

An Edhec Risk and Asset Management Research Centre Publication

Edhec Funds of Hedge Funds Reporting Survey

A Return-Based Approach to Funds of Hedge Funds Reporting



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Introduction

Since it was set up, in 2001, the Edhec Risk and Asset Management Research Centre has made a point of conducting research that is both independent and pragmatic.

The concern to render our research work relevant and operational led us, in 2003, to publish the first studies on the policies of the European asset management industry. The Edhec European Asset Management Practices survey allowed a comparison to be established between the academic state-of-the-art in the area of portfolio management and risks, and the practices of European managers.

This study was completed in the same year by a review of the state-of-the-art and the practices of European alternative multimangers, the Edhec European Alternative Multimangement Practices survey.

In drawing up the latter report, we were able to observe the gap that exists between the conclusions of the academic research work and the practices of multimangers in measuring and reporting on the performance and risks of funds or portfolios of hedge funds. This observation led us to carry out research and a survey on this fundamental dimension of the relationship between investors and managers: the Edhec Funds of Hedge Funds Reporting Survey.

The analyses, conclusions and recommendations that we are presenting today are the fruit of both an investigation and a thorough dialogue with alternative investment professionals. We hope that they will help to stimulate and nourish discussions between investors, managers and regulatory authorities, in a mutual concern to make information on hedge funds reliable.

I would like to thank all the members of the Edhec Risk and Asset Management Research Centre team who helped to produce this survey, particularly Mathieu Vaissié, who coordinated the contributions of the authors and synthesised the comments of the considerable number of professionals who reacted to our proposals.



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We would like to express our gratitude to Laurent Favre, Con Keating, Xavier Lépine, François-Serge Lhabitant, Jean Christophe Meyfredi and Nicolas Rousselet for their precious comments and suggestions. The opinions expressed in this document and any errors or omissions are the sole responsibility of the authors.

Executive summary



Executive summary

Over the last four years, Edhec has been developing a series of research programmes in the area of risk and asset management with the permanent objective of responding to the interests of the various industry actors and sponsors that have been supporting the initiative. The Edhec Funds of Hedge Funds Reporting Survey was written in this spirit. It is the first study conducted worldwide comparing and contrasting suggestions from the industry (buy side and sell side) and academic recommendations on the sensitive issue of investor information.

In the first section of this publication, we carry out a review of the literature to identify the consensus that has been reached in the academic world on the risk profile of hedge funds. We highlight the fact that even though the specific features of the risk profile of hedge funds have been widely discussed in the literature, market participants tend to understate their importance, and remain strongly impregnated by traditional world investment practices. In the light of our study on the specific risk profile of hedge funds, we show the extent to which performance measures traditionally used by market participants (investors and fund managers alike), such as the Sharpe ratio, face limitations when it comes to assessing the performance of alternative investments. In this respect, we argue that due to the exposure to multiple sources of risk, and due to the dynamic and non-linear nature of the relationships with risk factors, traditional risk-adjusted performance measures fail to account properly for the risk profile of hedge funds, and as a result fail to assess their performance accurately. Yet, as illustrated in Edhec (2003)¹, a large majority of investors still prefer indicators such as the

Sharpe ratio (82%), the Sortino ratio (58%) or even the information ratio (49%) to monitor hedge fund performance.

In the following sections of this publication, we make a number of suggestions with regard to the content of the activity report and present the principal indicators. We first suggest opting for a monthly publication frequency and list a number of indicators covering the whole spectrum of the risk and return dimension definitions. We thus give a number of measures accounting for normal risks (e.g. Volatility), extreme risks (e.g. Modified Value-at-Risk) and loss risks (e.g. Maximum Drawdown) with the corresponding risk-adjusted performance indicators so that investors, whatever their preferences, can be provided with relevant information. In this respect, it is worth noting that all this information can be obtained through a return-based analysis that is carried out by simply analysing FoHFs' historical returns. As a result, with the approach suggested in this publication, managers can provide investors with valuable information on their fund performance and risk profile without disclosing detailed positions. We thus argue that it is possible to satisfy investor requirements for information without challenging managers' requirements for secrecy. We also propose to include original risk-adjusted indicators, such as the Omega ratio, which are specifically designed to account for the non-normal return distributions of hedge funds. We finally suggest that the activity report should include detailed information on the fund's key return drivers in the form of style and factor analysis, so that investors can optimally mix alternative

¹ - Cf. Edhec European Alternative Multimangement Practices Survey, 2003

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investments with their traditional portfolio. We argue that such information is essential, since an increasing proportion of investors are using hedge funds to improve the diversification of their portfolio.

In the final sections of this publication, we analyse the answers to the questionnaire, and confront investor and fund manager opinions on what the future content of the monthly activity report should be. Despite some slight differences, investors and fund managers tend to agree on the definition of the relevant information. This finding contrasts sharply with what is usually said on the conflict of interest between investors and fund managers. Nevertheless, as one might have expected, investors tend to ask for more details than fund managers. In this respect, we suggest fitting the degree of detail to the level of granularity (i.e. detailed information at the FoHF level and succinct information at the fund level) in order to reach a good compromise between the information needs of investors and the constraints of fund managers. According to both investors and fund managers, traditional performance measures have their place in the hedge fund activity report of tomorrow. The Sharpe ratio is considered to be important to very important by 77% of the fund managers and 79% of the investors. However, it is worth noting that new performance measures, which are better suited for alternative investments, are gaining acceptance, demonstrating the interest of market participants in rationalising the performance evaluation and attribution process. Indeed, the Omega ratio is already considered to be important to very important by 57% of fund managers and 48% of investors. In the same vein,

it seems that market participants are progressively accepting the idea that hedge fund returns are driven by beta and alpha drivers since many of them are looking for relative returns. We believe that this shift from an absolute return paradigm to a relative return paradigm is a major step forward for the future development of the alternative investment industry. However, it brings new challenges in terms of reporting to investors. Investors will be increasingly demanding with regard to information on the underlying risk factors of FoHF. For this reason we suggest including static and dynamic style/factor analysis in the monthly activity report so that investors can either study the diversification properties or measure the relative returns of FoHF.

As a conclusion, there is still a long way to go before investors in the alternative arena can be provided with relevant information on a monthly basis. Nevertheless, we can at least say that the results that we have obtained are encouraging. Investors and fund managers are heading in the same direction and they have chosen the right direction, in that they tend to suit their investment practices to the specific features of alternative investment. While only 20% of fund managers include VaR measures in their reporting to account for extreme risks (see Edhec (2003)^{II}), 40% of fund managers consider that robust indicators such as Beyond VaR should be included in their reporting in the future. The same observation holds for risk-adjusted performance indicators. While only 4% of fund managers (see Edhec (2003)^{III}) currently use the Omega ratio, 57% of them consider that an indicator of that kind should be part of their monthly activity reports in the future.

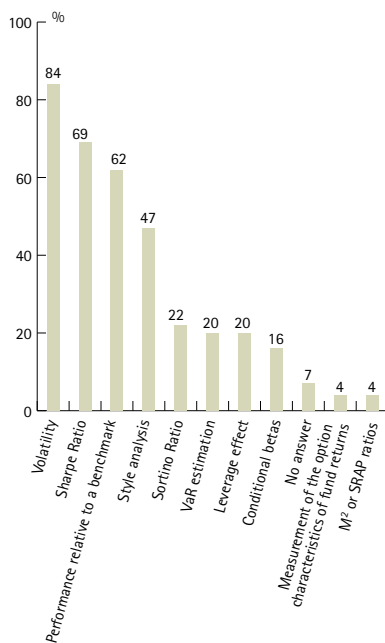
II - Cf. Edhec European Alternative Multimangement Practices Survey, 2003
 III - Cf. Edhec European Alternative Multimangement Practices Survey, 2003

Preamble



Preamble

Graph 1
Which indicators and information do European FoHF use for reporting to their clients?



Source: Edhec European Alternative Multimangement Practices Survey, 2003

Alternative investment has experienced a two-stage development process in the past fifty years. Initially, there was a long period of incubation, during which only a few wealthy private investors bought shares in hedge funds in a search for absolute performance. The bursting of the Internet bubble then broadened the range of subscribers. Since all investors were looking for investments that were liable to improve the diversification of their portfolio, they naturally turned to hedge funds. The massive arrival of institutional investors and the diversification of the risk profiles of final investors allowed an in-depth examination of the management practices in the alternative universe to take place, highlighting risk control in particular. The initial work that aimed to rationalise and, above all, to standardise these management practices, was carried out under the impetus of the Investor Risk Committee (IRC), set up by the International Association of Financial Engineers.

This work is all the more important in that the risk-taking and control that should result from it form, essentially, the basis of alternative investment. Even the so-called non-directional alternative strategies, i.e. those that are not directly subject to market risk, are exposed to multiple risk factors such as volatility risk, credit risk, liquidity risk, etc. (cf. Amenc et al. (2003)¹). It is therefore true to say that correct assessment and rigorous monitoring of risks are requisite conditions for a hedge fund to function well. It is thus vital for investors to ensure that the funds in which they have invested or in which they wish to invest (again) have adequate control over the risks being run. However, in spite of this obvious

fact, investors are rarely in a position to implement satisfactory risk monitoring and control. The main reason put forward relates to the low level of information generally provided by hedge funds. A study carried out recently by Edhec involving 61 European multimangers (cf. Edhec (2003)²) shows that, while 84% of the firms questioned include a volatility calculation in their monthly activity report (69% also include a Sharpe ratio, 22% a Sortino ratio and 20% a Value-at-Risk calculation), none provides a truly robust measure of the extreme risks, even though this is a measure that represents an element of information that is capital for all investors. (See graph 1)

Besides, the inadequacies of the monthly activity reports published by funds of hedge funds (hereafter FoHF in the text) do not stop there. Numerous studies have posed the question of the relative performance of hedge funds compared to traditional asset classes. Many have concluded that there was conditional and unconditional outperformance from strategies, thereby feeding the myth of "absolute return strategies." On the basis of this observation, researchers and investors have tried to highlight the eventual persistence of hedge fund performance so as to justify the usefulness of stock picking. Paradoxically, the results obtained are largely favourable for the allocation and risk management process. While no study has been able to produce tangible proof with regard to the persistence of hedge fund performance beyond a 6-month horizon, some have underlined the stability of the funds' risk profile (cf. Kat and Menexe (2003)³ or Mozes and Herzberg (2003)⁴),

1 - Amenc, N., Martellini, L. and Vaissie, M., 2003, Benefits and Risks of Alternative Investment Strategies, *Journal of Asset Management*, Vol.4, N°2, p.96-118.

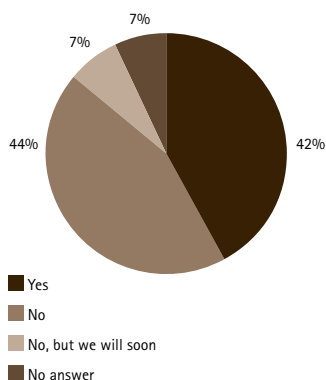
2 - Cf. Edhec European Alternative Multimangement Practices Survey, 2003

3 - Kat, H. and Menexe, F., 2003, Persistence in Hedge Fund Performance: The True Value of Track Record, *Journal of Alternative Investments*, Spring 2003, Vol.5, N°4, p.66-72

4 - Mozes, H. A. and Herzberg, M., 2003, The Persistence of Hedge Fund Risk: Evidence and Implications for Investors, *Journal of Alternative Investments*, Fall 2003, Vol.6, N°2, p.22-42

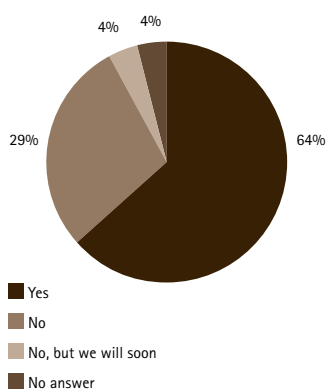
Preamble

Graph 2
Do you offer FoHF with specific behaviours or diversification objectives in relation to other asset classes?



Source: Edhec European Alternative Multimangement Practices Survey, 2003

Graph 3
Do you offer FoHF or manager pure funds by strategy?




Source: Edhec European Alternative Multimangement Practices Survey, 2003

thereby justifying the investors' transfer of interest from the alphas (i.e. absolute performance logic) to the betas (i.e. diversification logic) of alternative strategies. To adapt to this evolution, multimangers have offered investors FoHF that are specialised by strategy and FoHF that provide particular diversification objectives. (See graphs 2 & 3)

Unfortunately, the reporting from these FoHF has not satisfied the new needs of investors. None of the respondents to the Edhec survey (2003)⁵ provides, for example, the exposure of their funds to the principal risk factors. This is obviously in total contradiction with the fact that 95% of the FoHF consider that the quality of reporting and of risk control is the second most important criterion when they select a fund (with the most important criterion being the coherence and the quality of the explanations given by the managers on the subject of their investment strategy).

The objective of this publication is to contribute to the debate on the relevant information to transmit to investors that hold shares in FoHF. As such, it provides a recapitulative list of the figures that it would be desirable to include in the reports sent out to investors by the FoHF, in conformity with the recommendations of the IRC, and more particularly with those presented by the working group responsible for examining the specific problems posed by FoHF (cf. Minimum Transparency Requirements for Fund-of-Hedge Funds - IRC Meeting Findings Amsterdam, June 2002, Hedge Fund Disclosure for Institutional Investors, July 2001). We also provide, in light of recent research on the theme of evaluating the performance and risk factors of hedge funds, a series of indicators that are appropriate for the specific characteristics of alternative strategies.

5 - Cf. Edhec European Alternative Multimangement Practices Survey, 2003 - Opus Cit.2



The specific characteristics of hedge fund performance

The specific characteristics of hedge fund performance

Hedge funds employ dynamic investment strategies and enjoy a high degree of freedom with regard to the instruments that they can hold in their portfolio (stocks, bonds, derivative instruments, real estate, works of art, etc.). To that can be added the possibility of engaging in short selling of securities and using the leverage effect. As stressed by Fung & Hsieh (1997)⁶, alternative strategies are infinitely more complex than those of traditional funds (i.e. generally of buy-and-hold type) because it is no longer sufficient to identify the markets in which the funds are present (location factor), it is also necessary to identify their net exposure and leverage (strategy factor).

Whether it involves the strategic and/or tactical portfolio allocation process, risk-adjusted performance measurement or performance attribution, it is essential to be able to avail of both performance and risk indicators that are reliable. The opaque nature of hedge funds, and also the technical complexity of the strategies that they employ, make this difficult. On this subject, numerous articles have highlighted the weaknesses of the traditional risk and performance measurement indicators within the framework of evaluating the performance of hedge funds (cf. Lo (2001)⁷, Spurgin (2001)⁸ or Brooks and Kat (2002)⁹, etc.).

Biases in hedge fund performance measurement

The measurement of hedge fund performance is made difficult by the presence of various biases. As Fung and Hsieh (2000 & 2002)^{10&11} underline, some biases, such as the survivorship and selection biases, relate to the very nature of the alternative universe (natural biases), others, such as the backfilling or multi-period sampling biases, relate to the way in which the main hedge fund databases are constructed or the way in which the data is used (spurious biases). All these biases tend to artificially and significantly overestimate the performance of hedge funds (e.g. Fung and Hsieh (2000 & 2002)¹² value the survivorship and instant history biases at 4.4% per year¹³) and to underestimate the risks (i.e. mean risk and extreme risk). It is therefore difficult, for investors, to obtain accurate information with tools that are based on biased estimators of the risk and return. However, this is the case for traditional performance measurement tools such as the Sharpe/Treynor/Sortino ratios or traditional risk measurement tools such as volatility / Value-at-Risk (VaR). We should note, on this topic, that in order to solve the bias problems and also, above all, to provide a solution to the lack of representativity with which the various hedge fund indices available on the market are confronted, the Edhec Risk and Asset Management Research Centre launched indices of hedge fund indices at the beginning of 2003¹⁴. For want of reliable data, it is necessary to correct the estimation of the

6 - Fung, W. and Hsieh, D. A., 1997, Empirical Characteristics of Dynamic Trading Strategies: The Case of Hedge Funds, *Review of Financial Studies*, Summer 1997, Vol.10, N°2, p.275-302.

