

# Why doesn't Skill = Outperformance?

**Jason MacQueen**

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# Do Active Managers have Skill?

- It is often said that the markets are so efficient that they are impossible to beat consistently
- It is also said (most often by finance academics) that active managers don't (or even can't!) have Skill
- Their 'proof' is the fact that very few managers outperform their benchmarks consistently . . .
- . . . even though this flies in the face of common sense
- Active managers don't generate better performance because they don't manage their portfolio risk properly
- So the returns due to their Skill are lost in the Noise from their unintended bets

# What is Active Management?

- To a Quant, active management consists of either making factor bets, or stock specific bets, or both
- Active managers often cite 'Stock Selection' as the main source of their added value, but this is inherently ambiguous
- Every stock will have some exposure to common factors, even if only to the market; more typically, stocks will have exposures to industry and style factors as well
- And, of course, every stock will have its own idiosyncratic stock specific risk that is uncorrelated with other stocks

# The Risk Structure of Actively-managed Portfolios

- The stocks that a manager selects are held in a portfolio
- Portfolios, like individual stocks, are therefore exposed to common factors and to idiosyncratic stock specific risk
- However, while stock specific risk gets diversified away fairly quickly in a portfolio, factor risks tend to compound
- The practical result is that the factor bets are usually much bigger determinants of portfolio performance than the net effect of individual stock's idiosyncratic alphas
- For clarity, we should note, *en passant*, that much of what is usually claimed as 'alpha' is, in fact, factor-related performance

# Skill in Active Management

- Seen in this light, active management is primarily about having views on the expected return to various factors, and then making sure the portfolio's exposures to those factors reflect the manager's views
- Clearly, pure stock specific alpha can contribute as well
- Value tilts, Size tilts, Momentum tilts, Market and Industry tilts are all examples of factor tilts
- We can usefully think of factor **Skill** as the ability to get expected factor returns right more often than not
- Notice that even getting the sign of some factor returns right is a form of Skill which can improve performance

# What can go Wrong if a Manager has Skill?

- Having **Skill** is a necessary but not sufficient requirement for generating portfolio outperformance
- Remember that stocks held in a portfolio will be exposed to many other factors in addition to those on which the manager has beliefs about their expected returns
- A portfolio's performance will be the net result of all these factor return contributions, together with the net stock alpha
- However, managers typically only have strong views about a relatively small number of factors
- We can then think of the portfolio return contributions from all the other factor exposures as **Noise**

# It's not a Lack of **Skill**, it's Too Much **Noise**

- A low Signal to Noise ratio in almost any environment makes it very difficult to discern the true Signal
- In Actively-managed portfolios, the Noise returns can often mask the Skill returns, so that there seems to be no evidence that the manager actually has any Skill
- We have built many customised risk models, which have the particular benefit of being able to explicitly identify and quantify the bets that an active manager is making
- We have found that, on average, around 50% of active managers risks relative to their benchmark consists of unintended bets - in other words, Noise!

# Don't Active Managers try to Minimise Noise?

- Yes, of course.
- A manager whose investment process consists of picking High Yield, Small Cap stocks may well want to be neutral with respect to Sector bets, for example
- This is usually done by ensuring that the Portfolio Sector weights match the Benchmark Sector weights closely
- Unfortunately, this does a very poor job of eliminating the unwanted Noise, because :-

**WEIGHT does not equal EXPOSURE !!**



# Portfolio Return in a Multi-factor Framework

- *Ex post* Portfolio Return in a multi-factor framework over a single holding period can be written as :-

$$R_{Pt} = \alpha_P + \sum_{f=1}^K \beta_{Pf} R_{ft}$$

where

$$\alpha_p = \sum_{i=1}^N p_i \alpha_i \text{ and } \beta_{pf} = \sum_{i=1}^N p_i \beta_{if}$$

# Portfolio Return in terms of Weights?

- It is not usually possible to write a corresponding expression for *ex post* Portfolio Return in terms of the portfolio's weights in industries or countries
- Conceptually, this could only be done if each of the holdings was a single industry or country (ETFs ?), and the weights added up to 1
- Then we would have :-

$$R_{Pt} = \sum_{g=1}^M w_{Pg} R_{gt} \quad \text{and} \quad \sum_{g=1}^M w_{Pg} = 1$$

- However, this is rarely the case in practice

# A Special Case

- Some fundamental risk models use dummy variables as stock betas to currency, country or industry factors
- In this case, the resulting portfolio betas will, of course, correspond directly to the weight of the respective holdings in the portfolio, so a weight of 15% in Banks will give a portfolio beta to Banking of 0.15
- However, this is merely identifying a stock as being in a particular industry rather than trying to estimate its sensitivity to the industry factor
- As we know perfectly well, being 100% invested does not always mean you have a market beta of 1.00

