

Robust Returns-Based Style Analysis for Manager Selection

Asset Allocation, Style Analysis and Manager
Search Seminar
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Quantifying a Manager's Performance

- ◆ Institutional asset managers and consultants face the task of selecting and assigning assets to money managers to satisfy the needs of the beneficiaries.
- ◆ The questions are:
 - What is the manager doing?
 - How well is the manager doing it?
 - What is an appropriate benchmark for the manager?

Issues in Manager Selection

- ◆ Is the manager's style as advertised?
- ◆ Is one manager's style distinct from another manager?
- ◆ Is the manager's style consistent over time or has it varied?
- ◆ If we don't have a record of the manager's actual holdings, we can only make inferences about these questions
- ◆ Like any statistical inference, style analysis results should be presented with confidence intervals or we're going to get lots of false "positive" conclusions

Concept of Returns Based Analysis

- ◆ The basic idea was based in Sharpe's original name "Effective Asset Mix Analysis"
- ◆ The idea is to form a portfolio of indices such that this portfolio has a return behavior most closely related to the returns on the fund being analyzed
- ◆ Was originally conceived for "long only" portfolios

Mathematics of Return Based Analysis

- ◆ Mathematically the process is equivalent to a “least squares” regression analysis, subject to constraints:
 - All weights must be between zero and one
 - All weights must sum to one
- ◆ Basically, we’ve got a “pie chart” of indices that mimics a particular fund over time

The Problem of Linear Combinations

- ◆ If we use three indices to explain the returns of a manager, we can't attribute manager returns to the indices effectively, if the indices can also be explained by each other
 - Style analysis can only reliably attribute portfolio returns to the portion of market index returns that are themselves not attributable to the returns of other indices”
- ◆ In traditional regression this problem is called multicollinearity
- ◆ It was a not big deal for asset classes because bond returns don't explain stock returns and so forth, so Sharpe never worried about it

The Problem with “Style” Analysis

- ◆ To get at “styles” within an asset class, the indices will be highly correlated with one another, so the results will be imprecise
- ◆ The question of exactly how imprecise the results are was solved in:
 - Lobosco, Angelo and DiBartolomeo, Dan, “Approximating the Confidence Intervals for Sharpe Style Weights,” *Financial Analyst’s Journal*, July/August 1997, Volume 53 Number
- ◆ Interestingly, no commercial style analysis package (until now) has included the confidence interval calculation

Potential Errors using Returns Based Style Analysis

- ◆ We can be wrong about whether a manager is, or is not, following stated style preferences. The fund acts like 25% small cap value
 - The fund acts like 25% small cap value, plus or minus 50%
- ◆ We can be wrong about whether styles have changed over time
 - The fund used to act like it was 25% small cap value, now it acts like its 35% small cap value. That's a big difference
 - The fund used to act like it was 25% small cap value, now it acts like its 25% small cap value, but both numbers are estimated to plus or minus 50%. We can't tell if anything has really changed
- ◆ The long only requirement distorts portfolios that really do take short positions

7 Hedge Fund Managers using Diverse Styles

- ◆ We were supplied seven manager's monthly return series and told the following things:
 - All of the managers are “good to excellent”
 - All of the managers are running a market neutral strategy, although some have more risk (volatility) than others.
- ◆ We're going to relax the constraint that all index weights must be positive, but they still must add to one.

The Managers' Basic Statistics: 2001-2003

Fund Name	Return vs.		Sharpe Ratio
	Cash	Risk	
Manager B	2.20	16.21	0.06
Manager C	7.58	5.30	1.17
Manager E	3.26	3.56	0.55
Manager F	18.59	16.20	1.07
Manager I	5.04	3.96	0.94
Manager J	15.80	6.74	2.15
Manager K	7.84	3.87	1.69

Style Indices: Popular Choices for Domestic Equity Managers

- ◆ Domestic Equity Size and Style
 - S&P Large Cap Growth and Value
 - S&P Mid Cap Growth and Value
 - S&P Small Cap Growth and Value
 - Cash – 3 Month t-bill

Manager B

Fund Name	Style Wt.%	Error
S&P/BARRA 500 Growth !	-52.0	41.5
S&P/BARRA 500 Value !	35.6	45.2
S&P/BARRA Midcap 400 Value	-1.1	53.3
S&P/BARRA Midcap 400 Growth	53.6	49.2
S&P/BARRA 600 SmCap Value	-47.0	53.7
S&P/BARRA 600 SmCap Growth	0.0	62.6
Citi 3 Month Treasury Bill	110.8	13.1
T.E.	10.2	
Alpha	9.9	

Manager B: Observations

- ◆ None of the style weights are statistically different from zero, and are also not statistically different from 100%
- ◆ We don't know anything about this manager on average, except they are roughly market neutral.
- ◆ Maybe they are taking big tactical asset allocation shifts, so we may be able to get a better read by sub-samples of time, but then our confidence intervals will get even bigger

