Performance Measurement of Hedge Fund Indices—Does the Measure Matter?

Martin Eling and Frank Schuhmacher

Dipl.-Kfm. Martin Eling, University of St. Gallen, Institute of Insurance Economics, Kirchlistrasse 2, 9010 St. Gallen, Switzerland, Tel.: +41 71 243 40 93, E-Mail: martin.eling@unisg.ch.

Prof. Dr. Frank Schuhmacher, University of Leipzig, Department of Finance, Jahnallee 59, 04009 Leipzig, Germany, Tel.: +49 341 973 36 70, E-Mail: schuhmacher@wifa.uni-leipzig.de.

1. Introduction

Performance measurement is an integral part of investment analysis and risk management. The goal of performance measurement is to build a ranking of different investments on the basis of risk-adjusted returns in order to evaluate the relative success of these investments. The Sharpe Ratio is the best-known measure of this type. It considers the first two moments of the return distribution (expected value and standard deviation) and is an adequate performance measure if the returns of the investment fund are normally distributed and the investor wishes to place all his risky assets in just one investment fund. Nevertheless, many other performance measures in addition to the Sharpe ratio exist in theory and practice, but the justifications for these measures frequently have a heuristic character in a certain sense. However, one can identify two levels of argumentation for the application of alternative performance measures.

First, the choice of the “correct” performance measures depends on the concrete decision making situation of the investor. This means that a different performance measure is adequate for an investor who invests all his risky assets in

just one investment fund than for an investor that splits his risky assets for example in a market index and an investment fund (See Scholz/Wilkens (2003) for example). The Sharpe ratio is sufficient in the first case, while in the second case, a performance measure that also takes account of the correlation between the market index and the respective investment fund is adequate. Such measures are the Jensen, Treynor and Treynor-Black measures (See Treynor/Black (1973), Jensen (1968) and Treynor (1965)).

Second, the choice of an adequate performance measure depends on how the returns of an investment fund are distributed. In the case of normally distributed returns, performance measures that rely on the first two moments of the return distribution (expected value, standard deviation) such as the Sharpe ratio are sufficient. In the case of non-normally distributed returns, the standard deviation of the returns fails to adequately display risk and the Sharpe ratio inadequately displays performance. In the analysis of hedge funds, it is frequently stated that the returns they generate have a non-normal distribution and thus hedge funds cannot be adequately evaluated using the classic Sharpe ratio (See for example Mahdavi (2004), p. 47, Brooks/Kat (2002), p. 37, Bacmann/Scholz (2003)). For example, in the case of hedge funds the use of derivative instruments results in an asymmetric return distribution as well as fat tails. For this reason, there is a danger that the use of standard risk and performance measures will result in an underestimation of the risk and an overestimation of the performance (see Lo (2002), Kat (2003)). Consideration of these issues has led to the development of some new performance measures that are currently debated in hedge fund literature.

In this paper, we wish to analyse and compare the performance measures that have been developed with regard to these latter issues. We will not, however, seek to provide a justification for individual performance measures on a theoretical level but set out to answer a very practical question: Does it really matter which performance measure one chooses to evaluate the performance of hedge funds? To answer this question, we consider the criticised Sharpe Ratio and ten alternative approaches to measure the performance of hedge funds. The key idea is to compare the rankings provided by the different performance measures with Spearman's rank correlation coefficient. This investigation is motivated by papers that in other contexts or on the basis of other data have concluded that the choice of a particular risk measure or performance measure has no significant influence on the evaluation of an investment.

For example, Pfingsten/Wagner/Wolferink (2004) compared the rank correlations for various risk measures on the basis of an investment bank's 1999 trading book. In doing so, they found that different measures result in largely identical evaluations of risk. Pedersen/Rudholm-Alfvin (2003) compared risk-adjusted performance measures for various asset classes over the period from 1998 to 2003. The authors found that there was a high rank correlation between the performance measures. The questions that were treated only as a side issue by Pedersen/Rudholm-Alfvin (2003) are the focus of our study. In addition, we concentrate

on hedge funds as an asset class, the performance measures that have been proposed for measuring the performance of hedge funds, and the related debate concerning the suitability of classic and newer performance measures for evaluation of hedge funds.