# Estimating Stock Exposures & Portfolio Betas

- We can estimate stock sensitivities to these kinds of factors by running time-series regressions of stock returns against the corresponding factor returns
- We employ a number of techniques, including the use of Bayesian priors and statistical significance checking to try to minimise the estimation errors in these betas
- Note also that the estimation errors in the individual stock betas will themselves be diversified away to some extent when we calculate the portfolio betas

## But are the betas really different from 1.00?

- All multi-factor equity risk models make assumptions about the structure underlying the total covariance matrix
- Even though it may seem reasonable to assume that stock returns are driven by their sensitivity to these kinds of factors, we are still assuming that these sensitivities are meaningfully different from 1.00
- We ran an interesting experiment to see if there really was something real (and different from  $\beta = 1.00$ ) buried in the covariance structure
- We called it Frankenstein's Model . . . .

## But first : Scowcroft & Sefton (2001)

- Scowcroft & Sefton built three sets of risk models for the same set of stocks, using time-series regressions to estimate stock betas, cross-sectional regressions to estimate factor returns, and a pure statistical factor model
- They then tested them out of sample to see which methodology gave the best forecasts of portfolio risk. The result ?

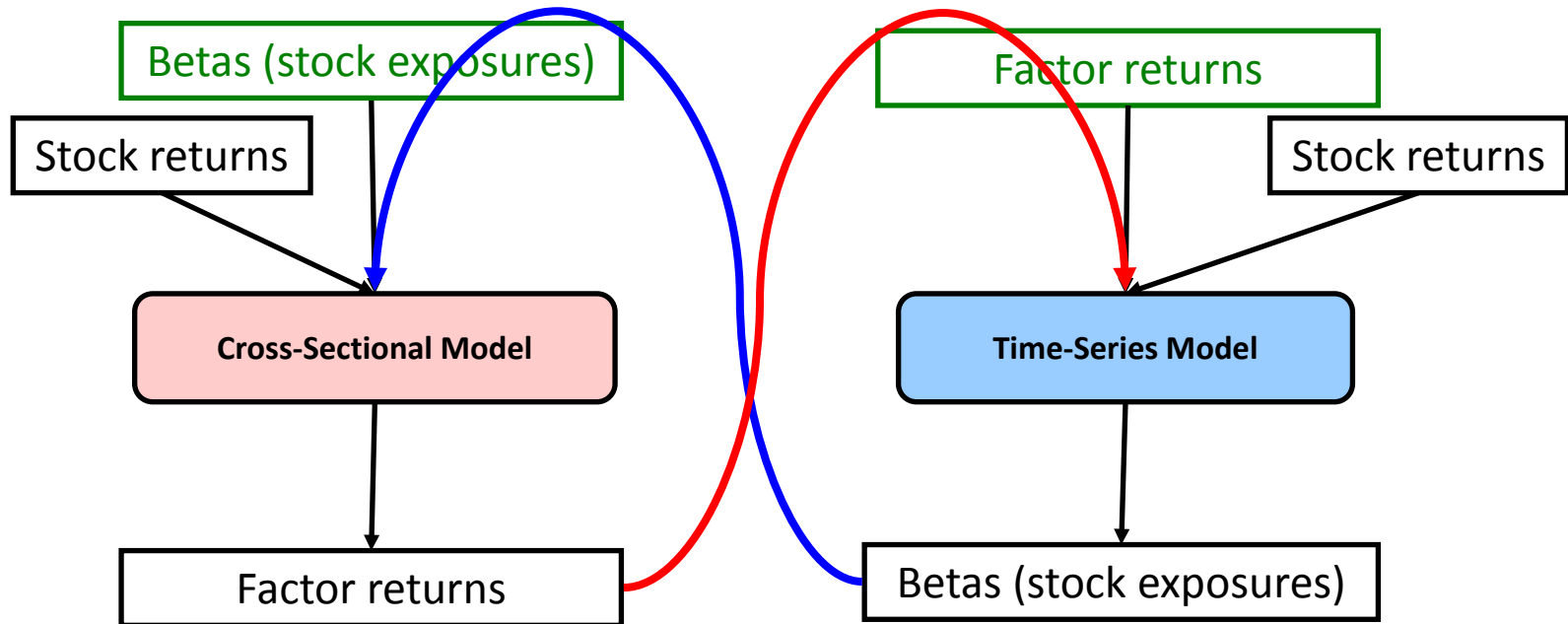
**Time-series > Statistical > Cross-sectional**

- (Except if you were God, and **knew** what the stock betas were; in this case, the cross-sectional method was better)