7 - Lo, A., 2001, Risk Management for Hedge Funds: Introduction and Overview, *Financial Analysts Journal*, Nov/Dec 2001, Vol. 57, Issue 6, p.16-33.

8 - Spurgin, R., 2001, How to Game your Sharpe Ratio, *Journal of Alternative Investments*, Winter 2001, Vol. 4, N°3, p.38-46.

9 - Brooks, C. and Kat, H., 2002, The Statistical Properties of Hedge Fund Returns and their Implications for Investors, *Journal of Alternative Investments*, Fall 2002, Vol.5, N°2, p.26-44.

10 - Fung, W. and Hsieh, D. A., 2000, Performance Characteristics of Hedge Funds and Commodity Funds: Natural versus Spurious Biases, *Journal of Financial and Quantitative Analysis*, Vol.35, Issue 3, p.291-307.

11 - Fung, W. and Hsieh, D. A., 2002, Benchmark of Hedge Fund Performance, Information Content and Measurement Biases, *Financial Analysts Journal*, Jan/Feb 2002, Vol.58, N°1, p.22-34.

12 - Cf. Fung and Hsieh (2000 & 2002) – Opus Cit. 10 & 11

13 - It is interesting to note that a working paper by Posthuma and van der Sluis, *A Reality Check on Hedge Fund Returns* (2003), values the instant history bias alone at 4.35% for the whole TASS database, and at 6.34% for the long short equity funds.

14 - Thanks to an original construction method based on principal component analysis (PCA), the Edhec indices allow both the representativity dimension to be maximised and the biases to be minimised. They therefore provide investors with better quality information.

The specific characteristics of hedge fund performance

hedge fund performance and risk ex-post to account for the impact of the different biases mentioned above.

Liquidity and credit risks

Hedge funds are exposed to a large number of risk factors. Among all these sources of risk, the liquidity and credit risks should be considered with care. These two sources of risks are very closely related in the minds of investors, especially since the LTCM affair. Taking the interdependence between the credit and liquidity risks into account should notably lead to a modelling of the consequences of using the leverage effect in arbitrage operations. Today, however, with the exception of highly academic research, such as that on the application of mathematical network theory to the construction of systemic measures of credit and liquidity risks¹⁵, professionals do not have robust and simple microeconomic results at their disposal in this area. It will nevertheless be necessary to attempt to take the interdependence of these two risk factors into account in extreme risk calculations (scenarios, stress tests, etc.).

Some authors (cf. Asness, Kraill and Liew (2000)¹⁶, Brooks and Kat (2002)¹⁷, Lo (2001)¹⁸, Okunev and White (2004)¹⁹, Getmansky, Lo and Makarov (2003)²⁰, etc.) have highlighted the fact that hedge funds tend to invest in instruments that are fairly illiquid. Consequently, when there is no market price available, the calculation of a fund's net asset value can pose

a problem. The choice of the method for valuing illiquid positions then comes down to the hedge fund managers. They can therefore take advantage of this leeway to manipulate the prices so as to smooth the performance of their fund. If that is the case, the auto-correlation coefficient of the return series will be significant and the analysis will yet again be biased. The volatility of the fund performance will be underestimated (by up to 100% according to Okunev and White (2004)²¹). In the same way, the correlation coefficient of the performances of the fund and traditional assets, and the exposure to certain risk factors, will tend to be underestimated. Investors then overestimate the diversification potential and the level of performance that the fund provides. Lo (2001)²² therefore suggests the use of a significance test for the auto-correlation coefficients, the Ljung-Box test, to estimate the liquidity risk. When the latter is significant, it is necessary to correct the return series of the fund or the index before estimating its performance and risk. To this end, Geltner (1991²³, 1993²⁴) proposes a method that is widely used in the real estate sector, which allows the first order auto-correlation to be eliminated. Okunev and White (2004)²⁵ recently proposed a method that is more general, and much more sophisticated, which aims to correct the auto-correlation coefficients up to the n^{th} order.

An alternative solution involves no longer correcting the return series directly, but modifying the measurement tool itself, as proposed, for

15 - Notably Watts, D. and Strogatz, S., June 1998, Collective dynamics of 'small-world' networks, *Nature*, Vol. 393, n° 6, p.440-442, and Watts, D., 1999, *Small worlds: the dynamics of networks between order and randomness*, Princeton University Press.

16 - Asness, C., Kraill, R. and Liew, J., 2000, Do Hedge Funds Hedge?, *Journal of Portfolio Management*, Fall 2001, Vol.28, N°1, p.6-19.

17 - Brooks and Kat (2002) - Opus Cit. 9

18 - Cf. Lo (2001) - Opus Cit. 7

19 - Okunev, J. and White D., 2004, An Analysis of the Risk Factors Underlying Hedge Fund Returns, in *Intelligent Hedge Fund Investing*, Ed. B. Schachter, Pub. RiskBooks.

20 - Getmansky, M., Lo, A. and Makarov, I., 2003, An Econometric Model of Serial Correlation and Illiquidity in Hedge Funds Returns, 2003, Working Paper 4288-03, MIT.

21 - Cf. Okunev and White (2004) - Opus Cit. 19

22 - Cf. Lo (2001) - Opus Cit. 7

23 - Geltner, D., 1991, Smoothing in Appraisal-Based Returns, *Journal of Real Estate Finance and Economics*, Vol.4, p.327-345.

24 - Geltner, D., 1993, Estimating Market Values from Appraised Values without Assuming an Efficient Market, *Journal of Real Estate Research*, Vol.8, p.325-345.

25 - Cf. Okunev and White (2004) - Opus Cit. 19

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example, by Asness et al. (2000)²⁶, Lo (2002)²⁷ or Getmansky et al. (2003)²⁸ with their extensions to the Sharpe ratio.

Non-linear exposures to risk factors

Most of the performance evaluation methods that are currently used are based on mono- or multi-factor linear models (cf. the CAPM, the Fama/French 3-factor model, the Carhart 4-factor model, APT, etc.). The effectiveness of these models depends, amongst other things, on the linearity of the relationships between the dependent variable and the explanatory variables. Unfortunately, three factors contribute to the non-linearity of the exposure of hedge fund performance to the various risk factors:

- First of all, most hedge funds use market timing or risk factor timing. The hedge funds take up a position in a given market or take a long position on a particular risk factor if they anticipate a rise for that factor, and unwind their positions or take a short position when they anticipate a fall. Their exposure is therefore sensitive to the evolution of the factors.
- In addition, hedge funds hold assets in their portfolio whose exposures to the different risk factors are not linear. This is the case for the derivative instruments that they hold for either leverage effect reasons or hedging purposes. As a result, their exposure to certain risk factors (market, volatility, raw materials, interest rates, etc.) is non-linear.

- Finally, the remuneration system for hedge funds is made up of a fixed part (i.e. management fees) and a variable part (i.e. incentive fees). It is therefore an asymmetric form of remuneration because the variable part presents a profile that is similar to that of a call option on the fund performance (with the strike price being equal to the "hurdle rate" specified in the contract). Since the performances of hedge funds are published net of fees by the databases, this introduces, de facto, a non-linear component.

Since the exposures to the risk factors are not linear, it is important, in measuring the sensitivity of fund performance to the different risk factors identified, to analyse at the same time the unconditional and conditional correlations (cf. Amenc et al. (2003)²⁹). This will allow the diversification potential that the fund provides during normal and volatile market phases to be evaluated. Unfortunately, only 16% of the fund managers questioned include information of that kind in their reporting (cf. Edhec (2003)³⁰).

Numerous authors have explored the non-linearity of the exposure of hedge fund performance to risk factors and have underlined the problems that it leads to within the framework of multi-factor analysis (Fung and Hsieh (1997 & 2000)³¹, Edwards and Caglayan (2001)³², Lo (2001)³³, Dor et al. (2003)³⁴, Amin and Kat (2003)³⁵, Liang (2004)³⁶ and Agarwal and Naik (2004)³⁷). They have come up with different suggestions for capturing the share

26 - Cf. Asness et al. (2000) - Opus Cit. 16

27 - Lo, A., 2002, The Statistics of Sharpe Ratio, *Financial Analysts Journal*, Vol.58, Issue 4, p.36-50.

28 - Cf. Getmansky et al. (2003) - Opus Cit. 20

29 - Cf. Amenc et al. (2003) - Opus Cit. 1

30 - Cf. Edhec (2003) - Opus Cit. 2

31 - Cf. Fung and Hsieh (1997 & 2000) - Opus Cit. 6 & 10

32 - Edwards, F. and Caglayan, M., 2001, Hedge Fund and Commodity Fund Investment Styles in Bull and Bear Markets, *Journal of Portfolio Management*, Vol. 27, N°4, p. 97-108.

33 - Cf. Lo (2001) - Opus Cit. 7

34 - Dor, A., Jagannathan, R., and I. Meier 2003, Understanding Mutual Fund and Hedge Fund Styles Using Return Based Style Analysis, *Journal of Investment Management*, Vol.1, N°1, p.94-134.

35 - Amin, G. and Kat, H., 2003, Hedge Fund Performance 1990 - 2000: Do the Money Machines Really Add Value?, *Journal of Financial and Quantitative Analysis*, Vol.38, N°2, June 2003.

36 - Liang, B., 2004, On the Performance of Alternative Investments: CTAs, Hedge Funds, and FoHF, *Journal of Investment Management*, Vol.2, N°4.

37 - Agarwal, V., Naik, N., 2004, Risks and Portfolio Decisions Involving Hedge Funds, *Review of Financial Studies*, Spring, Vol.17, N°1, p.63-98.

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of non-linearity, i.e. the strategy factor, of hedge fund returns. To this end, some propose introducing implicit factors (Fung and Hsieh (1997)³⁸) or option strategies (Agarwal and Naik (2004)³⁹); others suggest using hedge fund indices in order to adapt Sharpe's (1992)⁴⁰ style analysis to the alternative universe (cf. Agarwal (2000)⁴¹, Lhabitant (2001)⁴² and Dor et al. (2003)⁴³). Finally, there are those who suggest using models that are capable of taking the so-called "phase locking" phenomena into account (cf. Lo (2001)⁴⁴).

Extreme risks

Most traditional performance and risk measurement tools are based on a common assumption: that the return distribution function of the asset being evaluated is normal. In that case, the risk of an asset is only characterised by the second order moment of its return distribution function (i.e. the standard deviation or volatility). However, numerous studies have highlighted the significance of the third and fourth order moments of the hedge fund return distribution functions (respectively, the skewness and kurtosis coefficients). In view of the sensitivity of investors to the third and fourth order moments (cf. Scott and Horvath (1980)⁴⁵), hedge fund performance cannot be analysed within a mean/variance framework. Based on that observation, tools such as the Sharpe ratio or the VaR (unless the VaR is calculated on the

basis of historical data or with Monte Carlo simulations based on non-normal distributions) only partially integrate the risk to which investors are exposed. However, as the Edhec study (2003)⁴⁶ shows, most European multimangers only use those kinds of indicators in their reporting. The Bera Jarque test (1987)⁴⁷ allows for an evaluation of the extent to which the distribution function observed is removed from a normal distribution. It therefore indirectly evaluates the investors' risk of being wrong when they use a traditional performance measurement tool in their investment management process. To make up for that, it is essential to integrate the third and fourth order moments of the distribution function in the risk analysis. That is the case for certain performance and/or risk indicators such as the Cornish-Fisher VaR, the Sharpe-Omega ratio (cf. Kazemi et al. (2004)⁴⁸), Keating and Shadwick's Omega (2002)⁴⁹ or the ASRAP presented in the present document. Unfortunately, the study carried out by Edhec shows that only 4% of multimangers give any importance to the Omega (and only 2% to the BVaR) when they select a fund.

38 - Cf. Fung and Hsieh (1997) - Opus Cit. 6

39 - Cf. Agarwal and Naik (2004) - Opus Cit. 37

40 - Sharpe, W., 1992, Asset Allocation: Management Style and Performance Measurement, *Journal of Portfolio Management*, Winter 1992, Vol. 18, p.7-19.

41 - Agarwal, V., 2000, Generalized Style Analysis of Hedge-funds, *Journal of Asset Management*, July 2000, Vol.1, N°1, p.93-109.

42 - Lhabitant, F.S., 2001, Assessing Market Risk for Hedge Funds and Hedge Funds Portfolios, *Journal of Risk Finance*, Spring 2001, p.1-17.

43 - Dor et al. (2003) - Opus Cit. 34

44 - Cf. Lo (2001) - Opus Cit. 7

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The specific characteristics of hedge fund performance

Dynamic exposures to risk factors

Hedge funds invest in a wide variety of instruments. They are therefore exposed to different risk factors (market, volatility, liquidity, credit, etc.). If we consider that for each alternative strategy there is a corresponding set of underlying risk factors, the best funds, for a given strategy, are those that successfully manage to over- or underweight their exposure to the different risk factors in accordance with market conditions. As a result of this tactical factor allocation strategy, the hedge funds' exposure to the risk factors evolves over time. In addition, since the markets are relatively efficient, there is not an infinite number of arbitrage opportunities. To maintain their performance, therefore, some hedge funds tend to grab opportunities that arise, even if this makes them deviate from the strategy that they claim to follow. This occasional change in style, which is called "style drift" (cf. Lhabitant (2001)⁵⁰) by investors, also leads to a variation in the exposures to the risk factors. As a result, the exposure of hedge funds to risk factors is doubly dynamic (cf. Brealey and Kaplanis (2001)⁵¹ and Lo (2001)⁵²).

The standard multi-factor models do not allow the dynamics of the exposures to risk factors to be taken into account, because the stability of the coefficients is one of the central assumptions of these models. They restrict themselves to measuring the average exposure to the different risk factors during the analysis period. This naturally distorts the evaluation of the risk-adjusted performance of hedge funds. A natural solution is to divide the return series being analysed into various sub-periods and to use the factor model on those different sub-samples to study the dynamics of the exposures to the risk factors. The paradox with this method is that it seeks to capture dynamics with a model that includes an assumption on the stability of the coefficients. A more elegant solution is to use models that allow the coefficients of the model to vary over time. The use of conditional beta evaluation models that aim to resolve this problem is currently being examined in numerous research studies (cf. Kat and Miffre (2002)⁵³, Schneeweis and Kazemi (2003)⁵⁴, Gupta et al. (2003)⁵⁵ and Gregoriou (2003)⁵⁶).

50 - Cf. Lhabitant (2001) – Opus Cit. 42

51 - Brealey, R., Kaplanis, E., 2001, Hedge Funds and Financial Stability: An Analysis of their Factor Exposures, *International Finance*, Vol. 4, N°2, 2001, p.161-187.


52 - Cf. Lo (2001) – Opus Cit. 7

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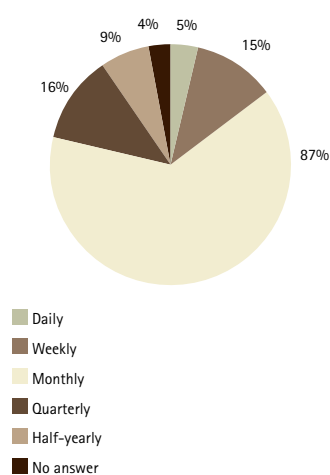
56 - Gregoriou, G., 2003, Performance Evaluation of Funds of Hedge Funds Using Conditional Alphas and Betas, *Derivatives Use, Trading & Regulation*, Vol.8, N°4, p.324-344.



Edhec
recommendations
for funds of hedge
funds reporting

Edhec recommendations for fund of hedge fund reporting

Graph 4
How frequently is reporting carried out?



Source: Edhec European Alternative Multimanagerment Practices Survey, 2003

The lack of transparency of hedge funds is widely regarded as the last major obstacle to the industrialisation of alternative investment. In that respect, the following questions come up again and again: what should the granularity of hedge funds' reporting be? What publication frequency is appropriate? These questions are certainly relevant, but the debate on the transparency of hedge funds often fails to emphasise the right issue. One has to bear in mind that transparency is not an objective per se, it is simply a means. The aim is to reach a level of information that is sufficient to allow investors to feel comfortable when investing in a hedge fund. It does not involve wondering about the metaphysics of transparency but is simply a response to a practical problem: "What is the minimum level of information that investors require in order to evaluate the risk-adjusted performance of hedge funds?" If we can answer this question, we will know whether a compromise between the constraints of hedge funds and the requirements of investors can be envisaged.