The remainder of the paper consists of three sections. First, we present our data and methodology (Section 2). Then eleven performance measures are employed for determining the performance of ten hedge fund indices as well as for five equity and bond indices (Section 3). Finally, the results of the study are summarised (Section 4).

2. Data and Methodology

In hedge fund literature it is argued that it is inappropriate to assess hedge funds using the classic Sharpe Ratio because hedge fund returns display atypical skewness and excess values, values the Sharpe Ratio does not reflect (see Mahdavi (2004), Brooks/Kat (2002)). Instead, measures that take into account the risk of loss should be used to measure hedge fund performance, in particular the lower partial moments, the drawdown, and the value at risk.

We explore this argument by comparing the classic Sharpe Ratio and ten newer approaches to performance measurement based on the risk of loss: Omega, the Sortino Ratio, Kappa 3, the Upside Potential Ratio, the Calmar Ratio, the Sterling Ratio, the Burke Ratio, Excess Return on Value at Risk, the Conditional Sharpe Ratio, and the Modified Sharpe Ratio (for a full description of each measure, see Eling/Schuhmacher (2005)).

We measure performance using monthly returns of ten Credit Suisse First Boston/Tremont (CSFB) hedge fund indices over the period from January 1994 to December 2003. The hedge fund indices are also compared with five market indices; two of them measure equity performance, two measure bond performance and the remaining index measures an equally weighted investment in the equity and bond indices.

Our methodology takes the following three steps. First, we measure the distributional characteristics and the performance of various hedge fund indices and traditional investments (such as stocks and bonds). Next, we calculate the correlation between the rankings based on different performance measures using Spearman's rank correlation coefficient and also test for significance using Hotelling Pabst statistics. Finally, we check the robustness of our results by varying several parameters. However, in this contribution, we report only the Spearman's rank correlation coefficient results. For a detailed survey of the performance measures,

a full description of our measurement results, and several robustness checks, we refer to Eling/Schuhmacher (2005).

3. Findings

After measuring the distributional characteristics and the performance of the hedge fund indices and the traditional investments, we calculate the correlation between rankings based on different performance measures using Spearman's rank correlation coefficient (See Table 1).

Table 1: Rank Correlation of Rankings Based on Different Performance Measures

Performance measure	Sharpe Ratio	Omega	Sortino Ratio	Kappa 3	Upside Potential Ratio	Calmar Ratio	Sterling Ratio	Burke Ratio	Excess Return on Value at Risk	Conditional Sharpe Ratio	Modified Sharpe Ratio	Sharpe Ratio
Sharpe Ratio												
Omega	1.00											
Sortino Ratio	0.99	0.98										
Kappa 3	0.95	0.94	0.97									
Upside Potential Ratio	0.83	0.80	0.88	0.95								
Calmar Ratio	0.88	0.85	0.85	0.83	0.73							
Sterling Ratio	0.98	0.97	0.95	0.92	0.80	0.95						
Burke Ratio	0.95	0.92	0.92	0.90	0.82	0.98	0.98					
Excess Return on VaR	0.99	0.99	0.99	0.96	0.86	0.86	0.97	0.93				
Conditional Sharpe Ratio	0.94	0.93	0.97	0.98	0.93	0.82	0.91	0.90	0.96			
Modified Sharpe Ratio	1.00	0.99	0.99	0.96	0.84	0.87	0.98	0.94	1.00	0.95		
Average	0.95	0.94	0.95	0.94	0.84	0.86	0.94	0.92	0.95	0.93	0.95	

All performance measures produce almost similar rankings and thus result in a widely identical evaluation of the investments. Our three main findings are as follows.

1. Spearman's rank correlation coefficient between the Sharpe Ratio and the alternative approaches exhibits very high values for almost all measures and is on average 0.95. The picture is the same when comparing the new performance measures with each other (on average 0.92). Hence, all performance measures deliver nearly the same rankings.