# Frankenstein's Risk Model - 1

- In this process, we start with a very simple multi-factor model, using dummy variables to identify the industry and country of each stock
- We use these to derive factor returns, in the usual way
- We then regress the stock returns against these factor returns to estimate revised stock betas . . .
- . . . and then use these (hopefully better) stock betas to re-estimate the factor returns . . .
- . . . and repeat
- The interesting question is whether the risk model converges to a stable set of betas and factor returns

# Frankenstein's Risk Model - 2





## Frankenstein's Risk Model - 3

- The model does, indeed, converge after around 30 to 40 iterations
- This tells us that a given historic data set does have an underlying multi-factor covariance structure, and that the industry and country stock betas are not (usually) 1.00
- We also need to ask whether these non-unit betas are stable through time, and it turns out that most of them are
- Given the determinants of portfolio return, we therefore need to neutralise EXPOSURES rather than WEIGHTS to stop the Noise from unintended factor bets overwhelming the returns due to our Skill

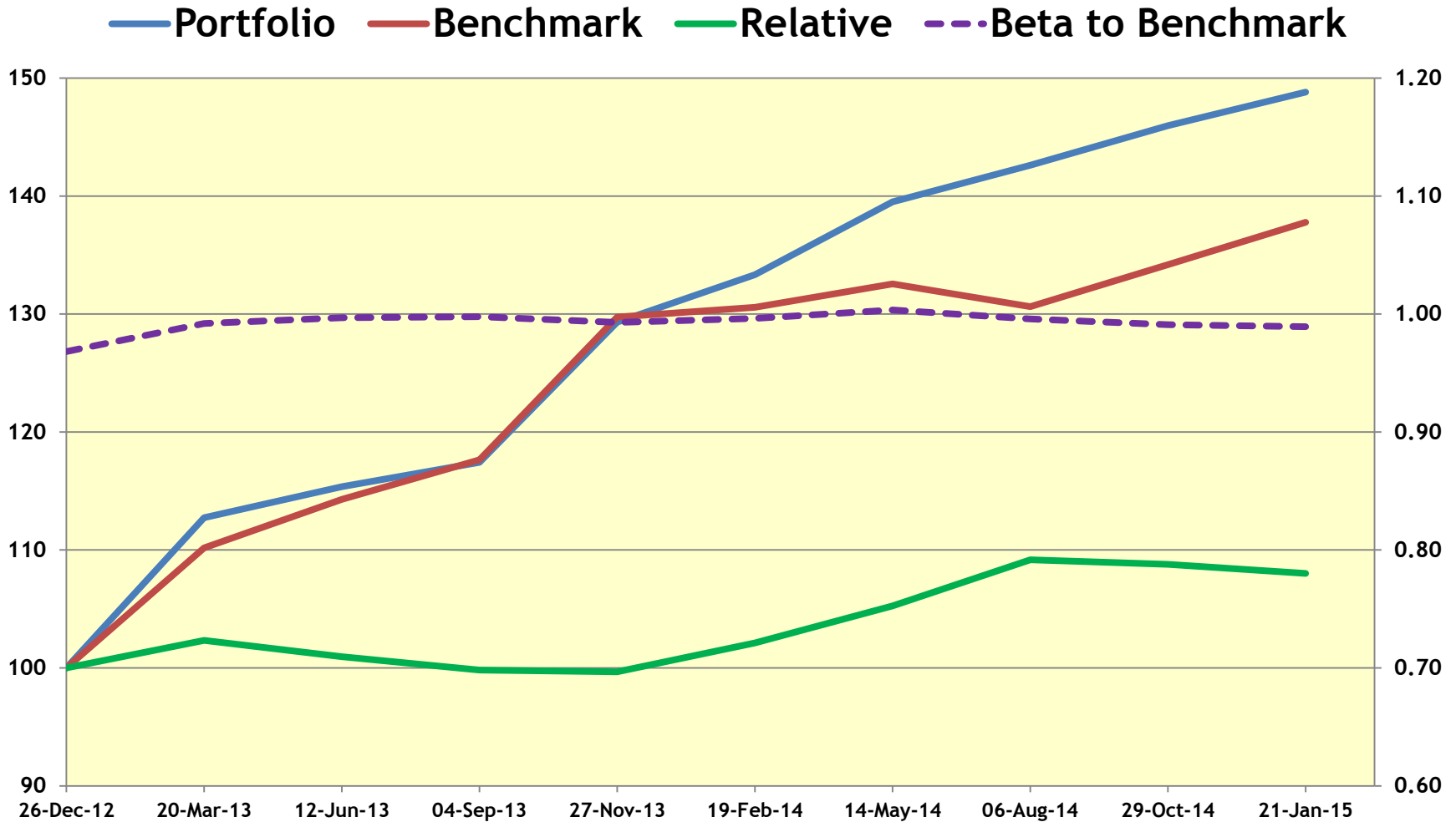
# Does it Matter Very Much? - An Example