The frequency of publication

The frequency of publication generally depends on the portfolio turnover and the difficulties in pricing the positions held. With regard to FoHFs, monthly periodicity seems technically possible and commercially acceptable, as is confirmed by 87% of the multimanagerment who participated in the Edhec survey (2003)⁵⁷ (See graph 4). While high turnover trading strategies such as CTAs' discretionary active strategies can value their positions on a daily basis, the same is not true of medium/long-term strategies like distressed debt, which hold less liquid

assets. Therefore monthly periodicity for reporting may be a good trade-off. In its June 2002 report on the minimal transparency requirements for FoHF, the IRC specifies the data that it is appropriate to publish on a monthly basis. The data that could or should be included in a monthly report is enumerated below and the data that has been given a special mention by the IRC is indicated.

The granularity of the monthly activity report

The data that is generally disclosed by hedge funds does not allow investors to manage the risks to which they are exposed. All investors, especially institutional investors, therefore agree that greater transparency is necessary. However, one question remains to be answered: can hedge funds provide investors with a sufficient level of information without putting themselves in danger? To answer that, it is necessary to know the minimal level of information required by institutional investors to implement risk control tools. Investors must be able to assess the level of risk and performance of the fund at time t , but also follow its evolution through time and under varying market conditions. For that purpose, do investors need full disclosure of the hedge fund's positions (portfolio-based approach) or can they make do with data aggregated by strategy, by asset class or by sector (return-based approach)?

As far as the disclosure of individual fund positions is concerned, the opinions are fairly clear-cut because the members of the IRC all agree that they can only be revealed when the

57 - Cf. Edhec (2003) - Opus Cit. 2

Edhec recommendations for fund of hedge fund reporting

positions are no longer held. Besides, they add that any information for which disclosure could potentially have a negative impact on the fund does not have to be revealed by the manager, even to the investors who receive the reports. Indeed, full disclosure would appear to be the ultimate inefficient solution since most investors would not have enough time to process a large amount of information and, at the same time, the costs implied by such reports would significantly reduce the funds' performance.

On the other hand, there is no argument that could justify the non-disclosure of the FoHF allocation (weights by type of strategy and by hedge fund with a full weighting history from the start). The IRC working group on FoHFs specifies that information of that kind should be communicated to investors every month.

On the subject of risk and return indicators, the IRC also suggests completing the aggregate results obtained at the FoHF level through an analytical presentation:

- at the strategy type (relative value, event driven, etc.) and/or sub-strategy level (market neutral, fixed-income arbitrage, convertible arbitrage, deal arbitrage, distressed, long/short equity hedged/non-hedged, etc.);
- at the asset group level (sector, country, currency, management style, etc.) or by any combination of analysis criteria that is relevant with regard to the FoHF's sources of return.

Risk and return indicators

The indicators that we shall now present will complete the basic information that is usually communicated by the FoHF each time a report is published, whatever its frequency (net asset value per share*, net assets* (allows redemption/subscription flows, which are rarely disclosed outside of the annual report, to be monitored) and strategic allocation (weight of each strategy and each fund relative to the FoHF's net assets)).

*N.B. - *As far as the problems posed by the pricing of positions are concerned, FoHFs have to make sure that the pricing rules defined by each single hedge fund in which they invest are compliant with the SEC's recommendations (see guidance on fair value pricing for funds) and that they are applied correctly. In that respect, procedures aimed at checking that pricing rules are actually applied should be mentioned in a special section of the client report.*

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Risk and return analysis

N.B. Exponent^M mentioned with some indicators means that the IRC considers the data to be indispensable and the minimal publication frequency of the data should be monthly.

Traditional performance measurement tools	<ul style="list-style-type: none"> - history of FoHF's monthly returns (net of fees^{**})^M, - history of monthly returns (net of fees^{**}) for each strategy and each fund in which the FoHF invests^M, - FoHF's annualised return (net of fees^{**})^M, - annualised return (net of fees^{**}) for each strategy and each fund in which the FoHF invests^M, - FoHF's year-to-date return (net of fees^{**})^M, - year-to-date return for each strategy and each fund in which the FoHF invests^M, - FoHF's cumulative return since inception (net of fees^{**}) compared with a composite index of hedge funds, traditional equity and bond indices and the risk-free rate, - analysis of the contribution of each strategy and each fund to the FoHF's return^M, - performance attribution (analysis of excess return with a composite index: asset allocation, fund picking).
Basic extreme risk measure	<ul style="list-style-type: none"> - minimum/maximum returns for the period, maximum drawdown (peak to valley) and uninterrupted loss since the FoHF was launched with both time to recovery and drawdown time.
Analysis of the (non) linearity of returns	<ul style="list-style-type: none"> - percentage of positive/negative months, - up months in up market, - down months in down market, - outperformance in up market, - outperformance in down market.
Analysis of the distribution function of the returns	<ul style="list-style-type: none"> - analysis of the distribution of returns for the period: Bera Jarque test for the assumption of normality to be tested, then: <ul style="list-style-type: none"> • calculation of the annualised standard deviation and the semi-variance or downside risk to account for asymmetrical distributions^M, • calculation of the skewness to measure the asymmetry of the distribution^M, • and calculation of the kurtosis to verify the fatness of the distribution tails^M.
Analysis of the interaction between leverage and both credit and liquidity risks	<ul style="list-style-type: none"> - gross and net leverage analysed at the FoHF level (with breakdown by sector, management style, country, currency, etc.), and also by strategy and by hedge fund held, simply because an apparently low risk at the portfolio level may mask an unreasonable long or short bet on one or more strategies or asset groups^M, - calculation of the effective duration and spread duration (credit risk) for interest rate products^M,

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- | | |
|--------------------------|--|
| Analysis of extreme risk | <ul style="list-style-type: none"> - liquidity risk evidenced by the auto-correlation coefficient, for which the degree of significance is measured by the Ljung-Box⁵⁸ statistical test, - evaluation of the liquidity risk through the Herfindahl index (cf. Getmansky et al. (2003)⁵⁹), - liquidity ratio (cash/equity or cash+borrowing capacity, VaR/equity or cash+borrowing capacity, worst historical drawdown/equity or cash+borrowing capacity, scenario derived market risk measure/equity or cash+borrowing capacity)^M. |
| | <ul style="list-style-type: none"> - stress test^M to assess the impact on the FoHF's NAV of a sudden and sharp change in market prices (requires the application of identical stress scenarios to each hedge fund held), - calculation of Style-VaR^M (Lhabitant – Opus cit. 42), which provides a relevant measure of the risks of extreme losses. This method is also particularly useful within the framework of a FoHF because it allows the investment style of a fund to be clearly determined, dynamically and over time, irrespective of what the manager claims⁶⁰, - calculation of Cornish-Fisher VaR, together with Incremental and Component Cornish-Fisher VaR, to assess the contribution of each strategy or asset group to the portfolio's extreme risk, - calculation of BVaR to estimate the mean value of the losses that exceed the VaR. |

*NB. - **Disclosure of gross and net FoHF returns should also be an opportunity to clarify the arrangements for applying incentive fees (the notion of equalisation). Experience shows that, due to the number of equalisation methods and their complexity, few investors genuinely understand how this mechanism works, even though it is implemented by 75% of the funds administered in Europe with the aim of ensuring that performance commissions are spread equitably between all the investors.*

Risk-adjusted return analysis

The following performance indicators should be calculated both at the FoHF level and for each type of strategy and fund in which the FoHF invests:

- Sortino ratio: more relevant than the Sharpe ratio when the return distribution is skewed, particularly when it is left-skewed. Even though it is defined from the same principles, except that the risk-free rate is replaced

by the minimum acceptable return (MAR) targeted by the FoHF and the denominator is the standard deviation of the returns that are below that return, the Sortino ratio takes skewed distributions into account^M.

- the Omega: this indicator was proposed recently by Keating and Shadwick (2002)⁶¹. It allows all the moments of the return distribution function of the asset being evaluated to be taken into account in a very simple way.

58 - Ljung, G.M. and Box, G.E.P., 1978, On a Measure of Lack of Fit in Time Series Models, *Biometrika*, Vol. 65, N°2, p.297-303

59 - Cf. Getmansky et al. (2003) – Opus Cit. 20

60 - An improvement to the calculation proposed by F.-S. Lhabitant would be a two-stage process (style analysis, extreme risk analysis) which, in the 2nd stage, allows for the removal of the portfolio constraints and recovery of the independent nature of the residuals, which are essential for the reliability of the analysis.

61 - Cf. Keating and Shadwick (2002) – Opus Cit. 49

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New Indicators

- Sharpe – Omega ratio: this indicator was proposed recently by Kazemi et al. (2004)⁶². It is an extension to the Sharpe ratio and Keating and Shadwick's Omega (2002)⁶³. It presents the advantage of taking all the moments of the return distribution function into account and providing an intuitive measure of the risk-adjusted performance of a fund.
- Alternative-Style-Risk Adjusted Performance (ASRAP): this performance measure is an adaptation of the SRAP to performance measurement in the alternative universe. The risk is no longer adjusted by the volatility but by the Cornish-Fisher extension to the VaR.

Note that it is advisable for all of these indicators to correct the return series first for the auto-correlation problems mentioned above. Please see below for more details on the method used.

- Calmar and Sterling Ratios: the original feature of these two risk-adjusted performance indicators is to use the maximum drawdown to define the risk dimension. The Calmar ratio is equal to the fund's return divided by its maximum drawdown while the Sterling ratio is equal to the fund's return divided by 10% plus the average drawdown (generally calculated over the last three years).

Beta and correlation analysis

Since the exposure of hedge funds to the different risk factors is dynamic and, in certain cases, non-linear, it is essential to carry out the following analyses, both at the FoHF level and for each type of strategy and each type of fund in which the FoHF invests:

- static and dynamic style analysis, notably using pure style indices (cf. the Edhec alternative indices⁶⁴). This analysis presents the par-

ticular advantage of highlighting any eventual style drift;

- analysis of correlations and conditional / unconditional betas with traditional equity and bond indices^M,

- analysis of correlations and conditional / unconditional betas with risk factors that are appropriate for the strategy of the fund or FoHF;

- dynamic factor analysis to track the evolution of the exposure to the risk factors selected for the strategy followed.

This analysis gives investors a better understanding of the risks to which they are exposed, which in turn gives them a more accurate measurement of the risk-adjusted performance of the fund and the genuine diversification potential that it offers.

For more demanding investors, one can attempt to enhance reports by attempting to assess the alpha generated by the FoHF through multi-factor/multi-index models (peer groups [cluster], implementation of

62 - Kazemi et al. (2004) – Opus Cit. 48

63 - Cf. Keating and Shadwick (2002) – Opus Cit. 49

64 - The Edhec indices are composite portfolios of competing indices that provide good representativity and minimise the problems of purity. A detailed presentation of the construction method for the Edhec indices, together with their performance history, can be downloaded from www.edhec-risk.com.

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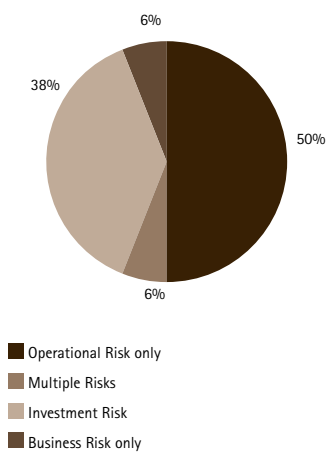
implicit and explicit multi-factor methods, Amenc-Curtis-Martellini's implicit / explicit multi-index model).

All the above-mentioned indicators provide exhaustive information in the area of applied quantitative analysis and enable the FoHF to build quality reports for final investors. In line with the expectations of the IRC, such reports measure the risks of a FoHF and check on their evolution without the need for details on the positions. Nonetheless, as relevant as it might or might not be, the client report alone does not suffice. It should never replace the classic due diligence process (questionnaires, on-site visits, discussions with the manager, etc.). Thorough knowledge of the fund is essential to make up for any eventual weaknesses in the quantitative analysis (no tool, for example, allows the impact of off-balance sheet operations to be measured. These operations are not taken into account at all by 27% of the respondents to the Edhec survey (2003)⁶⁵). According to a study by Capco (2003)⁶⁶, 50% of hedge fund failures are due to operational risk,

rather than financial risk (See graph 5). However, operational risk is not integrated by the various indicators mentioned above. It requires an in-depth qualitative analysis which complements the quantitative analysis that appears in the client report. As such, due diligence presents the advantage of giving investors a more qualitative side of the risk, which allows them to assess the short-term evolution of the risk more accurately. The strategic importance of these audits is justification for the fact that only 20% of European multimanager outsource the activity (cf. Edhec (2003)⁶⁷).

We note that it would be interesting to draw up quality standards that would be comparable to the ISO 9000 standards used in the industry. This would allow for certification of the quality of the investment management process and risk control implemented by a fund, which would considerably reduce the operational risks. Institutional investors could thus invest unreservedly in alternative investments.

Graph 5
Analysis of Hedge Fund Failures



Source: Capco Research and Working Paper, "Understanding and Mitigating Operational Risk in Hedge Fund Investments", 2003

65 - Cf. Edhec (2003) - Opus Cit. 2

66 - Capco, Understanding and Mitigating Operational Risk in Hedge Fund Investments, 2003

67 - Cf. Edhec (2003) - Opus Cit. 2

Presentation of the principal indicators



Presentation of the principal indicators

Analysis of the distribution function

The analysis of the distribution function should never be limited to the first order (mean) and second order (standard deviation) moments. As we mentioned previously, hedge fund returns are not normally distributed. It is therefore essential to analyse the third order (skewness) and fourth order (kurtosis) moments.

Skewness

The skewness indicator measures the return distribution function's asymmetry coefficient. For an exhaustive series of N returns, the skewness is equal to:

$$S = \sum_i \frac{(r_i - \bar{r})^3}{N \cdot \sigma^3},$$

where r_i corresponds to the i^{th} return of the observed series of N returns, \bar{r} is the mean of the returns, and σ the standard deviation.

Applied to a normal distribution, the skewness would be equal to 0.

Kurtosis

The kurtosis allows the fatness of the distribution tails to be assessed. A high level of kurtosis therefore means that there are extreme returns (outliers). The kurtosis is calculated as follows:

$$K = \sum_i \frac{(r_i - \bar{r})^4}{N \cdot \sigma^4}$$

with r_i the i^{th} of the observed series of N returns, \bar{r} the mean of the returns, and σ the standard deviation.

Applied to a normal distribution, the kurtosis would

be equal to 3. That is why we more commonly use the excess kurtosis, i.e. the differential obtained compared to a normal distribution, or:

$$\sum_i \frac{(r_i - \bar{r})^4}{N \cdot \sigma^4} - 3$$

The Bera Jarque test

This indicator tests the normality of a distribution function. It presents the advantage of simultaneously analysing the third and fourth order moments of the distribution function.

$$BJ = N \left[\frac{S^2}{6} + \frac{(K - 3)^2}{24} \right]$$

where N is the number of observations. Under the assumption of normality, the BJ statistic follows a Chi-squared distribution with 2 degrees of freedom.

Analysis of the auto-correlation coefficients

The Ljung-Box test

Given that hedge funds take positions on assets that are sometimes illiquid, their returns are liable to be auto-correlated. In that case, it becomes difficult to measure the real exposure of hedge funds to the different risk factors (market, volatility, credit, etc.). The Ljung-Box test (1978)⁶⁸ can be used to assess the level of auto-correlation:

$$Q = N(N + 2) \sum_{k=1}^m \frac{\theta_k^2}{N - k}$$

where N is the number of observations and θ_k the k^{th} order auto-correlation coefficient. Under the assumption that the auto-correlation coefficients of order 1 to m are null, the Q statistic follows a Chi-squared distribution with m degrees of freedom.

