

# Alpha Purification with Index Futures & Omega Metrics

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In this article we describe a strategy for removing unwanted market exposure in the returns produced by a successful fund manager. The fund ("the Fund") is one of a growing number that invest in Central, Eastern Europe and Russia. Investors in such funds are looking both for diversification benefits compared with standard European equity portfolios and for the high return which well-informed managers can produce from comparatively high risk exposures to Eastern Europe and Russia. What they are not looking for in such a fund is significant correlation with a major European equity index such as the Dow Jones EURO STOXX 50®. In the case of the fund considered here, this correlation is more than 0.41 over its seven year history.

An investor who wishes to retain the excellent qualities of the Fund, without the unwanted exposure to this market could apply the standard financial model – beta hedging – to isolate the manager's alpha. However this would be an under-achieving strategy: it produces exactly the same portfolio of the Fund and the Dow Jones EURO STOXX 50® Index that one would create in order to minimise variance. An investor whose objective is the minimisation of variance, with no consideration for the effect on return, is unlikely to be a client of this manager in the first place. Fortunately, there are other options: Instead of beta hedging, one may introduce an alternative objective for optimising a portfolio of the Fund and the Dow Jones EURO STOXX 50® Index. For example, the positions might be constructed to maximise the Sharpe Ratio for example or using an objective function which takes into account the benefits of positive asymmetry by maximising a combination of Sharpe Ratio and skewness. Our approach uses our proprietary Omega Score as the objective function.

## Out of Sample Performance of the Fund and the Omega Alpha Hedge

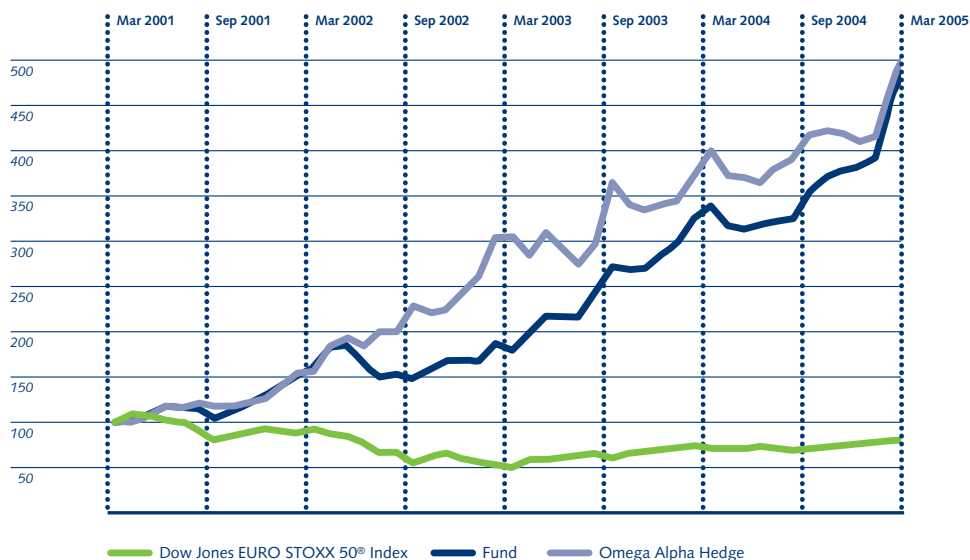
April 2001–March 2005	The Fund	Omega Alpha Hedge
Terminal Value of EUR 100	EUR 498.56	EUR 517.16
Annualised return	49.43%	50.80%
Omega Score	1.34	1.73
Annualised Standard Deviation	21.21%	24.07%
Sharpe Ratio ( 0% risk free)	2.33	2.08
Skewness	-0.16	0.70
Maximum monthly loss	-11.65%	-7.14%
Maximum monthly gain	17.85%	24.57%
Downside deviation	6.39% per month	5.77% per month
Upside deviation	6.00% per month	8.32% per month

We emphasise the fact that this is a strategy open to anyone who can make quarterly (or monthly) trades of Dow Jones EURO STOXX 50® Index Futures, on the basis of monthly returns from the Fund manager. The strategy is therefore readily achievable with low transaction costs and low capital requirements.

## Back Test and Alpha Extraction

Three year rolling data windows were used with quarterly updates. A portfolio long the Fund and short Dow Jones EURO STOXX 50® Index Futures was rebalanced quarterly to maintain the optimal Omega Score. No intermediate rebalancing was done and the returns are calculated gross of transaction costs. The short position was constrained to a maximum of EUR 1.25 for each EUR 1 in the Fund. The out of sample period was 48 months from April 2001 to March 2005.

## Out-of-sample Performance of the Fund, Omega Alpha Hedge and the Dow Jones EURO STOXX 50® Index NAVs (April 2001 value is normalised to 100)



The chart shows that the return on the Omega Alpha Hedge was higher than on the Fund for almost the entire out of sample period. While the total return has increased, the standard deviation has also increased so the Sharpe Ratio has declined. The remaining statistics show that this is entirely due to the additional upside which the hedge produced. The monthly downside deviation and maximum monthly drawdown have both been reduced while upside deviation, skewness and maximum monthly return have all been increased significantly. The out of sample correlation of the Fund with the Dow Jones EURO STOXX 50® Index is 0.41 but with the Omega Alpha hedge it is  $-0.50$ . The increase in the Omega Score reflects the asymmetric risk reduction which this hedging strategy has produced. The much lower downside means that an investor could now apply substantial leverage without reaching the downside exposure of the unhedged fund. The result of our strategy is a “pure alpha” fund whose characteristics are even more attractive than the original fund.

### A Brief Introduction to Omega Metrics and Omega Alpha Hedges

The Omega function of a distribution is a mathematically exact proxy for the distribution itself. It is a source of a new class of statistics, which we have called “Omega Metrics” or “Omega Scores”, which are based on geometric properties of the Omega function rather than on expected values of the distribution (Omega Functions and Omega Metrics, A. Cascon and W.F. Shadwick, The Finance Development Centre 2004).

Omega Metrics are a natural generalization of Sharpe Ratios. They reward a distribution for the size of its mean and for the degree of concentration around the mean. Unlike Sharpe Ratios however, Omega Scores take asymmetry and fat tails into account explicitly. They reward fat tails above the mean and penalize them below the mean. In short, they take into account the things that must be considered in evaluating risk adjusted return, especially in hedge fund investments.

#### Omega Alpha Purification

The standard approach to identifying “alpha” in a fund is based on a linear model which separates the returns on the fund into a part which is a multiple (“beta”) of the returns on a market index

and a part which is uncorrelated with the index. Hedging the fund with a short position of beta times the index then produces a return stream uncorrelated with the index whose average value is the extracted alpha.

This may be motivated in different ways, but it is a fact that beta hedging produces the portfolio of Fund plus Index with the minimum possible variance. This means that beta hedging can only be optimal if minimising variance is the only relevant consideration. In the case of returns where asymmetry and fat tails are present as with the Fund in combination with the market index described here, it is even less likely to succeed.

Our strategy replaces the beta hedge by the Omega Alpha portfolio. This is the portfolio of Fund plus Index with maximum possible Omega Score (subject to whatever constraints are desired). As the Omega score is a financially meaningful statistic which, unlike variance, takes into account fat tails and asymmetry as well as the size of the mean and the degree of dispersion around it, Omega Alpha portfolios produce superior out of sample risk-adjusted performance.

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