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The "Misinformation" Ratio: Manipulating Portfolio Risk Statistics

There's an easy way for institutional money managers to enhance the risk-reward profile of their portfolios: ask any number of vendors to calculate the portfolios' risk statistics, then pick the best one. Depending on the methodology, the calculation can generate a favorable result – even during periods of absolute underperformance. With no apparent industry standard and no governing body overseeing the calculation and reporting of increasingly used measures such as the information ratio or the Sharpe ratio, the lack of uniformity can lead to significantly different results for the same portfolio, depending on the source of the calculation.

This became clear to us as we reevaluated our internal portfolio risk statistic methodologies. First, we gathered formulas for the information ratio from three investment manager databases, two performance software vendors, and one performance measurement/consulting firm. Then we plugged performance data from both a U.S. and non-U.S. portfolio (each managed by a different investment manager) into the six formulas.

	U.S. Manager vs. S&P 500	Non-U.S. Manager vs. MSCI EAFE
Source A	0.168	1.172
Source B	0.168	1.172
Source C	0.184	1.116
Source D	0.167	1.162
Source E	0.080	1.179
Source F	0.384	1.311

data as of 12/31/01

As the table above illustrates, the results generally differed – sometimes by margins that we consider significant. Only two of the six sources use formulas that produce identical results. At first, we thought there had to be some simple error in the formula calculations. It turned out each calculation was correct, and the differences were in the interpretation of what "information ratios" actually mean.

Our research suggests the differences in methodologies we addressed with regard to calculating information ratios also apply to the Sharpe ratio, which measures a portfolio's value added over the risk-free rate per unit of risk, or standard deviation. Also, our study revealed that methodologies using "alpha" in determining the information ratio could generate a positive number even during periods of absolute underperformance.

The information ratio, in essence, is designed to measure residual return per unit of residual, "non-market" risk. The information ratio seeks to quantify a manager's value added per unit of risk from active management, that is, stock selection. The ratio is calculated by taking a portfolio's excess return and dividing it by the residual risk, where excess return is the difference

"Misinformation" Ratio *continued*

between the portfolio and benchmark returns, and residual risk is the variability in the excess returns. With only two variables, one might think the calculation would be fairly straightforward. Not necessarily.

For starters, the denominator, or the residual risk variable, can be computed in a number of ways. The sources in our study use two principal denominators: "tracking error" and "residual standard error." While comparable, there are differences in the methodologies for determining these figures that, in turn, influence the information ratio.

More importantly, we noted that even the basic excess return of a portfolio might be calculated in two different ways, with materially different results. Here, the decision to use one methodology over the other can have a more significant influence on the resulting quotient. At its most rudimentary, excess return is simply the portfolio's return minus the benchmark return.

Another way to calculate excess return is to use a portfolio's alpha, which is a measure of risk-adjusted outperformance. Essentially, this method integrates the volatility of the portfolio in relationship to the market (as measured with beta) in determining excess return. So how does that influence the information ratio? Put simply, it isn't simple.

Generally, portfolios with higher betas will tend to have lower information ratios and vice versa. However, the opposite is true if the benchmark return is lower than the risk-free rate of return. If the benchmark underperforms the risk-free return during a period, the resulting difference will be a negative number. In this case, multiplying that difference by a high beta would exaggerate the market's underperformance. That sounds bad, except when considering that this figure is subtracted from the portfolio's return. Subtracting a negative number is the same as adding a positive number. Thus, in this scenario, the higher beta enhances the portfolio's alpha and contributes to a higher information ratio.

While these results were surprising, we must note that most methodologies produced different measures for the information ratio, but generally conveyed similar risk-return relationships.

Overall, each of these methodologies is theoretically and fundamentally correct. However, without an industry-recognized set of standards – something similar to the performance presentation standards of the Association for Investment Management and Research(AIMR) – ambiguities can persist. We believe investors, managers, and consultants need to be aware of the differences that exist in how statistics, such as the information ratio and Sharpe ratio, are calculated and presented.

11988 El Camino Real
Suite 500
P.O. Box 919048
San Diego, CA 92191-9048
858.755.0239
800.237.7119
Fax 858.755.0916
brandesinstitute@brandes.com
www.brandes.com/institute