68 - Cf. Ljung and Box (1978) - Opus Cit. 58

Presentation of the principal indicators

The Herfindahl index

Taking the following system:

$$\left\{ \begin{array}{l} R_t^0 = \sum_{i=0}^k \theta_i R_{t-i} , \\ \theta_j \in [0,1], j = 0, \dots, k , \\ I = \sum_{i=0}^k \theta_i . \end{array} \right.$$

where R_t^0 is the observed return of an asset, R_t the real return of this fund and θ_i the auto-correlation coefficient of order i .

The auto-correlation coefficient of order m is written as follows:

$$\text{Corr} [R_t^0, R_{t-m}^0] = \begin{cases} \frac{\sum_{j=0}^{k-m} \theta_j \theta_{j+m}}{\sum_{j=0}^k \theta_j^2} & \text{if } 0 \leq m \leq k \\ 0 & \text{if } m > k \end{cases}$$

with *Herfindahl Index* = $\sum_{j=0}^k \theta_j^2$

The Herfindahl index is between 0 and 1. When it tends towards 1, the auto-correlation (i.e. the liquidity risk) is low. The auto-correlation is maximal when it tends towards 0.

Method for correcting auto-correlation coefficients

Numerous methodologies have been proposed to solve the problem of the auto-correlation of the return series of certain assets: Blundell and Ward (1987)⁶⁹, Ross and Zisler (1991)⁷⁰, Geltner (1991 & 1993)⁷¹, Barkham and Geltner (1994)⁷², Fisher et al. (1994)⁷³, Brown and

Matysiak (1998)⁷⁴, Cho et al. (2001)⁷⁵ and Okunev and White (2004)⁷⁶.

In their analysis, Okunev and White (2004)⁷⁷ show that only the first order auto-correlation coefficients are systematically significant in the case of alternative strategies (the second order coefficients are only significant for some of the indices that represent the convertible arbitrage and fixed-income arbitrage strategies). For simplicity purposes, we therefore suggest correcting the first order auto-correlation only, using the Geltner method (1991)⁷⁸. To do so, we simply consider that the return observed at time t is equal to a linear combination of the real return recorded at t and the return observed at $t-1$. It is thus easy to calculate the real series of returns, because we have:

$$R_t = \frac{R_t^* - \alpha R_{t-1}^*}{1 - \alpha}$$

where R_t^* is the return observed at t , R_t the return that was really recorded at t , R_{t-1}^* the return observed at $(t-1)$ and α the first order auto-correlation

We note that the evaluation of the risk-adjusted performance of an asset for which the return series is auto-correlated is liable to be strongly biased. The same goes for the evaluation of the exposures to the various risk factors. We therefore suggest applying the Geltner method (1991)⁷⁹ presented above before calculating the different performance and risk indicators presented in this document.

69 - Blundell, D. and Ward, C.W.R., 1987, Property Portfolio Allocation: A Multi Factor Model, *Journal of Development Studies*, N°4, p.145-156.

70 - Ross, S.A. and Zisler, R., 1991, Risk and Return in Real Estate, *Journal of Real Estate Finance and Economics*, Vol.4, N°2, p.175-190.

71 - Cf. Geltner (1991 & 1993) - Opus Cit. 23 & 24

72 - Barkham, R. and Geltner, D., 1994, Unsmoothing British Valuation Based Returns without Assuming an Efficient Market, *Journal of Property Research*, N°11, p.81-95.

73 - Fisher, J.D., Geltner, D.M. and Webb R.B., 1994, Value Indices of Commercial Real Estate: A Comparison of Index Construction Methods, *Journal of Real Estate Finance and Economics*, N°9, p.137-164.

74 - Brown, G.R. and Matysiak G.A., 1998, Valuation Smoothing without Temporal Aggregation, *Journal of Property Research*, N°15, p.89-103.

75 - Cho, H., Kawaguchi, Y. and Shilling J.D., 2001, Unsmoothing Commercial Property Returns: A Revision to Fisher Geltner Webb's Unsmoothing Methodology, Working Paper.

76 - Cf. Okunev and White (2004) - Opus Cit. 19

77 - Cf. Okunev and White (2004) - Opus Cit. 19

78 - Cf. Geltner (1991) - Opus Cit. 23

79 - Cf. Geltner (1991) - Opus Cit. 23

Presentation of the principal indicators

The Omega

Since hedge fund returns are not normally distributed, it is not appropriate to evaluate their performance within a mean-variance framework. The investor requires a performance measurement tool that takes the first to fourth order moments of the distribution function into account. The Omega is therefore perfectly suitable for evaluating the performance of hedge funds because it considers the whole distribution function of the asset that is being evaluated. The main weakness of the Omega is its sensitivity to the size of the sample because at least 40-50 observations are necessary to obtain relatively stable results.

$$\Omega(MAR) = \frac{\int_a^b [1 - F(x)] dx}{\int_a^b [F(x)] dx}$$

where x is a random variable and F is the cumulative return distribution function of the asset that is being evaluated. The constants a and b respectively represent the lower and upper boundaries of the distribution function. MAR corresponds to the minimal acceptable return.

We note that the choice of the MAR has particular importance in the calculation of the Omega, because as Keating and Shadwick (2002)⁸⁰ stress, the classification of an asset depends on this choice. Unfortunately there is no absolute rule in this area. One thing is certain: the choice of the MAR has to be consistent with the investors' preferences.

The latter invest in FoHF for two reasons: to improve their portfolio diversification (i.e. exposure to various risk factors) and to limit the risk of loss by taking advantage of the

manager's skill in selecting the right funds (i.e. preservation of capital). As a result, the MAR can be set to the level of the risk-free rate.

In view of the lock-up periods imposed by hedge funds and FoHF, investors are forced to take their decisions in a multi-period framework. Consequently, since they cannot redeem their money whenever they want, they must be sure that the current success of a fund is not obtained at the expense of its future performance. The success of a fund greatly depends on its capacity to attract talented managers. Given that managers' remuneration primarily depends on incentive fees, all the returns below the hurdle rate (i.e. the point above which funds are entitled to incentive fees) tend to increase the probability that the best managers will quit (i.e. diminishes the fund's future profit potential). It can therefore be useful to account for the hurdle rate and the high watermark provisions when setting the MAR. We suggest integrating them into the computation of the MAR as follows⁸¹:

$$MAR_t = \max(0; CMGR) * \delta + \text{Hurdle Rate}$$

where

$$CMGR = 12 \cdot \sqrt[12]{\frac{\max_{Inception Date \leq t \leq T} NAV_t - NAV_t}{NAV_t}} - 1$$

where t corresponds to the month in which the MAR is computed, d is a dummy variable equal to 0 when the remuneration clause in the fund contract does not include a high watermark provision and 1 otherwise. $\text{Max } NAV_t$ is the highest historical level of the NAV that served as a reference for calculating the incentive fees. $CMGR$ (Compounded Monthly Growth Rate) is the actuarial growth rate enabling $\text{Max } NAV$ to be reached between the MAR calculation date (i.e. t) and the year end (i.e. 12). "Hurdle Rate" is the threshold above which the hedge fund is entitled to incentive fees.

Nonetheless, in order for each investor to be able to compare, for a level of MAR that corresponds to their own objectives, the Omega ratio

80 - Cf. Keating and Shadwick (2002) - Opus Cit. 49

81 - We assume that the incentive fees are calculated at the end of the year (i.e. once a year).

Presentation of the principal indicators

of the FoHF with that of the reference indices (for example, an equity index, a fixed-income index and a portfolio corresponding to the investor's strategic allocation), we suggest that the Omega function (i.e. the evolution of the Omega ratio according to the level of the MAR) be included in the FoHF's monthly activity report⁸². It would then be up to each investor to identify the weight that corresponds to their risk profile on the curve. It might also be interesting to highlight the point that corresponds to the value of the ratio that is calculated by default, i.e. with a MAR obtained according to the method presented above.

From the Sharpe ratio to the Sharpe-Omega ratio

The Sharpe ratio

The Sharpe ratio intuitively measures the risk-adjusted performance of an asset. It involves measuring the excess return – or risk premium – of a portfolio in relation to the risk-free rate, compared to the total risk of the portfolio measured by its standard deviation.

$$S_p = \frac{E(R_p) - R_f}{\sigma(R_p)}$$

where $E(R_p)$ denotes the portfolio's expected return
 R_f denotes the return of the risk-free asset
 $\sigma(R_p)$ denotes the standard deviation of the portfolio's returns

The main weakness of the Sharpe ratio is that it takes the volatility as a measure of risk. Since the hedge funds' return distribution function is asymmetrical, it is essential to take the loss aversion of investors into account.

The Sortino ratio

As a response to this criticism, Sortino proposed his own ratio. It is defined like the Sharpe ratio, but also allows the asymmetry of the return distribution to be taken into account by calling on the semi-variance. It measures the excess return of a portfolio in relation to a level of minimal acceptable return (MAR), compared to the risk that is situated below the MAR only:

$$Sortino = \frac{E(R_p) - MAR}{SV}$$

$$SV = \frac{E(R_p) - MAR}{\sqrt{\frac{1}{T} \sum_{t=0}^T (R_{Pt} - MAR)^2}}$$

with $R_t < MAR$ (MAR = monthly average minimal acceptable return), $t = 1$ to T (T being the total number of months for which the monthly return is situated below the MAR).

The Sortino ratio is perfectly suited to an asymmetrical return distribution because, contrary to the measures that are based on the standard deviation, the use of the semi-variance avoids one having to make an assumption on the shape of the return distribution function. Having said that, the measurement of the downside risk (or the risk situated below the MAR) is not problem-free. The main source of error relates to the estimation of what Sortino calls the location point. Given that the MAR is determined in relation to this point, if the location point is underestimated, then we underestimate the downside risk and if the location point is overestimated, we overestimate the downside risk. The ratio is then biased and does not allow the performance of

82 - On this topic, we thank Con Keating for his astute advice and remarks.

Presentation of the principal indicators

the portfolio to be measured efficiently. For that reason, we suggest, like for the Omega ratio, the inclusion of the evolution of the Sortino ratio according to the level of the MAR. Moreover, we note that the practical application of this ratio requires the portfolio's return distribution function to be determined. It is thus necessary to turn to the historical data, which can be biased if it is reported wrongly.

The Sharpe–Omega ratio

This ratio, which preserves the simplicity of the Sharpe ratio and takes all the moments of the distribution function into account, was proposed recently by Kazemi et al. (2004)⁸³. The advantage of this indicator is that it provides the investor with the same information as the Omega indicator while preserving the spirit of the Sharpe ratio, hence the name, the Sharpe – Omega ratio:

$$\text{Sharpe} - \text{Omega} = \frac{E(R_p) - MAR}{P(MAR)}$$

where $P(MAR)$ represents the price of a European put option on the asset evaluated, with a maturity of 1 month and a strike price equal to the MAR.

We note that this means that the option pricing method takes the fatness of the distribution tails of the hedge funds' return distribution function into consideration. The Black & Scholes method cannot therefore be applied.

From M^2 to Alternative Style Risk Adjusted Performance (ASRAP)

M^2 (cf. Modigliani and Modigliani (1997)⁸⁴) is an indicator that allows the performance of all funds to be measured in relation to the market portfolio. An extension to this indicator, the Style Risk

Adjusted Performance, was proposed by Lobosco (1999)⁸⁵ to take the impact of the management style of the asset being evaluated into account.

In M^2 and the SRAP, the level of risk is fitted with the volatility. However, as we have stressed on several occasions, hedge fund risk is not limited to the second order moment of their return distribution function; it is imperative to take the extreme risks into account (i.e. third and fourth order moments of the return distribution function).

To integrate the higher order moments, one solution is to take the Cornish–Fisher VaR (see below for a definition of the Cornish–Fisher VaR) as a risk indicator. We obtain the following indicator:

$$ARAP = \frac{VaR_{\text{CornishFisher}}(I_{\text{FoHF}})}{VaR_{\text{CornishFisher}}(HF)} (R_{HF} - R_f) + R_f$$

where I_{FoHF} is a FoHF index and HF the hedge fund being analysed. As Fung and Hsieh (2002)⁸⁶ suggest, the FoHF index offers the best possible approximation of the hedge fund universe. R_{HF} and R_f are respectively the mean return of the hedge fund and the risk-free rate. $VaR_{\text{CornishFisher}}(HF)$ and $VaR_{\text{CornishFisher}}(I_{\text{FoHF}})$ are respectively the VaR calculated according to the Cornish–Fisher extension of the fund being analysed and the FoHF index.

The ARAP thereby allows two funds that follow the same strategy to be compared. If the two funds follow different strategies, one simply adapts the SRAP as follows:

$$ASRAP = ARAP(\text{fund}) - ARAP(\text{style index}).$$

The Alternative Style Risk Adjusted Performance or ASRAP thus allows the RAP and the SRAP to be adapted to performance measurement in the alternative universe.

83 - Kazemi et al. (2004) – Opus Cit. 48

84 - Modigliani, F. and Modigliani, L., 1997, Risk Adjusted Performance, Journal of Portfolio Management, Winter 1997, Vol.23, Issue 2, p.45-54.

85 - Lobosco, A., 1999, Style Risk Adjusted Performance, Journal of Portfolio Management, Vol.25, N°3, Spring 1999, p.65-68.

86 - Cf. Fung and Hsieh (2002) – Opus Cit. 11

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From Maximum Drawdown to the Style VaR

Maximum drawdown

Since hedge fund returns are not normally distributed, it is important to measure the extreme risks. The simplest measure involves calculating the maximal loss recorded by the fund during the period of analysis or the maximum drawdown, i.e. the biggest loss recorded in comparison with the highest level reached by the fund during the period.

$$\text{Maximum Drawdown} = \min_{0 \leq t \leq T} \left[\frac{NAV_t}{\max_{0 \leq i \leq t} (NAV_i)} - 1 \right]$$

It is also interesting to calculate the maximum uninterrupted loss, i.e. the maximal consecutive loss recorded by the fund.

$$\text{Maximum Uninterrupted Loss} = \min_{1 \leq i \leq n} \prod_{t=1}^i (1 + \min(0; r_t)) - 1$$

with i the date on which the analysis is carried out and r_t the monthly returns of the fund observed at date t .

This measure is generally accompanied by the number of months for which the loss was realised and the number of months required to compensate for the loss.

Value-at-Risk (VaR)

These indicators do not, however, allow the "average" extreme risks of a fund to be characterised. In order to measure the extreme risks more accurately, it is essential to use instruments such as the VaR.

Within the Gaussian framework, the VaR can be calculated explicitly by using the following

formula:

$$P(dW \leq -VaR) = 1 - \alpha$$

$$VaR = n\sigma W dt^{0.5}$$

where n = number of standard deviations at $(1-\alpha)$
 σ = standard deviation
 W = present value of the portfolio
 dt = year fraction
 dW = variation in the value of the portfolio

The limitations of the VaR and the measures required to adapt it to alternative investment have been largely commented upon in the literature⁸⁷:

The VaR measures potential losses that arise habitually or regularly; it does not mention the consequences of exceptional events;

Taking exceptional events into account exacerbates the problem of statistical estimation. In the case of a VaR that is calculated from the distribution of past returns, it is necessary to have a very large amount of data to obtain a significant sample of "historical" VaR events. This problem, which already exists in the traditional universe, is exacerbated in the alternative universe because of the frequency of the data, which is often monthly;

The so-called "parametric" approach involves explicitly assuming that the returns are normally distributed (or distributed according to a given law) in order to calculate the VaR. As such, it is not appropriate for the alternative universe.

One solution to the criticism addressed at the parametric and historical VaR has been proposed, with the VaR based on simulations using the Monte-Carlo method. This VaR itself has been subject to criticism, both because of

87 - Chung, S. Y., 2000, What is the optimal portfolio risk measurement? A review of value-at-risk, in *Managing hedge fund risk*, Risk Books.

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the considerable size of the simulations implemented, and therefore the amount of calculation involved, and because it often uses a normal distribution of the risk factor returns (semi-parametric VaR). The resulting simplification of the Monte-Carlo simulations contradicts the goal of going beyond the unrealistic initial framework of the parametric VaR.

Faced with these difficulties, investors and managers have come up with interesting solutions (stress testing, scenario analysis, more complex modelling of the distribution tails with extreme value theory). These "variations" on the management and measurement of extreme risks should, in our opinion, be popularised and generalised and thereby permit a relative appreciation of the parametric risk and return measures. The latter are totally inappropriate for the alternative universe and this approach would allow for better management of the benefits of alternative diversification.