- A US fundamental active manager is primarily a stock picker, but also decides to follow a High Yield, Small Cap strategy
- Not having any strong views on Sector performance, he wishes to remain neutral with respect to Sector bets against his large cap benchmark of 500 stocks
- He therefore keeps the portfolio Sector weights within 0.25% of the benchmark Sector weights
- He also maintains a beta close to 1.00 relative to his benchmark
- The portfolio is initially invested at the end of 2012, and is then rebalanced quarterly for the next two years

# Sector Weight Constraints - Dec 2012

GICS : Sector	Portfolio Minimum	Benchmark Holding	Portfolio Maximum
Energy	10.48	10.73	10.98
Materials	3.26	3.51	3.76
Industrials	10.46	10.71	10.96
Consumer Discretionary	12.88	13.13	13.38
Consumer Staples	9.78	10.03	10.28
Health Care	11.53	11.78	12.03
Financials	16.84	17.09	17.34
Information Technology	17.83	18.08	18.33
Telecoms	1.91	2.16	2.41
Utilities	2.52	2.77	3.02
<b>Portfolio Values</b>		<b>100.00</b>	

# Performance from Dec 2012 to Jan 2015



# Performance Attribution - Style & Market factors

Factor	Mean Relative Beta	Total Return	% of Return
Dividend Yield	0.632	3.65	47.35
Value	-0.001	0.02	0.25
Growth Trend	-0.150	-0.34	-4.46
Growth Momentum	-0.058	-0.40	-5.19
Short Term Price Momentum	-0.050	-0.04	-0.51
Long Term Price Momentum	-0.064	0.05	0.59
Leverage	0.001	0.09	1.12
Liquidity	0.002	-0.12	-1.60
Quality	-0.133	-0.94	-12.16
US Market Large	-0.033	-0.99	-12.79
US Market Small	0.090	2.64	34.29

# Performance Attribution - Industry factors 1

Factor	Mean Relative Beta	Total Return	% of Return
Energy Eqpt & Services	0.021	-0.01	-0.18
Materials	0.007	0.12	1.57
Aerospace & Defence	-0.013	-0.56	-7.29
Building & Construction	0.001	0.13	1.67
Industrials	0.020	0.26	3.34
Transport	-0.014	-0.71	-9.25
Consumer Discretionary	-0.001	0.23	2.99
Retailers	0.007	0.14	1.84
Consumer Staples	-0.000	-0.11	-1.45
Health Care	0.033	1.29	16.69

# Performance Attribution - Industry factors 2

Factor	Mean Relative Beta	Total Return	% of Return
Biotech. & Pharmaceuticals	-0.028	-1.24	-16.14
Banking	-0.027	-0.94	-12.18
Diversified Financials	-0.019	-0.63	-8.21
Capital Markets	0.007	0.30	3.85
Insurance	-0.017	-0.54	-6.96
Real Estate	0.014	0.59	7.68
Software & IT Services	-0.024	-0.81	-10.54
Hardware & Technology	0.016	0.52	6.68
Telecom Services	0.002	0.05	0.71
Utilities	-0.009	-0.23	-2.97

# Performance Attribution on Relative Returns

Factor	Total Return	% of Return
Relative Style Factors	1.96	25.39
Relative Market Factors	1.66	21.51
Relative Industry Factors	-2.17	-28.15
Relative Factor Returns	1.44	18.75
Relative Alphas	6.26	81.25
Relative Returns	7.71	100.00



# Performance Attribution - Skill vs Noise

Factor	Skill Return	Skill as % of Return	Noise Return	Noise as % of Return
Relative Style Factors	3.65	47%	-1.69	-22%
Relative Market Factors	1.66	22%		
Relative Industry Factors			-2.17	-28%
Relative Factor Returns	5.31	69%	-3.86	-50%
Relative Alphas	6.26	81%		
Relative Returns	11.57	150%	-3.86	-50%

# Summary & Conclusion

- It seems implausible that no professional active managers have Skill, and yet we have to account for their frequent underperformance
- Why doesn't their Skill lead to Outperformance?
- We believe the answer lies in poor portfolio risk management
- Making deliberate bets to reflect a manager's views of expected returns is relatively straightforward
- However, avoiding unintended bets is also necessary to avoid the resulting Noise masking the returns due to their Skill
- To neutralise unwanted factor effects, managers need to focus on exposures, not weights.