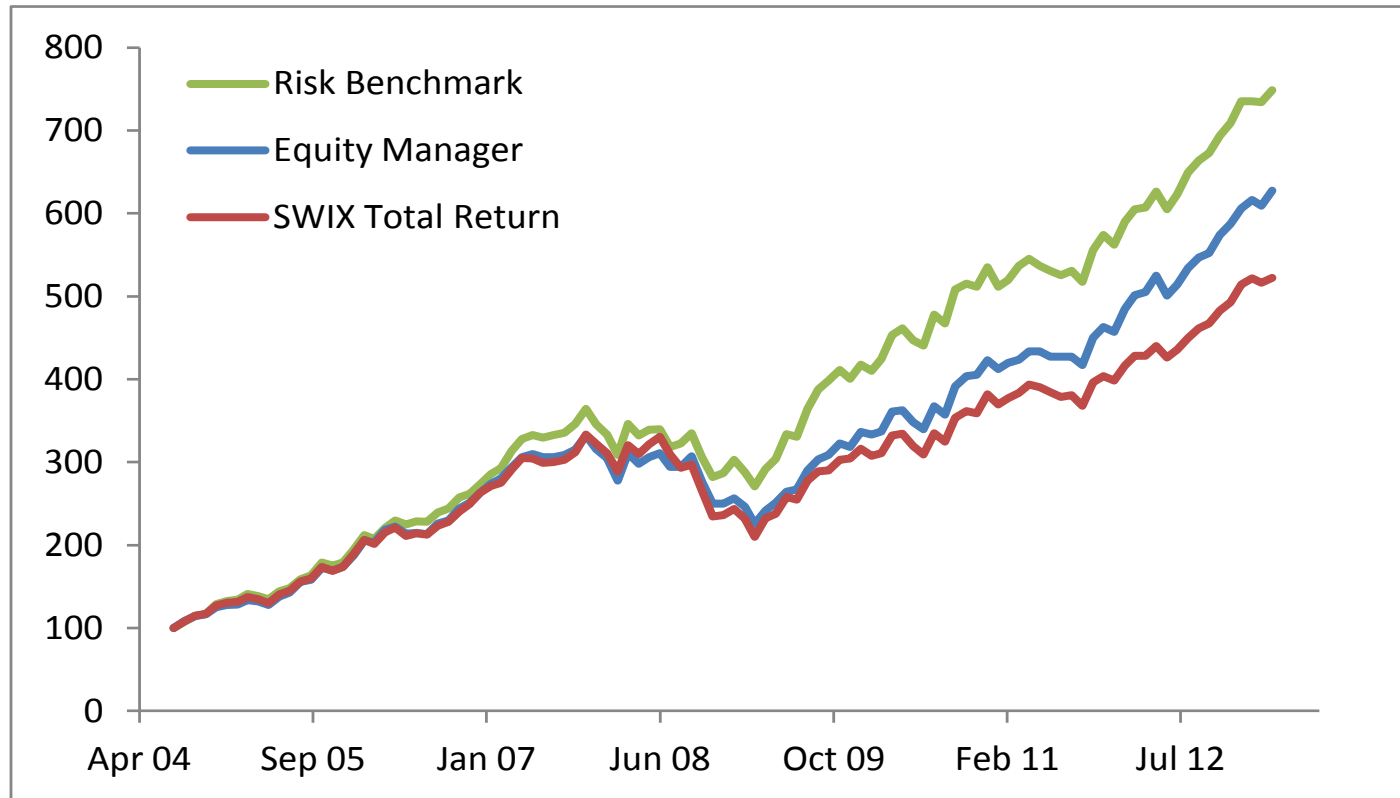
Benchmarking – Factor Attribution

- By combining the out performance factors identified in the South African equity space it is possible to create a benchmark for active equity managers
- Use 24 months of data rather than 60 months, this keeps the statistical significance but is more practically sensitive to manager changes
- The manager has performed in line with SWIX but what risk are they taking?



