

(Alain Ruttiens, *Fund Performance and Market Volatility*)



## *Fund Performance and Market Volatility*

To assess the performance of a fund, we have several quantitative measures, such as (among others) series of past returns, fund volatility, and ratios such as the Sharpe ratio, or more sophisticated ones. As a matter of fact, a fund performance – and its related quantitative measures – is depending to some extent of the volatility of the markets it is trading. Roughly speaking, a market presenting a low volatility level is not offering much positive return potential, and a (very) high market volatility can lead to either higher profits or higher losses. To formulate it simply: if a fund has presented attractive performances during a period of low/medium market volatility levels, it should better be able to keep its performance during high market volatility periods, and conversely. By considering a past series of fund performances, it should therefore be useful to quantitatively assess to what extent these performances are affected by the volatility of the market(s) traded by the fund, which could be called a kind of “fund vega”, by analogy to the *vega* (i.e., the sensitivity to the volatility) of an option.

A simple way to measure this “fund vega” may consist in both

- on the one hand, computing the correlation between past fund returns and past volatilities of the fund (market) benchmark;
- on the other hand, regressing the past fund returns and past volatilities of the fund (market) benchmark.

, on a long enough time series of past performances so that the time horizon is involving both some low volatilities period and some higher volatilities period showed by the traded market(s).

In the case of a hedge fund, if the traded markets are easy to identify, on a relative weighted basis, the calculation remains easy and coherent. If not, a common index benchmark would yet make sense, a fortiori if the fund prospectus is itself confronting its performances to such an index, and because the investor in alternative investment is anyway concerned with traditional, long only, market performance. Let us call “market reference volatility” the historical volatility showed by the benchmark used with this respect.

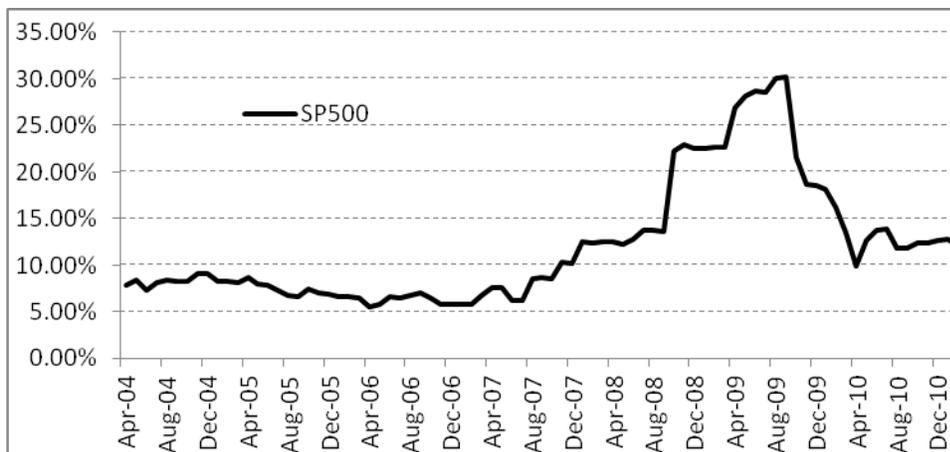
The correlation allows for evidencing that the fund performance is not too much linked to the market reference volatility: the lower the correlation, the better it should be. But the correlation sign also

matters: a positive one should be appreciated, since trading in a high volatility environment is more risky.

On the other hand, (linearly) regressing the fund returns as the depending variable, with the market reference volatility as the independent variable, conveys a dual-purpose information:

- the slope (or *regression coefficient*) of the regression line: if positive, it means that the fund is likely to achieve a higher performance during periods of more market reference volatility. This can be viewed as a positive feature of the fund, given the risk that during high volatility phases, the fund performance is subject to more non-directional risk. Conversely, if this slope is negative, it means that the fund is less performing during high volatility phases, which could be hold against the fund;
- the coefficient of determination ( $R^2$ ) of the regression. This measure will tend to be low – meaning the regression will inevitably present a significant dispersion – but relatively speaking, the higher is the  $R^2$ , the more valid is the slope measure.

To illustrate this fund vega measure, let us compare 2 hedge funds over the period going from end of April 2004 to end of February 2011. They are both benchmarked (at least, compared) to the S&P500, by the funds themselves. These funds are ATTAIN (the Strategic Diversification Program managed by Attain Capital Management) and the AHL fund (belonging to the Man Group). During the period considered, the S&P 500 volatility, computed on a monthly basis, has shown a first period of relatively low volatility (< 10% p.a.), followed by a much higher volatility period (up to 30% p.a.):



To measure the relationship between the funds monthly returns and the S&P500 monthly volatility, we have computed, for each of the funds, a series of 1-year moving returns (from April 04 to March 05, May 04 to April 05, etc), and the corresponding series of 1-year moving volatilities of the S&P500 on the same periods (these series are of 72 data each). The following table gives, for each of the funds, their average return and volatility and their Sharpe ratio (using as a risk-free rate the average monthly 12-month LIBOR rate, i.e. 3.14%) on the whole period, as well as their correlation coefficient, regression slope and corresponding  $R^2$  with respect to the S&P 500:

	ATTAIN	AHL
Average return (in % p.a.)	10.74	10.92
Average volatility (in % p.a.)	15.00	11.00
Sharpe ratio	0.51	0.71
Correlation coeff. with SP500	0.23	-0.35
Regression slope	+4.59	-0.89
R <sup>2</sup> of the regression line	0.37	0.02

At first sight, from the conventional measures, AHL seems to supersede ATTAIN, with a very similar average return, a lower volatility and higher Sharpe ratio. But if we focus on the ability of these funds to achieve their performance in periods of higher market volatility, ATTAIN is achieving a better score: its performance is positively correlated with the market reference volatility (regarding AHL, the regression is quite useless, with a  $R^2$  of about 0, but the correlation of the returns with the market reference volatility is clearly negative). This could help the potential investor who would like to select one of these funds in the most comforting way.

Finally, since both of the funds compared here are hedge funds, it could be interesting to look at a global (index) hedge fund performance with respect to this analysis. In the table below, we have added the same kind of calculations relative to the HFRI index of hedge funds:

	ATTAIN	AHL	HFRI
Average return (in % p.a.)	10.74	10.92	8.43
Average volatility (in % p.a.)	15.00	11.00	10.00
Sharpe ratio	0.51	0.71	0.53
Correlation coeff. with SP500	0.23	-0.35	-0.57
Regression slope	+4.59	-0.89	-2.92
R <sup>2</sup> of the regression line	0.37	0.02	0.32

At least over the period considered here, it appears that the average hedge funds performance (HFRI) was more similar to the case of AHL, that is, showing a performance that is negatively correlated with the SP 500 as a market reference volatility.

In conclusion, besides the usual quantitative criteria for assessing the attractiveness of a fund performance, it makes sense to check to what extent the performances are affected by the volatility level of the markets traded by the fund. This can be easily quantified by a “fund vega” measure, involving both the correlation coefficient of the fund returns and the market reference volatility, and the characteristics of their regression.

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