HEDGE FUND AND PORTFOLIO RISK MANAGEMENT

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Hedge fund industry participants do not always offer the same definition of risk management. Likely, this is due to the dynamic nature of risk and also due to the different level of significance or interest various risk factors will have to different parties. For example, it is often said that hedge fund managers will tend to have a very focused or granular view of risk factors within their portfolio (based on holdings), while investors will have a bird's eye view of the fund's portfolio limited to return streams or top positions.

At Pavilion, we separate risk management into two categories: market risk (which should be rewarded with commensurate performance) and non-market or business / operational risk, which only can impact fund performance negatively and should not be rewarded. This article will focus largely on the former type.

Risk management practices assist managers in both monitoring and reducing their funds' exposures to unwarranted risks, and reducing exposures to downside risk. Historically, hedge funds invested little in the way of risk systems beyond unsophisticated spreadsheets, and offered low transparency around strategies, risk and market outlook. Following the financial crisis of 2008, increased regulatory and public scrutiny, combined with additional compliance and monitoring, have put significant pressure on hedge funds to better measure and control risk and to be more transparent in the process.

Keys to a successful risk management process focus on the importance of i) establishing a proper risk management framework; ii) creating and segregating the risk management function from portfolio trading activities; and iii) investing in specialized risk systems (whether internally developed or off-the-shelf through a third-party vendor) which allow the firm to adequately monitor the portfolio. A recent study[1] noted that 84% of hedge funds use off-the-shelf risk analytics that form part of the portfolio management or trading systems.

The due diligence investment process calls for a deep understanding of the manager's approach to risk management, the components identified as most important and how the manager measures these risk components. This risk management structure must be accompanied by an effective oversight function with reporting lines independent to those managing the portfolio. The same study[2] noted that 79% of firms separate their risk manager and fund manager functions to ensure independent oversight.

Managers' incentives to implement good risk management practices are a function of a number of fund characteristics:

1) **Leverage:** Higher borrowing increases the fund's exposure to changes in asset values. Large losses can lead to margin calls from lenders and redemptions from investors, both of which can require the manager to liquidate the portfolio at "fire sale" prices. Moreover, lenders may implicitly or explicitly require a minimum level of risk management in contractual agreements or legal covenants.

1, 2 - Source: Risk Roadmap: Hedge Funds and Investors' Evolving Approach to Risk, BNY Mellon, Aout 2012

Therefore, funds using more leverage would benefit from good risk management.

2) Fund size: The cost impact of implementing and operating risk management practices decreases with increasing fund sizes.

3) Alignment of interest: Fund managers with a substantial portion of their liquid net worth invested in their funds are likely more risk averse and incented to implement more extensive risk management practices to better understand and monitor risk exposures.

4) Reputation: Managers of established hedge funds want to protect valuable reputations. Therefore, they have more to lose, such as their ability to charge higher fees, start new funds or keep existing investors should substantial changes in the value of the fund's invested assets occur due to unexpected risk exposures.

Portfolio risk management for hedge funds goes well beyond traditional risk management tools such as mean-variance analysis, beta and the various iterations of Value-at-Risk (VaR). While these measures can be helpful under certain circumstances, they do not capture well the risk exposures of most hedge funds. As an example, VaR does not fully capture the spectrum of risks that hedge funds exhibit given that returns are not normally distributed. Performance for most hedge fund strategies is also non-linear and relatively uncorrelated with equity market indices such as the S&P500. Risks can be unique or idiosyncratic, and some strategies target relative value relationships which are complex. Additionally, the potential use of leverage, options, the more frequent trading of positions, the illiquidity of positions and the event risk for event strategies, among others, can individually or collectively increase the risk of investment. These broad risk types are described in a findings matrix developed by Jaeger and Säfvenblad, who define the different risk exposures by hedge fund strategy. (See Figure 1 below)

For example, managers should have pre-defined rules in place with respect to leverage. Leverage, or how much a fund has borrowed to generate performance, is one of the first items analyzed during the due diligence. It is important to

Figure 1 : Risk Types Matrix

	Long/Short Equity	Equity Market Neutral Statistical Arbitrage	Equity Market Timing	Merger Arbitrage	Fixed income Arbitrage	Convertible Bond Arbitrage	Distressed Securities, Regulation D	Global Macro, Managed Futures
Equity Market Risk	+ +		+	+			+	
Corporate Event Risk	+ +	+ +		+ +			+ +	
Small Firm Risk	+ +	+		+			+ +	
Hedging Demand Risk								+ +
Complexity of Efficiency Risk		+			+ +	+ +	+	
Liquidity Risk					+		+ +	
Term Structure (Interest-Rate) Risk					+ +			+ +
Credit Risk					+ +	+ +	+ +	
Foreign Exchange Risk								+ +
Extreme Event Risk		+		+	+ +			

\+ Some Exposure   + + Considerable Exposure

Source: Jaeger and Säfvenblad

understand how the manager defines leverage, as this varies across hedge fund strategies. What is the typical leverage employed and how does the current level compare to the historical average? Is there a maximum leverage level allowed and is it documented in the legal offering? What method does the fund use to access leverage (inherent or economic)?

Understanding the liquidity of the portfolio is another important step. The strategy and portfolio instruments traded must be in line with the manager's liquidity parameters and, more broadly, with the fund's investor-redemption terms. For a manager trading relatively illiquid credit or debt instruments, we would expect the fund's redemption terms to include some form of cap or gate on capital redemptions to protect ongoing investors from the adverse valuation effect of a forced selling of positions in the market.

Relatedly, a concentrated portfolio of securities could pose a liquidity risk to the portfolio. Investors should understand how positions are sized and what hard rules (if any) are applied in the event where the fund's position would exceed the maximum allowed size as a percentage of the fund. The analysis also should encompass other restrictions, such as on geography, sector and issuer. Hedging techniques, if any, should be examined. Does the manager hedge at the portfolio level and/or the individual-position level? What types of exposures does the portfolio face: interest rate, credit, currency, event or liquidity risk? For example, when analyzing a large position denominated in foreign currency, does the manager hedge the currency risk fully, partially, or not at all? Different scenarios will result in different risk profiles, which must all be evaluated by investors in the context of the investment strategy.

Investors should also inquire about stress testing and the extent to which the fund's portfolio is tested. What are the scenarios and exposures tested, and are they realistic? This is an area which typically demonstrates how thoughtfully the risk management process has been designed. Additionally, investors should check if the firm employs additional risk management techniques, such as diversification parameters or soft/hard stop losses (especially for multi-portfolio manager funds).

Risk aggregating platforms, which collect a fund's position data from its fund administrator on a monthly basis, can provide investors with a way to evaluate a fund's risk exposures, stress on their own and compare to the tests reported by the fund manager.

The ultimate goal of effective risk management is to eliminate – or at least partly mitigate – the potential tail risk events (equivalent to a portfolio's positions moving more than three standard deviations from its current price). Effective risk management practices should help improve the hedge fund managers' understanding of how changes in the financial environment would affect their fund's performance and, ultimately, help them to perform better during volatile market environments and extreme negative financial events.

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