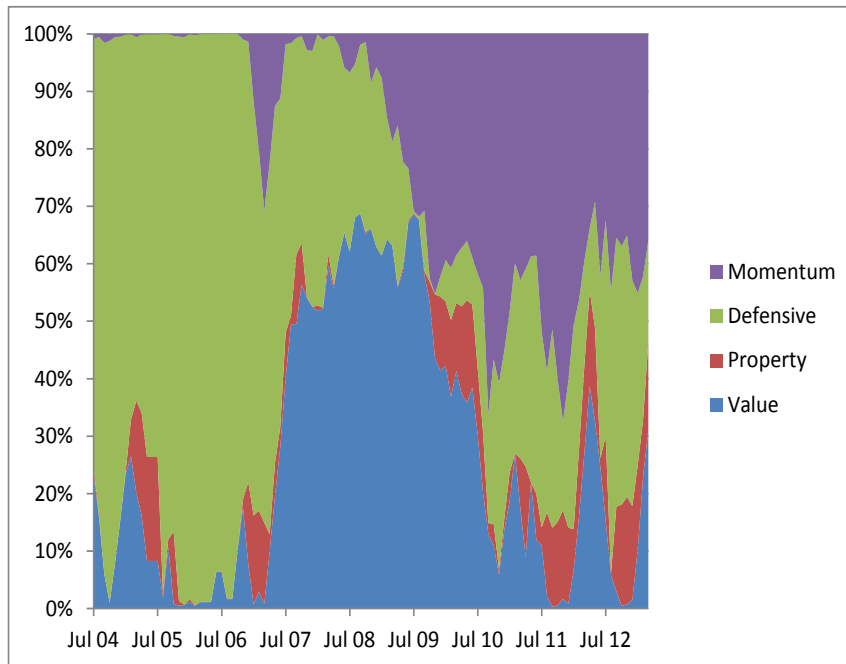
Benchmarking – Factor Attribution

- Analysis suggest although the manager out performed the Market Capitalisation SWIX benchmark, they did not manage to perform in line with the composite risk benchmark
- Should the manager be paid performance fees?



Benchmarking – Factor Attribution

- Composite breakdown of the allocations may offer insight into change in manager behaviour
- This may be as a result of practical issues (increase in size of portfolio, manager skill) but may also be useful in mandate compliance – increase in Momentum?
- Out of sample R^2 suggest that roughly 92% of the return can be attributed to the underlying factors with 8% being manager style.
- In this case style has a deleterious effect on performance



Retirement Reform Context

- In July National Treasury released a paper entitled “Charges in South African retirement funds”.
 - By way of international comparison charges were found to be too high.
 - Active versus passive debate discussed from a fee perspective.
 - “To outperform benchmarks, many funds may take on extra risk”
 - Comparison was provided between different countries on a standard benchmarking methodology as well as four factor benchmark.
 - Four factors used were:
 - Market returns,
 - Size (smaller firms typically outperform larger ones),
 - book-to-market (value firms outperform growth firms),
 - and momentum (there is some persistence in individual stock returns).



Retirement Reform – Benchmark comparison

Selected countries	Percentage of Funds reporting positive:	
	Benchmark adjusted returns (net of fees)	Four factor benchmark adjusted returns (net of fees)
USA	47.5	34.5
UK	48.2	35.7
Asia Pacific	49.4	36.2
Germany	51.0	42.6
France	52.2	41.3
Netherlands	54.6	46.5
Canada	39.2	37.0
Portugal	52.3	36.2
All countries (21)	46.7	36.2

Source: National Treasury, Cremers et al (2011)



Benefits

- Measures value add of manager relative to risk sensitive benchmark.
- Represents an alternative approach to passive investing that can harvest risk premia over time.
- Mandate monitoring.
- Represents an investable benchmark.
- Risk Benchmarking is fully investable.
- Can be accessed by investors at very competitive fees.



Thank you!

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