Manager C

Fund Name	Style Wt.%	Error
S&P/BARRA 500 Growth !	-6.6	16.4
S&P/BARRA 500 Value !	3.9	17.8
S&P/BARRA Midcap 400 Value	16.6	21.0
S&P/BARRA Midcap 400 Growth	-49.7	19.4
S&P/BARRA 600 SmCap Value	-4.5	21.2
S&P/BARRA 600 SmCap Growth	40.1	24.7
Citi 3 Month Treasury Bill	100.1	5.2
T.E.	4.0	
Alpha	6.3	

Manager C: Observations

- ◆ The alpha (about 6.3%) is lower than the manager's excess returns (about 7.5%). Therefore, security selection added to performance.
- ◆ The style indices only reduce the tracking error to about 4% compared to the fund's absolute volatility of about 4.6%.
- ◆ Even though some of the weights are significantly different from zero or one (or minus one), the portion of fund volatility that is explained is quite low. This manager is taking big individual security bets, or doing "something else"

Manager C Continued

- ◆ Maybe this fund isn't doing long/short equity at all
 - Add in in a Corporate Bond Index (-30% \pm 15% weight)
 - Add in a Convertible Bond Index (32% \pm 17%)
- ◆ Indicates that the manager may have been using a convertible arbitrage strategy – long the convert, short the stock and the bond.

Manager E

Fund Name	Style Wt.%	Error
S&P/BARRA 500 Growth !	-8.1	8.9
S&P/BARRA 500 Value !	9.2	9.7
S&P/BARRA Midcap 400 Value	5.4	11.4
S&P/BARRA Midcap 400 Growth	-4.5	10.6
S&P/BARRA 600 SmCap Value	-12.2	11.5
S&P/BARRA 600 SmCap Growth	21.6	13.4
Citi 3 Month Treasury Bill	88.5	2.8
T.E.	2.1	
Alpha	2.7	

Manager E: Observations

- ◆ The style indices reduce the tracking error to about 2.1% compared to the fund's absolute volatility of about 3.1%.
- ◆ Other than cash, none of the style weights are statistically significant.

Manager F

Fund Name	Style Wt.%	Error
S&P/BARRA 500 Growth !	-53.3	41.9
S&P/BARRA 500 Value !	46.4	45.6
S&P/BARRA Midcap 400 Value	-44.1	53.8
S&P/BARRA Midcap 400 Growt	29.2	49.6
S&P/BARRA 600 SmCap Value	30.6	54.1
S&P/BARRA 600 SmCap Growth	-2.6	63.2
Citi 3 Month Treasury Bill	93.8	13.2
T.E.	10.1	
Alpha	18.1	

Manager F: Observations

- ◆ The alpha (about 18%) is about the same as the manager's excess returns.
- ◆ The style indices reduce the tracking error to about 10% compared to the fund's absolute volatility of about 16%.

Manager I

Fund Name	Style Wt.%	Error
S&P/BARRA 500 Growth !	-6.7	9.9
S&P/BARRA 500 Value !	-2.1	10.8
S&P/BARRA Midcap 400 Value	14.9	12.8
S&P/BARRA Midcap 400 Growth	9.9	11.8
S&P/BARRA 600 SmCap Value	16.5	12.9
S&P/BARRA 600 SmCap Growth	-28.8	15.0
Citi 3 Month Treasury Bill	96.3	3.1
T.E.	2.4	
Alpha	2.8	

Manager J

Fund Name	Style Wt.%	Error
S&P/BARRA 500 Growth !	-15.1	21.5
S&P/BARRA 500 Value !	9.7	23.4
S&P/BARRA Midcap 400 Value	-18.2	27.6
S&P/BARRA Midcap 400 Growt	0.8	25.5
S&P/BARRA 600 SmCap Value	18.5	27.8
S&P/BARRA 600 SmCap Growth	8.3	32.5
Citi 3 Month Treasury Bill	96.0	6.8
T.E.	5.1	
Alpha	14.3	

Manager K

Fund Name	Style Wt.%	Error
S&P/BARRA 500 Growth !	-12.3	10.2
S&P/BARRA 500 Value !	20.4	11.1
S&P/BARRA Midcap 400 Value	-19.9	13.0
S&P/BARRA Midcap 400 Growth	12.8	12.0
S&P/BARRA 600 SmCap Value	20.5	13.1
S&P/BARRA 600 SmCap Growth	-24.9	15.3
Citi 3 Month Treasury Bill	103.5	3.2
T.E.	2.5	
Alpha	7.7	

Conclusions

- ◆ In order to help determine a manager's effective style mix, it is necessary to allow for short positions if the manager uses short positions.
- ◆ Confidence intervals and rolling period analysis are both necessary to determine if a manager is using tactical asset allocation.
- ◆ Removing indices that have style weights that are not statistically significant can help reduce the confidence interval magnitudes.