Cornish-Fisher VaR

The Cornish-Fisher VaR is a pragmatic application of the VaR calculation in a fat tail distribution environment (cf. Favre and Galeano (2002)⁸⁸). This method initially consists of calculating a VaR using a normal distribution formula and then a Cornish-Fisher expansion to take the skewness and excess kurtosis into account:

$$z = Z_c + \frac{1}{6}(Z_c^2 - 1)S + \frac{1}{24}(Z_c^3 - 3Z_c)K - \frac{1}{36}(2Z_c^3 - 5Z_c)S^2$$

where Z_c = the critical value of the probability (1- α)
 S = the skewness
 K = the excess kurtosis (i.e. kurtosis minus 3)

The adjusted VaR is therefore equal to:

$$VaR = -W(\mu + z\sigma)$$

It should be noted that if the distribution is normal, S and K are equal to zero and consequently, $z=Z_c$, and we come back to the Gaussian VaR.

Incremental and component Cornish-Fisher VaR

The principle behind the incremental VaR is the same as that of the marginal VaR. It involves measuring the effect on the portfolio's VaR of a variation in the weight of asset i in the composition of that portfolio. However, in the case of the Marginal VaR, the goal is to measure the impact of a marginal variation in the weight of one of the instruments held in the portfolio, while for the Incremental VaR it involves assessing the impact of introducing a new instrument into the portfolio. The relative variation in the weight is therefore liable to be much more significant in the case of the Incremental VaR and thereby lead to a non-linear variation in the portfolio's VaR. The following formula gives an approximate value for the Incremental VaR (IVaR)⁸⁹:

88 - Favre, L and Galeano J. A., 2002, Mean Modified Value-at-Risk Optimization with Hedge Funds, The Journal of Alternative Investments, Fall, Vol.5, N°2, p.21-25

89 - Refer to Jorion, 2001, Value at Risk, McGraw Hill, for more detailed information on the Incremental VaR.

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$$IVaR = VaR_{p+a} - VaR_p \approx (\Delta VaR)^T * a$$

with

$$\Delta VaR_i = \frac{\partial VaR_p}{\partial w_i} * W_i$$

where p corresponds to the vector of the initial weights of the portfolio and a to the vector of the new positions. VaR_{p+a} is the VaR of the portfolio after introducing new instruments and VaR_p the VaR of the initial portfolio. Finally, $(\Delta VaR)^T$ is the transpose of the vector of the marginal VaRs, which are defined as the partial derivatives of the VaR of the portfolio in relation to the variations in weights caused by the introduction of new instruments.

Once the Incremental VaR has been calculated, one simply multiplies by the weight that asset i represents in the portfolio to obtain the Component VaR. This Component VaR gives us the contribution of asset i to the total VaR of the portfolio. This tool is particularly useful for gaining a good understanding of the risks of a portfolio and therefore for managing them better. For example, in a fund of funds, it allows the strategy that increases or diminishes the VaR to be determined; one just needs to know the share allocated to each of the strategies.

$$VaR_p = \sum_{i=1}^n IVaR_i$$

We note an interesting property: the sum of the Incremental VaRs is equal to the total VaR of the portfolio (cf. formula above). Finally, the VaR calculation method proposed by Cornish-Fisher should be used to integrate the third and fourth order moments of the distribution function.

Beyond VaR

Unlike the VaR, which merely gives an indication of the frequency of occurrence of a loss that exceeds a certain fixed amount for a given confidence

interval, BVaR informs us on the frequency and also the amount of the maximal loss beyond the VaR (hence the name). It therefore involves calculating, for a given time horizon and confidence threshold, the average loss that an investor is liable to record beyond the VaR threshold. As shown by Longin (2001)⁹⁰, BVaR is applied both to portfolios that include option instruments and those that have fat distribution tails. From a statistical point of view, this calculation is subject to very strong statistical risk, given that it is only based on a very small number of observations. On the other hand, it is a risk measure that satisfies the property of sub-additivity, i.e. that the risk of a portfolio is lower than or equal to the sum of the risks of the different positions that make up the portfolio (cf. Artzner et al. (1999)⁹¹). Basak and Shapiro (1999)⁹² have shown that taking into account the first order moment of the distribution of the losses beyond the VaR was sufficient to obtain a satisfactory loss profile. They conclude that taking BVaR into account as a constraint in the allocation process allows one to obtain strategies for which the range of extreme risks is limited.

BVaR is especially useful when the return distribution function of a strategy has fat distribution tails. In that case, the higher the VaR, the more the losses beyond the VaR are dispersed. The difference between the BVaR and the VaR tends towards infinity. As a result, calculating the VaR alone is not sufficient. Calculating the BVaR allows the dispersion to be taken into account and thus provides a genuine measure of the risk of extreme losses.

In the case of a strategy that integrates option instruments, i.e. with a non-linear return profile, Vorst (2000)⁹³ has shown that under certain conditions the VaR calculated for linear positions could be equal to the VaR calculated for

90 - Longin, F., 2001, Beyond the VAR, Journal of Derivatives, Summer 2001, Vol. 8, Issue 4, p.36.

91 - Artzner, P., F. Delbean, Eber, J.-M and Heath, D., 1999, Coherent Measures of Risk, Mathematical Finance, July 1999, Vol. 9, Issue 3, p.203-228.

92 - Basak, S., and Shapiro, A., 1999, Value-at-Risk Based Risk Management: Optimal Policies and Asset Prices, Working Paper, New York University.

93 - Vorst, T. 2000, Optimal Portfolios under a Value-at-Risk Constraint, Report 2001, Erasmus University, Rotterdam.

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non-linear positions, even though the distribution profiles of the two types of positions are completely different beyond the VaR. The non-linear positions are characterised by a wide dispersion of extreme events and the greater the leverage effect, the wider the dispersion.

Alternative strategies are characterised by fat return distribution tails and the use of option products that involve considerable leverage. These characteristics make the use of BVaR indispensable within the framework of estimating extreme events.

Style VaR⁹⁴

This firstly involves calculating the exposure of the FoHF to a set of N alternative indices representing the risk factors (if possible, choose pure indices: composite indices drawn from the various competing alternative indices), as illustrated in the multi-factor model below:

$R_p = \alpha + \sum_i \beta_i X_i + \epsilon$, the X_i ($i = 1$ to N) corresponding to the returns of the N alternative indices (one index for each type of strategy: fixed-income arbitrage, convertible arbitrage, market neutral, event driven, long/short, etc.).

The original feature of this model compared to that of Sharpe (1992)⁹⁵ can be found at the level of the constraints imposed on the coefficients. To take into account the fact that hedge funds use leverage, the portfolio constraint is removed (i.e. the sum of the coefficients can exceed 1). We note that in Lhabitant (Opus cit. 42), the weight positivity constraint is maintained because the author considers that it is difficult, from an economic point of view, to interpret a negative coefficient on a style index. We also note that this

weight constraint causes the property of orthogonality between the regressors and the residuals to be lost, in such a way that the decomposition between specific and systematic risk is not exact (a residual correlation term remains). Fortunately, we can imagine removing the weight positivity constraint to account for the fact that hedge funds can sell securities short.

We then simultaneously apply to each index its worst variation in order to analyse the impact on the fund. We can thereby deduce the Value at Market Risk:

$$VaMR_p = \sqrt{\sum_{i=1}^N \sum_{j=1}^N \rho_{ij} \beta_i \Phi_i^* \beta_j \Phi_j^*}$$

Φ_i being in this equation the extreme quantile (percentile) of the performance of the alternative index i during a month, ρ_{ij} the correlation coefficient between the indices (covariance relative to the product of their standard deviations)

Since the market risk (systematic risk due to the styles) is evaluated in that way, we can deduce the specific risk from this through the difference with the total risk of the fund (σ_p^2), or:

$$\sigma_\epsilon^2 = \sigma_p^2 - \sum_{i=1}^N \sum_{j=1}^N \rho_{ij} \beta_i \Phi_i \beta_j \Phi_j$$

The percentile of the specific risk (VaSR₀) can be estimated, for a confidence interval set at 99%, at $2.33 * \sigma_\epsilon$ if we assume that the residuals are normally distributed⁹⁶.

From there, we can calculate the VaR of the fund:

$$VaR_p = \sqrt{VaMR_p^2 + VaSR_p^2}$$

94 - Cf. Lhabitant (Opus Cit. 42) for more detailed information on the method.

95 - Cf. Sharpe (1992) - Opus Cit. 40

96 - We note that this does not mean that the returns are normally distributed.

Conclusion of the consultation period



Conclusion of the consultation period

The debate on FoHF reporting poses the question of investor information. As such, it is very much a part of the process of the institutionalisation of the alternative investment industry. What is the information that investors absolutely must possess in order to measure and manage the risks to which they are exposed in a satisfactory way? The degree of transparency necessary to obtain this relevant information is the subject of considerable debate. On the one hand there are those who, on the pretext of better investor protection, plead for the absolute transparency of hedge funds, and on the other hand, those for whom alternative investment, by its very nature, cannot accommodate any transparency. Our position is more nuanced.

In the first sections of this document we proposed a series of risk-adjusted performance and risk indicators that allow the specific characteristics of the performance of alternative strategies to be taken into account without necessitating the disclosure of individual positions. Nonetheless, to allow investors to measure and manage the risks to which they are exposed, it is essential for funds of hedge funds to communicate details on their returns by asset group, by management style, by sector, by country, or by any other criterion that is considered to be relevant with regard to the sources of return. That is not systematically the case today. In the interest of investors (i.e. for better risk management), but also in the interest of the funds of hedge funds themselves (i.e. to attract institutional investors), it is necessary for the latter to make a move towards greater transparency.

As such, our contribution is to propose a pragmatic solution that allows final investors to be offered relevant information without simultaneously placing FoHF at risk. However, establishing and imposing a standard monthly report is not an easy task. It requires reconciliation of the often-conflicting interests of market participants (i.e. fund managers and investors), and thus implies reaching a compromise between their specific needs and constraints. By so doing, one can hope that in the end they will all adhere to the project and abide by standard rules. For this reason, we decided to confront investor and manager perspectives on the sensitive issue of the content of FoHF reports. In other words, we asked for their definition of relevant information. The following section is dedicated to the analysis of the insightful comments and suggestions we received from 98 professionals, who spontaneously decided to take part in our examination of FoHF reporting. These professionals work for major traditional and alternative institutions, representing over \$1.1 trillion in assets under management. The results we obtained should thus provide an accurate reflection of the sentiments and investment practices of market participants.

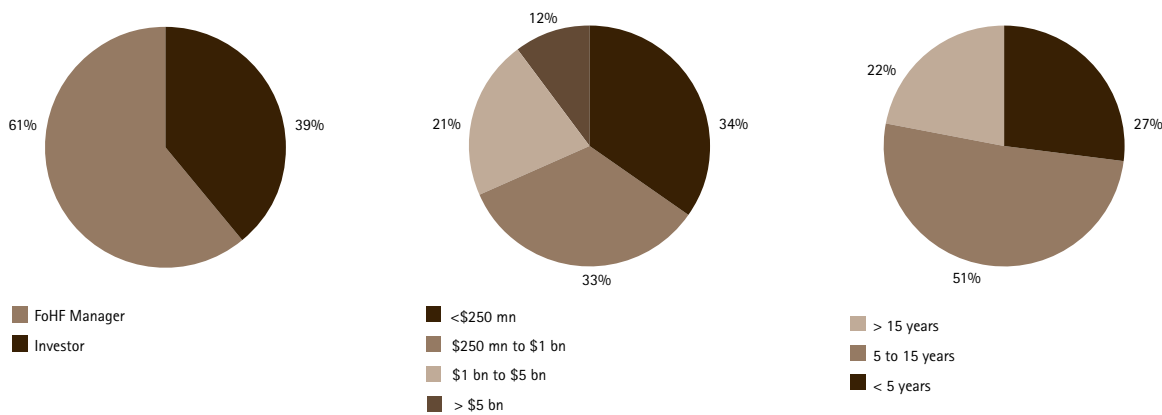
Profile of the respondents

As can be seen from Panel A, FoHF managers showed great interest in taking part in our investigation into the definition of relevant information. As a matter of fact, 61% of our respondents were FoHF managers, and only 39% were investors. Information will definitely be a key success factor for FoHF in the future, which doubtless explains why FoHF managers wanted to participate in discussions about defining the content of FoHF reports. To avoid any bias in our definition of the relevant information, we will differentiate between managers' and investors' answers when useful points can be made. As regards the average size of respondents, we can see in Panel A that the breakdown is well balanced, with 34% small funds (i.e. under \$250m), 33% medium-sized

funds (i.e. from \$250m to \$1bn) and 33% large funds (i.e. over \$1bn). A large majority of respondents appear to be experienced professionals, with 73% of them having at least 5 years of experience in the asset management industry. We should thus benefit from their awareness of the technical and theoretical challenges that the alternative industry is currently facing with regard to investor information.

To make sure that our analysis would not be biased due to the heterogeneity of respondents, we further investigated the profile of the investors and managers who took part in the study. As can be seen from Panel B and Panel C, our sample is relatively homogeneous in terms of both fund size and respondent experience.

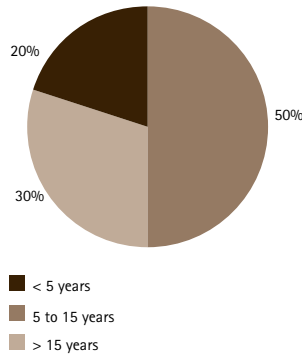
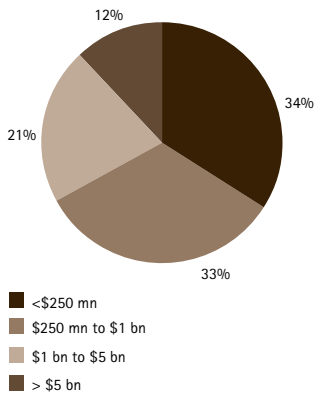
Panel A:
Profile of the Respondents



Profile of the respondents

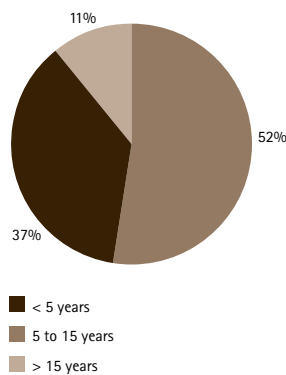
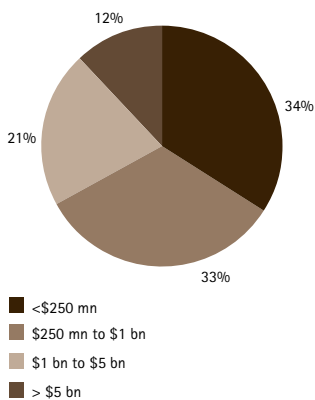
The FoHF managers primarily work for small- to medium-sized funds. We note, however, that despite the fact that large funds only account for 33% of the answers, they still represent the lion's share of assets under management. On the other hand, managers tend to be slightly more experienced than the average respondent, with 80% of them having 5 or more years of experience in the investment field.

Panel B:
Profile of the Managers



Like the size of the fund managers, the average size of investors is well balanced. In terms of average experience, however, the investors tend to be significantly less experienced than the fund managers, with 37% of the investors having less than 5 years of experience in the industry, and only 11% having more than 15 years' experience (30% for fund managers).

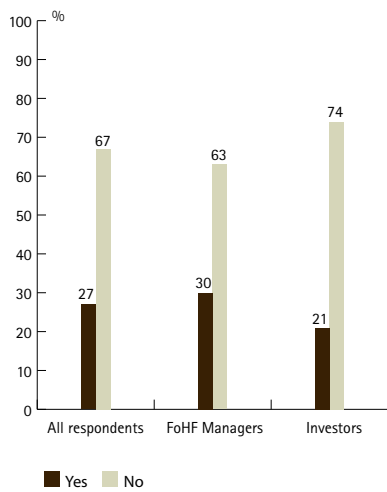
Panel C:
Profile of the Investors



Granularity and frequency

Illustration 7:

Do you see any acute issue as regards both the risk and return dimensions that could not be accounted for in a monthly activity report?