2. Two performance measures (the Upside Potential Ratio and the Calmar Ratio) result in slight changes in the evaluation of hedge funds as compared to all the other methods. However, following the Hotelling Pabst statistics, none of the new performance measures (including the Upside Potential Ratio and the Calmar Ratio) show a significantly different ranking than the Sharpe Ratio (see Eling/Schuhmacher (2005)).
3. These findings prove to be very robust when varying both the subject of study and the period of time under consideration, as well as with respect to any change in further given parameters, such as the minimal acceptable return or the confidence level (also see Eling/Schuhmacher (2005)).

These findings give rise to two conclusions. First, our data indicates that evaluating hedge fund indices by applying the Sharpe Ratio results in very slight differences in comparison to the new performance measures. Second, it does not appear to matter which of the numerous performance measures is used to assess the performance of hedge fund indices. In view of the large degree of similarity between the results of all performance measures we evaluated, the use of the classic Sharpe Ratio seems justifiable.

4. Conclusion

It does not matter too much which performance measure one chooses to evaluate hedge funds. The findings demonstrate that the difference that might occur by using the Sharpe Ratio, instead of one of the other methods, is small. Thus we disagree with the commonly held opinion that hedge funds cannot be accurately evaluated by using this well-known measure.

The results of this study will be helpful for investing in hedge funds that are constructed like indices. However, an important question is whether the choice of a specific performance measure matters when evaluating single hedge funds. The findings of the current study have motivated us to procure return data for single hedge funds in order to analyse this question in the future. However, the indices we examined in this paper appear to be representative for single hedge funds insofar as the return distributions deviate significantly from a normal distribution.

Another question not answered in this study is the relevance of performance measures that are evolved on the basis of correlations, such as the Jensen, Treynor and Treynor-Black measures. This question should also be examined in future studies.

References

- Bacmann, Jean-Francois/Scholz, Stefan (2003): Alternative Performance Measures for Hedge Funds, in: AIMA Journal, June 2003.
- Brooks, Chris/Kat, Harry M. (2002): The Statistical Properties of Hedge Fund Index Returns and Their Implications for Investors, in: The Journal of Alternative Investments, Vol. 5, No. 2, Fall, pp. 26-44.
- Eling, Martin/Schuhmacher, Frank (2005): Hat die Wahl des Performancemaßes einen Einfluss auf die Beurteilung von Hedgefonds-Indizes?, Working Paper, University of St. Gallen/University of Leipzig, to appear in: Kredit und Kapital, Vol. 39.
- Kat, Harry M. (2003): 10 Things that Investors Should Know about Hedge Funds, in: The Journal of Wealth Management, Vol. 5, No. 4, pp. 72–81.
- Jensen, Michael (1968): The Performance of Mutual Funds in the Period 1945-1968, in: The Journal of Finance, Vol. 23, No. 2, pp. 389-416.
- Lo, Andrew W. (2002): The Statistics of Sharpe Ratios, in: Financial Analysts Journal, Vol. 58, No. 4, pp. 36–52.
- Mahdavi, Mahnaz (2004): Risk-Adjusted Return When Returns Are Not Normally Distributed: Adjusted Sharpe Ratio, in: The Journal of Alternative Investments, Vol. 6, No. 4, Spring, pp. 47-57.
- Pedersen, Christian S./Rudholm-Alfvén, Ted (2003): Selecting a Risk-Adjusted Shareholder Performance Measure, in: Journal of Asset Management, Vol. 4, No. 3, pp. 152–172.
- Pfingsten, Andreas/Wagner, Peter/Wolferink, Carsten (2004): An Empirical Investigation of the Rank Correlation Between Different Risk Measures, in: Journal of Risk, Vol. 6, No. 4, pp. 55–74.
- Scholz, Hendrik/Wilkens, Marco (2003): Zur Relevanz von Sharpe Ratio und Treynor Ratio: Ein investorspezifisches Performancemaß, in: Zeitschrift für Bankrecht und Bankwirtschaft, Vol. 15, No. 1, pp. 1-8.
- Treynor, Jack L. (1965): How to Rate Management of Investment Funds, in: Harvard Business Review, Vol. 43, No. 1, pp. 63-75.
- Treynor, Jack L./Black, Fisher (1973): How to Use Security Analysis to Improve Portfolio Selection, in: Journal of Business, Vol. 46, No. 1, pp. 66-88.