Before going into more detail, and covering the range of risk and performance indicators that should be included in the activity report disclosed to investors, the first question to answer concerns the frequency of publication and the granularity of the report. What is the best solution according to investors and fund managers: an exhaustive monthly report or a less detailed weekly report? Which provides a better fit in terms of the needs of investors and the capacity of managers?

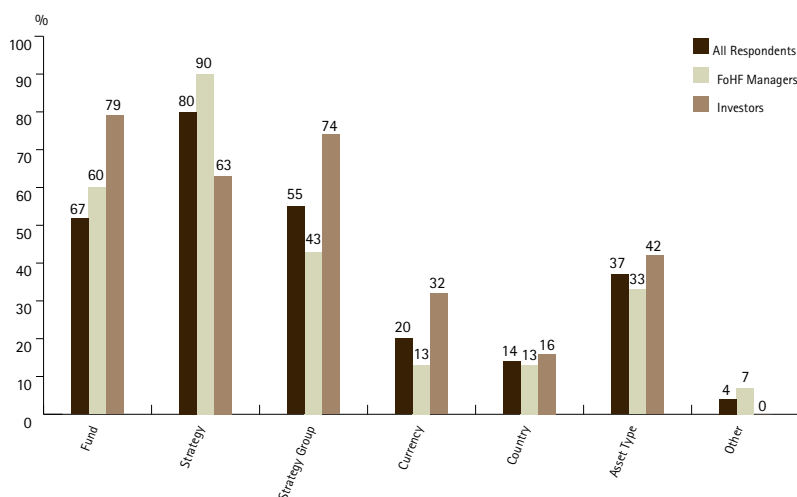
In line with the findings of a previous study on European multimanagerment investment practices (see Edhec (2003)⁹⁷), a large majority of market participants, 67%, considers that the monthly activity report can account for most of the issues relating to the risk and return dimensions. Surprisingly, however, fund managers appear to be more demanding than investors in terms of publication frequency. While 30% of them doubt that monthly frequency is enough to monitor risk properly, only 21% of the investors think so. This result seems to contrast with what is usually said on the insatiable need

for information of investors. One distinction must however be made among fund managers. Managers of small FoHF tend to be more inclined to publish more frequent data (respectively 29% and 13% of small and large fund managers consider that monthly frequency is not enough), especially to account for issues like intra-month volatility or weekly drawdowns. The reluctance of large funds to publish results on a weekly basis is doubtless due to the operational limitations inherent in cumbersome structures.

However, the answers suggest that while large structures tend to be less flexible, and as a result, generally plead in favour of monthly frequency, they tend at the same time to be more inclined than small structures to give detailed reports, with data aggregated at strategy or even fund level. This is certainly due to their desire to take advantage of their sophisticated IT systems in order to set high entry barriers, especially towards small- and medium-sized funds. Interestingly, it turns out that this corresponds precisely to the needs of investors. Indeed, most of them appear to be looking for detailed information rather than frequent information (i.e. 79% of investors want information at fund level, 74% at strategy group level and 63% at strategy level). Some investors even ask for details on the position pricing policy of underlying funds. However, it is worth noting that most of them appear to be aware of the overkill effect that too much information represents. Collecting and processing large amounts of information is time consuming and implies huge costs for the fund (meaning lower net returns for investors), whereas the marginal utility for investors is relatively low since they do not have the time to analyse this flow of

Illustration 8:

How should information ideally be aggregated in the monthly activity report?



97 - Edhec European Alternative Multimanagerment Practices Survey, 2003 - Opus Cit.2

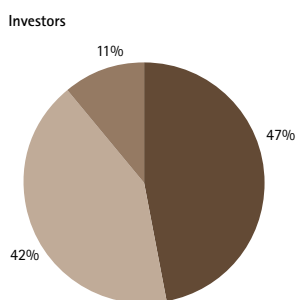
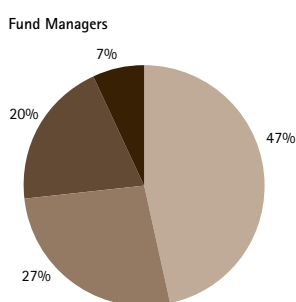
Granularity and frequency

information. Fund managers place emphasis on information aggregated by strategy (90%) and to a lesser extent by strategy group (43%) and by fund (60%). After these, aggregation at asset type level is considered the most useful by managers and investors (respectively 33% and 42%). However, as stressed by several participants, liquidity is an acute issue in the alternative arena; assets could thus be classified according to their level of liquidity within strategy groups or strategies (i.e. monthly, quarterly and annually). Finally, aggregation at the currency or regional level is regarded as interesting but not necessary.

As a conclusion, most investors and managers ask for monthly frequency and reports including principally three levels of aggregation, namely strategy group, strategy and fund. Many of them also agree on the fact that detailed information should not be given for every single fund contained in the portfolio. We thus suggest fitting the degree of granularity of the information to the aggregation level. In other words, we propose to increase the quantity of information at higher aggregation levels (e.g. strategy group), and decrease it at lower aggregation levels (e.g. fund). We argue on the other hand that a breakdown by asset type and level of liquidity should be given at the strategy group level.

Return analysis

Graph 9 and 10
How important, in your opinion,
is the history of monthly returns?



As expected, 100% of investors and fund managers consider that monthly return figures should be included in FoHF reports. More surprising, however, is the lower level of interest of investors and, to a lesser extent, fund managers, in annual figures (76% on average consider monthly figures to be very important versus 51% for annual figures). This is all the more surprising in that investors and fund managers are often forced to have up to annual investment horizons. Indeed, due to both the significant illiquidity caused by long lock-up and redemption periods and also funds' illiquid underlying positions, it is technically difficult to allow for monthly or even quarterly entry and exit. It is thus inconsistent and even dangerous for investors and fund managers to focus on short-term performance, because it forces fund managers to maximize their short-term performance, and it is well known that short-sighted investment strategies rarely serve investors' long-term interests. The same conclusion can be drawn at the strategy and fund levels, with 31% of respondents rating monthly returns as very important, compared to 20% for annual returns.

Nevertheless, it is worth noting that investors and fund managers, although they are more inclined to receive monthly rather than annual figures, appear in practice to be reluctant to forgo detailed information on underlying fund performance. As a result, only 20% of them think that monthly returns should not be disclosed at fund and strategy levels.

Interestingly, while 97% (respectively 80%) of fund managers consider that year-to-date returns (respectively cumulative returns since inception) are important to very important, only 79% (respectively 58%) of investors think so,

and 21% of them (respectively 42%) even think that they are not important. This discrepancy of appreciation is certainly due to the fact that investors are expecting absolute returns, and are thus less interested in cumulative returns or YTD indicators (i.e. absolute returns systematically lead to positive YTD or cumulative returns). Fund managers, however, emphasize these measures, doubtless to stress the quality of their management (i.e. to show that in the long run profits outweigh losses). Nevertheless, on average, 90% of respondents think that such information is important to very important, and should thus be integrated in the report.

In the same vein, results indicate that 72% of respondents consider that relative returns should be disclosed in monthly activity reports. However, this consensus masks the fact that investors are more interested in absolute performance than fund managers. While only 58% of investors are interested in receiving the cumulative performance of a fund relative to a benchmark, 80% of managers consider that it is important to very important information. This raises an important issue. Hedge funds have historically been associated with the absolute return paradigm, but this is not consistent with the very nature of hedge funds. Hedge fund returns, like traditional investment vehicle returns, are influenced by beta and alpha drivers. Beta drivers correspond to the fair reward for exposures to risk factors, and alpha drivers to the talent of the manager. There is however a significant difference between traditional and alternative investment vehicles. While the former generally follow buy-and-hold strategies, the latter implement dynamic strategies. As a result, hedge fund beta drivers are made up of two distinct components, i.e. static and dynamic beta drivers. It thus makes sense to calculate the

Return analysis

relative returns of hedge fund strategies, provided that particular attention has been paid to the choice of benchmark. It has been widely argued in the literature that the risk-free rate or equity or bond indices are not well suited for hedge fund strategies (cf. Amenc et al. (2003)). Investors and fund managers must use benchmarks that

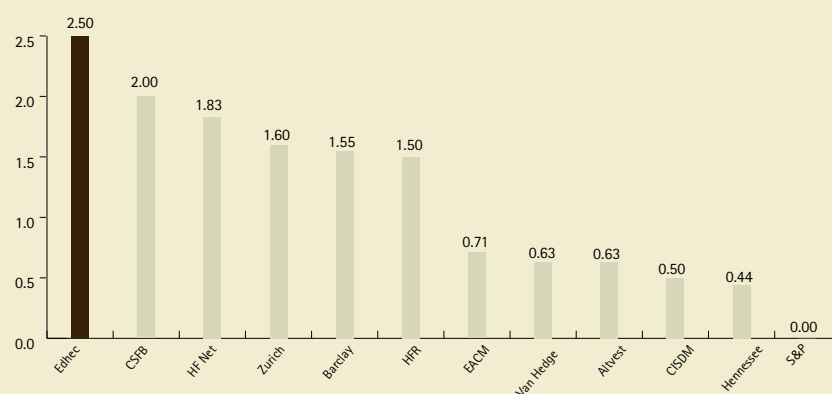
include the specific characteristics of hedge funds. Hedge fund indices are thus natural candidates to serve as pseudo risk factors. Due to the varying quality of the indices available on the market, we suggest using the series of index of indices published by Edhec (see the box below for further details on the Edhec Hedge Fund Indices).

EDHEC HEDGE FUND INDICES: The Index of Indices Approach

Given that it is impossible to come up with an objective judgment on what the best existing index is, a natural idea consists of using some combination of competing indices to reach a better understanding of what the common information about a given investment style would be. One straightforward method would involve computing an equally-weighted portfolio of all competing indices. Since competing hedge fund indices are based on different sets of hedge funds, the resulting portfolio of indices would be more exhaustive than any of the competing indices it is extracted from. We push the logic one step further and suggest using factor analysis techniques to generate a set of alternative indices that can be thought of as the best possible one-dimensional summaries of information conveyed by competing indices for a given style, in the sense of the largest fraction of the variance explained. Technically speaking, this amounts to using the first component of a Principal Component Analysis of competing indices (see Amenc and Martellini (2003)).

To test the representative qualities of the EDHEC Alternative Indices, we constituted an equally-weighted portfolio for each of the strategies from a proprietary database made up of 7,422 funds. The portfolios for the different strategies therefore each contain more than 600 funds on average, and as a result are considered to be relatively representative of their management universe. We then calculated the correlation coefficient of representative portfolios for the different strategies with the major indices publicly disclosing their data over the period from January 1998 through December 2000. The higher the coefficient, the more representative the index is. We classified the indices into three tiers. Indices with the highest coefficient are ranked as 1st tier indices and given 3 points. Indices ranked in the 2nd tier get 1 point and those in the 3rd tier receive 0 points. We finally computed the average number of points obtained by each index provider. With 2.50 points on average, the EDHEC Alternative Indices turn out to be more representative than any other index.

Illustration 11:
The Representativity Dimension

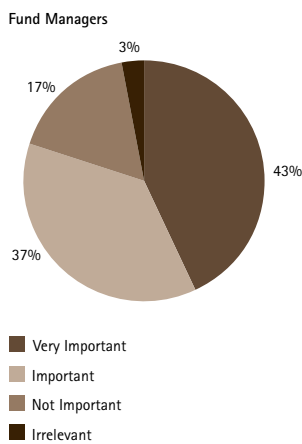


Note finally that since competing indices are affected differently by measurement biases, searching for the linear combination of competing indices that implies a maximisation of the variance explained leads implicitly to a minimisation of the bias, which is one of the appealing side-effects of the construction methodology.

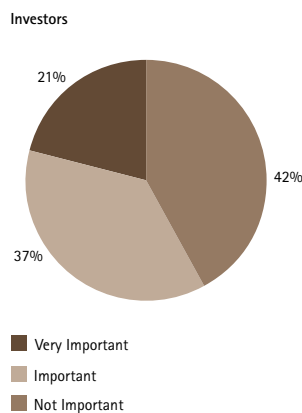
Source: Vaissié (2004)

Return analysis

Graph 12 and 13:
How important, in your opinion, are relative returns?



Again, investors and fund managers agree on the need to integrate indicators like percentage of positive and negative returns (respectively percentage of up/down months in up/down markets) in the monthly activity report (82% and 89% of respondents, respectively, think of this as important to very important information).



Finally, in the alternative arena, like in the traditional world, the first step in the investment process is to compare the investment opportunities available. However, since information is somewhat sketchy when it comes to hedge funds or FoHF, investors often have to compare apples with pears. FoHF often have different track record lengths, so it is difficult to attribute return differences to sample issues or to manager talent. Better/worse performance between two FoHF can be due to favourable/unfavourable momentum in the strategy of one of the funds in a subsample not covered by the other fund, or to the manager's skill/lack of skill. For this reason, several respondents have suggested including the average performance of the FoHF over 12/24/36/48/60 trailing months, to ease the screening process for investors.

As a conclusion, monthly and annual returns should be given at all aggregation levels, from strategy group to fund level. Historical returns, YTD or cumulative returns since inception should however be reserved for strategy group and strategy levels in order to avoid any data overkill effect. The same remark holds for performance that is conditional on equity and bond market conditions. This information should for the same reason be calculated at the strategy group and strategy levels, not at the fund level. Finally, as suggested by some of the respondents, performance at the FoHF level over the last 12/24/36/60 months could also be included in the report to facilitate the comparison of FoHF with different track records.

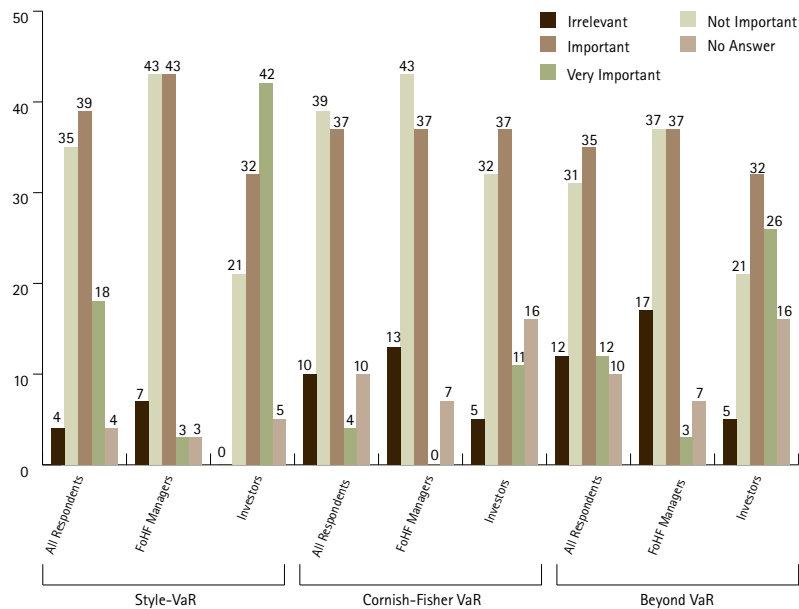
Risk analysis

One of the central assumptions of modern portfolio theory is that agents are risk averse. This is confirmed by the fact that 100% of respondents consider that risk measures such as volatility are important to very important. Similarly, as highlighted in many empirical studies, investors are particularly averse to loss. It is thus not surprising to find that 94% of respondents think that it is important to very important to look at indicators such as the maximum drawdown or uninterrupted loss. Not surprisingly, investors seem to be more concerned by losses than fund managers, as is illustrated by the fact that 74% of investors, compared to 57% of managers, think that it is very important to include these indicators in the monthly report.

Hedge funds tend to take advantage of the leverage effect and often invest in illiquid markets with high default risk. As a result, extreme risks are of major concern in the alternative arena. This

is well illustrated by the fact that 84% of respondents think that it is important to very important to look at the third and fourth order moments of return distributions (i.e. skewness and kurtosis). However, as many as 14% of respondents continue to neglect the fat tail effect, and consider for example that the analysis of gross and net leverage is not important or even irrelevant (30% for managers versus 11% for investors). Surprisingly, the Bera Jarque statistics, which aim to assess the joint effect of third and fourth order moments on the normality of the return distribution, are not important or even irrelevant for 57% of the respondents (52% for investors and 60% for managers). Again, investors seem much more sensitive to extreme risks, and as a result, much more demanding with regard to the information disclosed on this issue in the monthly report. Notwithstanding the fact that 76% of the respondents consider that liquidity ratios provide important to very important information, only

Illustration 14:
How important, in your opinion, are the following extreme risk indicators?



Risk analysis

17% of fund managers think of it as very important information, as opposed to 58% for investors. In the same vein, while 32% of investors consider stress tests to be very important, only 23% of fund managers think so (on average, however, 80% of respondents think of it as important to very important). Results are similar when it comes to Value-at-Risk (henceforth VaR) measures: 42% (respectively 11%, 16% and 26%) of investors think that it is very

important to have a Style VaR (respectively Cornish Fisher, Incremental or Component VaR and Beyond VaR) while only 3% (respectively 0%, 0% and 3%) of fund managers think so. More worryingly, 18%, 16%, 39%, 49%, 51% and 43%, respectively, consider that it is not important or even irrelevant to insert liquidity ratio, stress test, Style VaR, Cornish Fisher, Incremental or Component VaR, and Beyond VaR indicators in the report.

As a conclusion, even if investors seem to be more concerned by risk than fund managers, there is a broad consensus on the fact that the whole spectrum of risk dimensions should be covered by monthly reports, ranging from normal risks (e.g. volatility) to extreme risks (e.g. VaR measures) or loss risks (e.g. minimum monthly return, maximum drawdown, uninterrupted loss). We argue that this information should be available to investors at strategy group and strategy levels.

Risk-adjusted return analysis

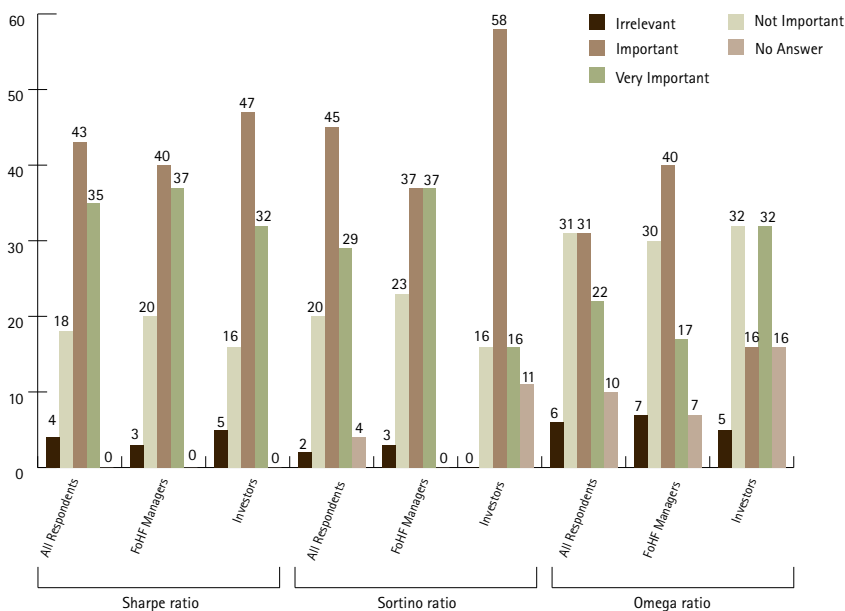
Return and risk are two sides of the same coin. They must thus be examined in parallel. For this purpose, a range of risk-adjusted performance indicators has been proposed to investors and fund managers. In line with the findings in Edhec (2003)⁹⁸, both investors and fund managers generally use ratios that are inherited from the traditional world. The Sharpe ratio and the Sortino ratio are regarded as important to very important by 78% and 74% of respondents respectively. Even though it has been widely argued that these traditional performance measures fail to account for the specific risk characteristics of hedge funds, only 22% think that these ratios provide unimportant or irrelevant information. The Omega ratio, however, which has recently been introduced to make up for the failure of traditional performance measures to account for the third and fourth order moments of hedge fund return distributions (i.e. skewness and kurtosis), is rated as important to very important by only 53% of the respondents.

In line with the results obtained regarding extreme risk measures, investors seem to be more interested in this ratio than managers. While 32% of the investors think that it is very important, only 16% of the fund managers feel the same. This suggests that hedge funds' asymmetric remuneration contracts (i.e. management + incentive fees) fail to align investors' and fund managers' interests properly. Investors turn out to be much more concerned by extreme losses than fund managers. To address this issue, we suggest including indicators that take investors' pronounced aversion for extreme risks into account in the monthly activity report.

Other ratios presented in previous sections of this document like the Sharpe Omega ratio, M^2 , ASRAP, Calmar ratio and Sterling ratio are considered not important to irrelevant by 51%, 63%, 65%, 63% and 71% of respondents respectively. Since most of these indicators would be redundant with the aforementioned risk-adjusted performance indicators, we suggest excluding all of these ratios except the Calmar ratio. We argue that this ratio provides valuable information, especially when high watermark provisions are included in the remuneration contract.

Risk-adjusted performance indicators must account for the different definitions of risk we have mentioned previously, so that investors with different preferences can assess the returns per unit of risk (e.g. volatility, VaR, draw-down, etc.) generated by the FoHF. As suggested by some respondents, measures like return to VaR (or modified VaR) should also be included in the report.

Illustration 15:
How important, in your opinion, are the following risk-adjusted performance indicators?



98 - Edhec European Alternative Multimangement Practices Survey, 2003 - Opus Cit.2

Risk-adjusted return analysis

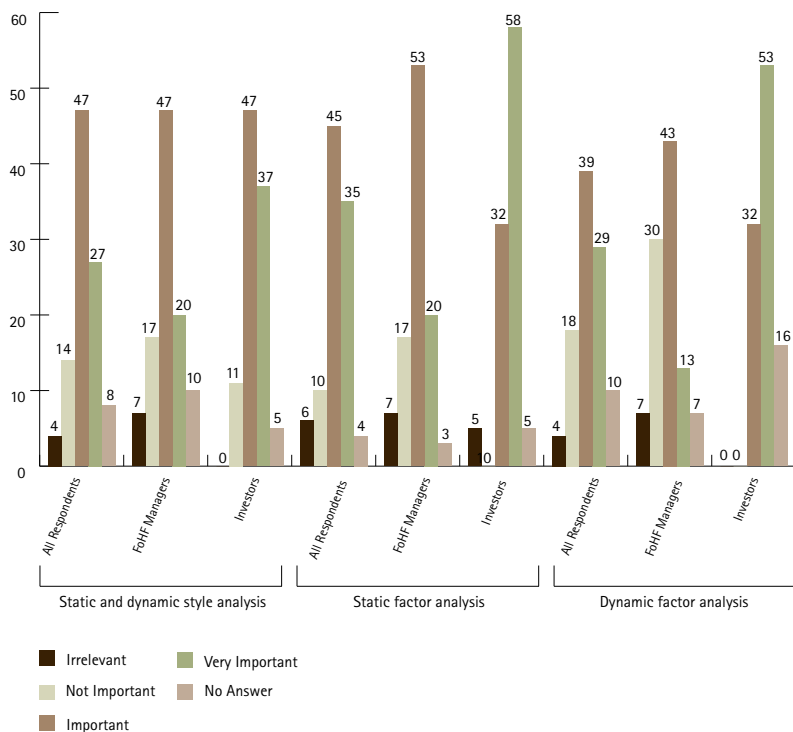
Once one has been informed about the risk-adjusted performance of an investment, it may be interesting to go one step further and try to understand where the added value comes from. This is precisely the objective of the performance attribution process. Information provided by the attribution process is essential for both investors and fund managers. It helps the former to better understand the performance of their investment and thus adjust performance fees accordingly. It helps the latter to manage the investment process better. It is therefore not surprising to see that performance attribution is important to very important for 96% of the respondents, but particularly for investors, with 68% considering performance attribution to be very important, while only 43% of managers think the same.

There is one interesting point to be made about the differences in answers between investors or fund managers working for large institutions and those working for smaller institutions. Large funds have an obvious propensity to plead in favour of a wide range of risk-adjusted performance indicators. The justification certainly lies in their desire to take advantage of their infrastructures (e.g. IT systems) to have an edge on smaller funds.

As a conclusion, monthly reports should include risk-adjusted performance measures with the definition of risk covering the aforementioned dimensions of risk (i.e. normal risk, extreme risks, etc.). Risk-adjusted performance indicators should span traditional (e.g. Sharpe ratio) and alternative ratios (Omega ratio) so that investors can be provided with information that they are familiar with and also ratios that are robust for the specific features of hedge fund strategies. We suggest that detailed information should be given at the strategy group and strategy levels. We consider that the results of the performance attribution process should also be included in the report at the strategy group and strategy levels.

Beta and correlation analysis

Illustration 16:
How important, in your opinion are static and dynamic style/factor analysis?



Hedge fund strategies are increasingly used by investors to improve their diversification. In other words, investors try to include hedge funds in traditional portfolios to benefit from the diversification potential offered by alternative betas (due to non-linear and dynamic exposure to risk factors). In order to efficiently manage their diversification strategy, it is essential for investors to be able to monitor the evolution of exposures of the FoHF to the different hedge fund strategies. It is thus not surprising to see that static and dynamic style analysis are considered to be important to very important by 74% of the respondents. Predictably, investors show more interest in finding such information in the report than

fund managers (i.e. 37% think that it is very important versus 20% for managers). This is in turn illustrated by the fact that 24% of fund managers think that it is not important or irrelevant (only 11% of investors think so). We note that style analysis is extremely useful, since it enables investors to ensure that fund managers are doing what they are supposed to do. As stressed in DiBartolomeo and Witkowski (1997)⁹⁹, “the easiest way to win a contest for the largest tomato is to paint a cantaloupe red and hope the judges do not notice”. We strongly believe that investors should be able to distinguish tomatoes from cantaloupes thanks to the monthly activity report.

Hedge fund strategies are generally represented by hedge fund indices and exposures computed through Sharpe’s style analysis model. One may however want to go one step further and handle true risk factors (e.g. volatility, liquidity, credit risk, etc.) rather than pseudo risk factors like hedge fund indices. This is the case for 85% of the investors but only 56% of fund managers, who think that factor analysis is important to very important (37% of fund managers consider that it is not important or irrelevant, compared to 0% for investors!). Finally, 84% of respondents think that it is important to very important to give a detailed analysis of unconditional and conditional correlations with traditional indices (i.e. equity and bond indices). Similarly, it is very important for 47% of investors but for only 33% of fund managers. Even more strikingly, 58% of investors think that it is very important to obtain a detailed analysis of unconditional and conditional correlations with risk factors,

99 - DiBartolomeo, D. & Witkowski, E., 1997, Mutual Fund Misclassification: Evidence Based on Style Analysis, Financial Analysts Journal, Vol.53, p.32-43.

Beta and correlation analysis

versus only 20% for fund managers. Such an analysis is considered not important to irrelevant by only 5% of investors, but 22% of fund managers.

Again, large funds seem to want to take advantage of their IT systems by including a wide variety of risk-adjusted performance indicators.

Hedge fund strategies are increasingly used for their diversification properties. Unfortunately, this cannot be done optimally with black boxes. Investors need to check their portfolio diversification, and must as a result be able to monitor the FoHF risk profile on a regular basis. For this reason, we argue that monthly activity reports should include in-depth style and factor analysis, both static and dynamic, at the FoHF level. It would also be interesting to include a factor analysis at strategy group and strategy levels, to perform the risk attribution process¹⁰⁰ in parallel with the performance attribution process.

¹⁰⁰ - Otherwise, investors could definitely opt for the transparency of investable hedge fund indices. It is thus in the interest of fund managers to improve their communication on key return drivers and, more generally, on the risk profile of their fund.

Conclusion

Information is a crucial issue for the future development of the alternative industry. Up until recently, only accredited investors¹⁰¹ had been allowed to invest in hedge funds. Now, however, the range of potential investors has widened considerably. It is thus high time for a better definition of the level of information that investors should be provided with on a regular basis. We strongly believe that activity reports should not be seen by fund managers as a constraint but should rather be viewed as a privileged means of communication with investors.

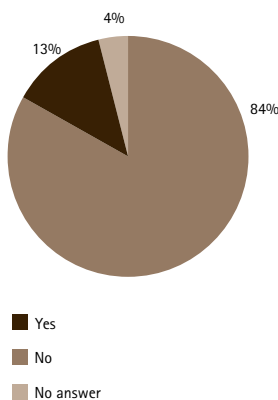
Activity reports should first inform investors about the levels of risk (i.e. normal, extreme and risk of loss) and performance of the FoHF. To this end, a series of risk and return measures with corresponding risk-adjusted performance indicators should be disclosed to measure the returns per unit of risk (e.g. volatility, VaR, drawdown, etc.) that the fund generated. FoHF reports should also offer more insight into the way the fund is managed. Investors should for example be informed on the effective style mix of the fund through a style analysis. In the same vein, factor analysis should be provided to inform investors about sources of risk. Performance attribution, finally, could inform investors about sources of value-added.

As mentioned in this document, there is an important risk of data overkill. We argue that only those investors who really need complete information should be provided with detailed analysis at all levels of aggregation. For the others, we suggest adapting the degree of detail to the level of aggregation. Detailed

information should be available at strategy group and strategy levels, but only basic information on performance and risk should be disclosed for every single fund that enters into the composition of the portfolio.

Alongside the think-tank that we have set up on the standardisation of the content of FoHFs' monthly activity reports, numerous actors from the hedge fund industry are working on standards for hedge fund position pricing methods (notably for exotic derivative instruments and non-quoted assets). May all this work allow multimangers to improve their reporting (only 13% of European multimangers today affirm that their reporting is certified by a third party¹⁰² (see graph 17)) and thereby help final investors to obtain reliable and relevant data on FoHF, so that they can approach alternative strategies as confidently as they approach the so-called traditional asset classes (i.e. stocks, bonds, etc.).

Graph 17:
Is European FoHF reporting certified by a third party?



101 - See Rule 501 of Regulation D of the US federal securities laws for a definition of the term accredited investor.
102 - Cf. Edhec (2003) - Opus Cit.2

Appendix



Appendix I

A Detailed Summary of Hedge Funds' Risk-Adjusted Performance Indicators

	Risk measures	Ratios	Comments
Normal Risk	Standard deviation	Sharpe Ratio	The non-normal distribution of hedge fund returns is not taken into account, leading to an overestimation of risk-adjusted performance measures such as the Sharpe ratio.
Loss Risk	Semi standard deviation	Sortino Ratio	Downside risk measures such as the semi deviation do not properly account for extreme risks. Instead of specifying the level of MAR arbitrarily, we suggest calculating the Sortino Ratio for all levels of MAR and plotting the Sortino function.
	Maximum drawdown (with time "under water")	Calmar Ratio	Hedge funds are entitled to incentive fees provided they have reached high watermark provisions. As a result, the higher the maximum drawdown, the higher the risk of seeing the best managers leave the fund to start a new hedge fund, and in turn, the higher the probability of performing poorly in the future. The Calmar Ratio thus provides investors with valuable information.
	Uninterrupted loss (with nbr of consecutive negative returns and time to recovery)	n.a.	
Extreme Risk	VaR	Return / VaR	Historical VaR is subject to a significant sample bias and generally assumes the normality of the return distribution. It therefore does not take the negative skewness and positive kurtosis of hedge fund strategies into account properly.
	Modified VaR	Return / Modified VaR	The Modified VaR accounts for 3rd and 4th order moments of the return distribution. It is thus well suited for hedge funds. However, it is subject to sample bias, and does not converge rapidly when sample size increases.
	Style VaR	Return / Style VaR	The appeal of the Style VaR is to use pseudo factors embedding the specific risk features of hedge funds. However, the estimation of the Style VaR relies strongly on the quality of the hedge fund indices used in the style analysis. We suggest using the index of indices series published by Edhec for their high level of representativity.
	Beyond-VaR	Return / Beyond VaR	Beyond VaR is a robust measure of extreme risk but "Block maxima" and "Peaks-over-threshold" approaches, which are generally used to calculate this measure, are very data consuming. Given the lack of historical data, it is technically difficult to apply this measure to hedge funds.
			Omega Ratio

103 - We thank Con Keating for his precious comments on this issue.

Appendix II

Detailed Results

Question n°1: Do you see any acute issue as regards both the risk and return dimensions that could not be accounted for in a monthly activity report?

	All Respondents	FoHF Managers	Investors
Yes	27%	30%	21%
No	67%	63%	74%

Question n°2: How should information ideally be aggregated in the monthly activity report? (Several answers possible)

	All Respondents	FoHF Managers	Investors
Fund	67%	60%	79%
Strategy	80%	90%	63%
Strategy Group	55%	43%	74%
Currency	20%	13%	32%
Country	14%	13%	16%
Asset Type	37%	33%	42%
Other	4%	7%	0%

Question n°3: History of FoHF's monthly returns (net of fees)

	All Respondents	FoHF Managers	Investors
Irrelevant	0%	0%	0%
Not Important	0%	0%	0%
Important	24%	27%	21%
Very Important	76%	73%	79%

Question n°4: History of monthly returns (net of fees) for each strategy and each fund in which the FoHF invests

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	20%	27%	11%
Important	45%	47%	42%
Very Important	31%	20%	47%

Question n°5: FoHF's annualised return (net of fees)

	All Respondents	FoHF Managers	Investors
Irrelevant	2%	3%	0%
Not Important	6%	7%	5%
Important	41%	33%	53%
Very Important	51%	57%	42%

Question n°6: Annualised return (net of fees) for each strategy and each fund in which the FoHF invests

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	22%	23%	21%
Important	53%	57%	47%
Very Important	20%	13%	32%

Question n°7: FoHF's year-to-date return (net of fees)

	All Respondents	FoHF Managers	Investors
Irrelevant	0%	0%	0%
Not Important	10%	3%	21%
Important	43%	50%	32%
Very Important	47%	47%	47%

Question n°8: Year-to-date return for each strategy and each fund in which the FoHF invests

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	24%	23%	26%
Important	59%	60%	58%
Very Important	12%	10%	16%

Question n°9: FoHF's cumulative return since inception (net of fees) compared with a composite index of hedge funds, traditional equity and bond indices and the risk-free rate

	All Respondents	FoHF Managers	Investors
Irrelevant	2%	3%	0%
Not Important	27%	17%	42%
Important	37%	37%	37%
Very Important	35%	43%	21%

Question n°10: Analysis of the contribution of each strategy and each fund to the FoHF's return

	All Respondents	FoHF Managers	Investors
Irrelevant	0%	0%	0%
Not Important	4%	3%	5%
Important	41%	50%	26%
Very Important	55%	47%	68%

Question n°11: Performance attribution

	All Respondents	FoHF Managers	Investors
Irrelevant	0%	0%	0%
Not Important	8%	10%	5%
Important	41%	47%	32%
Very Important	51%	43%	63%

Question n°12: Minimum/maximum returns, maximum drawdown and uninterrupted loss with both time to recovery and drawdown time

	All Respondents	FoHF Managers	Investors
Irrelevant	0%	0%	0%
Not Important	6%	3%	11%
Important	31%	40%	16%
Very Important	63%	57%	74%

Appendix II

Detailed Results

Question n°13: Percentage of positive/negative months

	All Respondents	FoHF Managers	Investors
Irrelevant	2%	3%	0%
Not Important	16%	17%	16%
Important	49%	47%	53%
Very Important	33%	33%	32%

Question n°14: Up months in up market & down months in down market

	All Respondents	FoHF Managers	Investors
Irrelevant	0%	0%	0%
Not Important	10%	10%	11%
Important	67%	73%	58%
Very Important	22%	17%	32%

Question n°15: Out-performance in up market & out-performance in down market

	All Respondents	FoHF Managers	Investors
Irrelevant	8%	13%	0%
Not Important	22%	20%	26%
Important	45%	50%	37%
Very Important	24%	17%	37%

Question n°16: Annualised standard deviation and semi-variance or downside risk

	All Respondents	FoHF Managers	Investors
Irrelevant	0%	0%	0%
Not Important	0%	0%	0%
Important	49%	50%	47%
Very Important	51%	50%	53%

Question n°17: Bera Jarque test

	All Respondents	FoHF Managers	Investors
Irrelevant	8%	10%	5%
Not Important	49%	50%	47%
Important	29%	30%	26%
Very Important	4%	0%	11%
No Answer	10%	10%	11%

Question n°18: Skewness and kurtosis

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	10%	10%	11%
Important	59%	67%	47%
Very Important	24%	17%	37%
No Answer	2%	0%	5%

Question n°19: Gross and net leverage analysed at the FoHF level (with breakdown by sector, management style, country, currency, etc.), and also by strategy and by fund

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	18%	23%	11%
Important	45%	43%	47%
Very Important	31%	23%	42%
No Answer	2%	3%	0%

Question n°20: Duration and spread duration for interest rate products

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	24%	33%	11%
Important	51%	43%	63%
Very Important	14%	10%	21%
No Answer	6%	7%	5%

Question n°21: Ljung Box test

	All Respondents	FoHF Managers	Investors
Irrelevant	14%	20%	5%
Not Important	49%	50%	47%
Important	18%	20%	16%
Very Important	4%	0%	11%
No Answer	14%	10%	21%

Question n°22: Herfindahl index

	All Respondents	FoHF Managers	Investors
Irrelevant	12%	17%	5%
Not Important	47%	50%	42%
Important	24%	23%	26%
Very Important	4%	0%	11%
No Answer	12%	10%	16%

Question n°23: Liquidity ratios

	All Respondents	FoHF Managers	Investors
Irrelevant	2%	3%	0%
Not Important	16%	20%	11%
Important	43%	53%	26%
Very Important	33%	17%	58%
No Answer	6%	7%	5%

Appendix II

Detailed Results

Question n°24: Stress tests

	All Respondents	FoHF Managers	Investors
Irrelevant	2%	3%	0%
Not Important	14%	17%	11%
Important	53%	53%	53%
Very Important	27%	23%	32%
No Answer	4%	3%	5%

Question n°25: Style-VaR

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	35%	43%	21%
Important	39%	43%	32%
Very Important	18%	3%	42%
No Answer	4%	3%	5%

Question n°26: Cornish-Fisher VaR

	All Respondents	FoHF Managers	Investors
Irrelevant	10%	13%	5%
Not Important	39%	43%	32%
Important	37%	37%	37%
Very Important	4%	0%	11%
No Answer	10%	7%	16%

Question n°27: Incremental Et Component Cornish-Fisher VaR

	All Respondents	FoHF Managers	Investors
Irrelevant	12%	17%	5%
Not Important	39%	47%	26%
Important	33%	30%	37%
Very Important	6%	0%	16%
No Answer	10%	7%	16%

Question n°28: Beyond VaR

	All Respondents	FoHF Managers	Investors
Irrelevant	12%	17%	5%
Not Important	31%	37%	21%
Important	35%	37%	32%
Very Important	12%	3%	26%
No Answer	10%	7%	16%

Question n°29: Sharpe ratio

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	3%	5%
Not Important	18%	20%	16%
Important	43%	40%	47%
Very Important	35%	37%	32%
No Answer	0%	0%	0%

Question n°30: Sortino ratio

	All Respondents	FoHF Managers	Investors
Irrelevant	2%	3%	0%
Not Important	20%	23%	16%
Important	45%	37%	58%
Very Important	29%	37%	16%
No Answer	4%	0%	11%

Question n°31: Omega ratio

	All Respondents	FoHF Managers	Investors
Irrelevant	6%	7%	5%
Not Important	31%	30%	32%
Important	31%	40%	16%
Very Important	22%	17%	32%
No Answer	10%	7%	16%

Question n°32: Sharpe Omega ratio

	All Respondents	FoHF Managers	Investors
Irrelevant	8%	10%	5%
Not Important	43%	47%	37%
Important	24%	27%	21%
Very Important	14%	10%	21%
No Answer	10%	7%	16%

Question n°33: M²

	All Respondents	FoHF Managers	Investors
Irrelevant	8%	10%	5%
Not Important	55%	60%	47%
Important	20%	20%	21%
Very Important	2%	0%	5%
No Answer	14%	10%	21%

Question n°34: ASRAP

	All Respondents	FoHF Managers	Investors
Irrelevant	14%	20%	5%
Not Important	51%	53%	47%
Important	22%	17%	32%
Very Important	0%	0%	0%
No Answer	12%	10%	16%

Question n°35: Calmar ratio

	All Respondents	FoHF Managers	Investors
Irrelevant	10%	10%	11%
Not Important	53%	60%	42%
Important	24%	27%	21%
Very Important	0%	0%	0%
No Answer	12%	3%	26%

Appendix II

Detailed Results

Question n°36: Sterling ratio

	All Respondents	FoHF Managers	Investors
Irrelevant	12%	10%	16%
Not Important	59%	67%	47%
Important	16%	20%	11%
Very Important	0%	0%	0%
No Answer	12%	3%	26%

Question n°37: Static and dynamic style analysis

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	14%	17%	11%
Important	47%	47%	47%
Very Important	27%	20%	37%
No Answer	8%	10%	5%

Question n°38: Analysis of correlations and conditional/unconditional betas with traditional equity and bond indices

	All Respondents	FoHF Managers	Investors
Irrelevant	2%	3%	0%
Not Important	12%	13%	11%
Important	45%	47%	42%
Very Important	39%	33%	47%
No Answer	2%	3%	0%

Question n°39: Analysis of correlations and conditional/unconditional betas with risk factors that are appropriate for the strategy of the fund or FoHF

	All Respondents	FoHF Managers	Investors
Irrelevant	6%	7%	5%
Not Important	10%	17%	0%
Important	45%	53%	32%
Very Important	35%	20%	58%
No Answer	4%	3%	5%

Question n°40: Static and dynamic factor analysis to track the evolution of the exposure to the risk factors selected for the strategy followed

	All Respondents	FoHF Managers	Investors
Irrelevant	4%	7%	0%
Not Important	18%	30%	0%
Important	39%	43%	32%
Very Important	29%	13%	53%
No Answer	10%	7%	16%
No Answer	12%	3%	26%

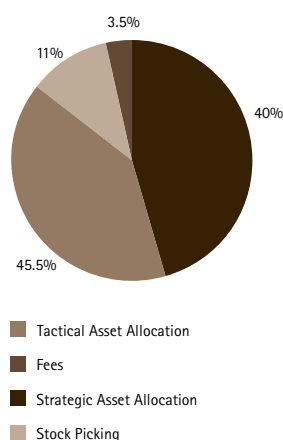
Edhec Risk and Asset Management Research Centre



Edhec Risk and Asset Management Research Centre

Edhec is one of the top five business schools in France owing to the high quality of its academic staff (98 permanent lecturers from France and abroad) and its privileged relationship with professionals that the school has been developing since it was established in 1906. Edhec Business School has decided to draw on its extensive knowledge of the professional environment and has therefore concentrated its research on themes that satisfy the needs of professionals. Edhec pursues an active research policy in the field of finance. Its "Risk and Asset Management Research Centre" carries out numerous research programs in the areas of asset allocation and risk management in both the traditional and alternative investment universes.

Illustration 18:
Percent of variation between funds



Source: Edhec (2002) and Ibbotson, Kaplan (2000)

• The choice of asset allocation

The Edhec Risk and Asset Management Research Centre structures all of its research work around asset allocation. This issue corresponds to a genuine expectation from the market. On the one hand, the prevailing stock market situation in recent years has shown the limitations of active management based solely on stock picking as a source of performance. On the other, the appearance of new asset classes (hedge funds, private equity), with risk profiles that are very different from those of the traditional investment universe, constitutes a new opportunity in both conceptual and operational terms. This strategic choice is applied to all of the centre's research programmes, whether they involve proposing new methods of strategic allocation, which integrate the alternative class; measuring the performance of funds while taking the tactical allocation dimension of the alphas into account; taking extreme risks into account in the allocation; or studying the usefulness of derivatives in constructing the portfolio.

• An applied research approach

In a desire to ensure that the research it carries out is truly applicable in practice, Edhec has implemented a dual validation system for the work of the Risk and Asset Management Research Centre. All research work must be part of a research programme, the relevance and goals of which have been validated from both an academic and a business viewpoint by the centre's orientation committee. This committee is composed of both internationally recognised researchers and the centre's business partners. The management of the research programmes respects a rigorous validation process, which guarantees both the scientific quality and the operational usefulness of the programmes. To date, the centre has implemented six research programmes:

Multi-style/multi-class allocation

This research programme has received the support of FIMAT, Misys Asset Management Systems and SG Asset Management. The research carried out focuses on the benefits, risks and integration methods of the alternative class in asset allocation. From that perspective, Edhec is making a significant contribution to the research conducted in the area of multi-style/multi-class portfolio construction.

Performance and style analysis

The scientific goal of the research is to adapt the portfolio performance and style analysis models and methods to tactical allocation. The results of the research carried out by Edhec thereby allow portfolio alphas to be measured not only for stock picking but also for style timing. This programme is part of a business partnership with EuroPerformance (part of the Fininfo group).

Indexes and benchmarking

Edhec proposes an original style index construction methodology for both the traditional and alternative universes. These indices are intended to be a response to the critiques relating to the lack of representativity of the style indices that are available on the market. Edhec is also deeply involved in the development of advanced techniques for core-satellite portfolio management. The indices and benchmarking research programme is supported by AF2I, Euronext, BGI, BNP Paribas Asset Management and UBS Global Asset Management.

Asset allocation and extreme risks

This research programme relates to a significant concern for institutional investors and their managers – that of minimising extreme risks. It notably involves adapting the current tools for measuring extreme risks (VaR) and

Edhec Risk and Asset Management Research Centre

constructing portfolios (stochastic check) to the issue of the long-term allocation of pension funds. This programme has been designed in co-operation with Inria's Omega laboratory. This research programme also intends to cover other potential sources of extreme risks such as liquidity and operations. The objective is to allow for better measurement and modelling of such risks in order to take them into consideration as part of the portfolio allocation process.

Asset allocation and derivative instruments

This research programme focuses on the usefulness of employing derivative instruments in the area of portfolio construction, whether it involves implementing active portfolio allocation or replicating indices. "Passive" replication of "active" hedge fund indices through portfolios of derivative instruments is a key area in the research carried out by Edhec. This programme is supported by Eurex and Lyxor.

Tactical allocation and the econometrics of financial markets

This programme concentrates on the application, through tactical allocation, of recent research in the area of behavioural finance. It involves analysing the conditions for producing alphas from the systematic component of a stock (sector or style timing) rather than its specific component (pure stock picking).

• **Research for business**

In order to facilitate the dialogue between the academic and business worlds, the centre has recently undertaken four major initiatives:

- Opening of a web site that is entirely devoted to the activity of international research into asset management. www.edhec-risk.com is aimed at a public of professionals who wish to benefit from Edhec's analyses and expertise in the field of applied portfolio management research such as detailed summaries, from a business perspective, of the latest academic research on risk and asset

allocation as well as the latest industry news assessed in the light of the results of the Edhec research programme. www.edhec-risk.com is also the official site for the Edhec Indices.

- Launch of Edhec-Risk Advisory, the consulting arm of the research centre focusing on risk management issues within the buy-side industry, and offering a wide range of services aimed at supporting fund managers and their service providers in the fields of operational risk, best execution, structured products, alternative investment due diligence and risk management system implementation.

- Launch of Edhec Investment Research, in order to support institutional investors and asset managers in implementing the results of the Edhec Risk and Asset Management Research Centre's research. Edhec Investment Research proposes asset allocation services in the context of a "core-satellite" approach encompassing alternative investments.

- Launch of Edhec Alternative Investment Education which is the exclusive official CAIA association course provider for Europe.

• **The Team**

The aim of the Edhec Risk and Asset Management Research Centre is to become the leading European centre of research into asset management in the coming years. To that end, Edhec has invested significantly to give the centre an international research team made up of both professors and permanent researchers, with whom professionals are affiliated in the capacity of research associates. To date, the Edhec Risk and Asset Management Research Centre has more than 28 members: 15 permanent members and 13 associates who are operating in firms that are reputed for their proficiency in asset management. This team is managed by Professor Noël Amenc, who has considerable experience in asset management as both an academic and a professional.

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