

Risk management for structurers

How do large hedge fund managers manage their risk with regard to structured products across a range of hedge fund styles and managers? By [Gilbert Dunlop](#)

Risk management in hedge funds is an unavoidably big and multi-faceted subject. While it is the defining issue in the success of a single-manager hedge fund, the issues become more complex, and the opportunities far more interesting, when building a portfolio of managers.

Economic consultant Peter Bernstein captured the central importance and pervasiveness of risk management when he said: "You cannot manage outcomes, you can only manage risk." The entire investment process for any hedge fund manager – irrespective of their particular investment style or product focus – is quintessentially about identifying, evaluating and managing risk.

This is particularly relevant to structured products when they provide capital or principal protection for portfolios that invest across a range of hedge fund styles and managers with the objective of reducing risk relative to return. Typically, these offer increased investment exposure and require a high level of structuring expertise to meet different fiscal, legal, liquidity, risk-transfer and financing requirements.

Risk and return

The hallmark of hedge funds is the pursuit of absolute returns – that is, the quest to generate positive returns and defend gains in both falling and rising markets. Importantly, this objective goes hand in hand with the goal of earning attractive returns per unit of risk – or risk-adjusted returns.

With hedge funds, it is possible to be reasonably definitive about how much risk one chooses to run and then to tailor and manage a portfolio in a disciplined way to try and achieve the target risk. One can decide to target returns at the higher end of the performance range, although this generally means having to run commensurately greater risk. Hence the key indicator of success is how much return is gained for risk taken.

There is sufficient historical depth to the hedge fund performance data available today to conclude that, over the medium term, different hedge fund styles deliver particular levels of return for associated levels of risk. The typical risk-return profile for each style is a function of the performance characteristics of all the constituent sub-strategies, and these characteristics vary among the managers within each style area. Obviously, risk-and-return characteristics for

each style are not static and shift in various ways with the market cycle, but the patterns in those shifts are becoming clearer, and understanding of the drivers of risk and return for different styles is also increasing.

Modelling techniques

Advanced modelling techniques – particularly Monte Carlo analysis – play a critical role in enabling a hedge fund manager such as Man Investments to determine the target risk and return for its portfolios and structured products. Monte Carlo analysis provides a mechanism to assess volatility, worst drawdown, return and other performance expectations and path-dependent features for structured products, rather than simply basing such analysis on observed historical performance.

The power of Monte Carlo analysis lies in the fact that it is path-dependent – the output is determined by the path of different random simulations. This makes it possible to produce distributions of the different output variables mentioned above. Consequently, it is possible to derive probabilities associated with the output variables.

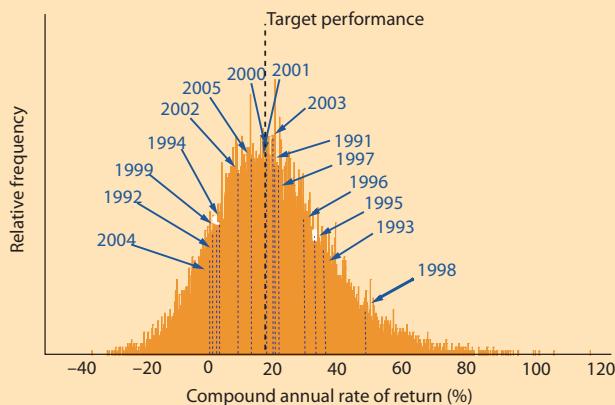
The Monte Carlo modelling technique runs thousands of random simulations of monthly returns for each manager in a portfolio, which are then used to simulate the likely distribution of returns from that portfolio of managers. The return profile gives a very powerful simulation of the potential performance of the portfolio as well as identifying the likelihood of extreme outcomes – so-called fat-tailed risk. The graph illustrates a typical return profile – that for AHL Diversified, Man Investments' trend-following commodity trading adviser programme.

Risk management considerations

The provision of principal protection should not be the overriding reason for an investor to choose a certain product. There are special risk-management requirements and considerations for structured products – such as principal-protected multi-strategy products – and these should be key considerations for an investor seeking to buy such a product. In other words, principal protection should be viewed as an added feature.

By way of analogy, a decision on which car to buy is likely to be

Probability distribution for AHL Diversified (Monte Carlo analysis)



Note 1: The longer the product life, the greater the probability of the return being within any given range around the mean.

Note 2. The Monte Carlo analysis here based on a proprietary model developed at Man Investments, which works by randomly simulating monthly returns for a manager/style. These are then combined to construct a possible random path that the net asset value of a portfolio might take over the period shown above, taking into account appropriate fees, interest and so on. This is repeated many thousands of times, so that at the end it is possible to analyse simulated distributions of product-level return, as shown. There is no guarantee of trading performance, and past performance is no indication of future results.

Source: Man Investments

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governed by a number of critical considerations – size, fuel consumption, performance, reliability and so on. One added feature car manufacturers might offer is an airbag. If the vehicle's chassis is strong, and you can succeed in driving the vehicle safely, the airbag – which we can liken to a principal-protection arrangement – is largely redundant. But it is nice to have.

In fact, many investors view principal protection strictly as a relatively inexpensive put option for the segment of their portfolio dedicated to alternative asset-management strategies. From a fiduciary standpoint, it is another form of protection after due diligence has been conducted on the manager, the strategies and the manager's risk-control process.

A key priority is to continually monitor the risk capital of each multi-strategy portfolio to determine the appropriate level of trading exposure needed to ensure a robust product. Careful management of risk capital is particularly important for structured products. The provision of principal protection means that, if the product

were to suffer a very significant drawdown, its risk capital would be depleted more quickly than the equivalent non-principal-protected structure. To offset this risk, the investment manager must carefully determine the optimal split between the risk-capital portion and the principal-protection portion.

If a manager allocates too much capital to the risk portion, thereby reducing the amount available for the principal-protection portion, the zero-coupon bonds he can buy will take longer to reach a value equal to the principal. Conversely, if a manager allocates too much to the zero-coupon bonds, the product will be left with insufficient capital to achieve the target return.

Part of Man Investments' daily risk-management process for structured products involves monitoring the appropriate level of capital that should be put to work relative to the target investment exposure for a particular portfolio.

The structure is compromised if the manager does not maintain the optimal allocation split between risk capital and the principal-protection portion. This is another area where Monte Carlo modelling techniques come into their own. For each strategy or manager, it is possible to derive a clear assumption of worst-loss risk – the maximum that can be lost in any one trading period – and at portfolio level, these measures can be combined to produce a portfolio-level worst-loss figure. It is therefore possible to determine the level of trading capital and trading reserve needed for each portfolio structure to be robust.

This information is used to calculate gearing levels and to implement the associated risk controls to ensure a structured product has a high probability of withstanding market shocks at any point during its life and preserving the trading capital necessary for meeting its risk-adjusted return objective.

Conclusion

Hedge funds involve risks at the level of managers, strategies and portfolios. These risks must be clearly identified and decisions must be taken with regard to avoiding, accepting, eliminating or mitigating, and controlling them.

A vast array of risk measures, concepts, techniques, quantitative processes and qualitative considerations come into play, and risk-management requirements escalate as one moves towards the more specialised end of the hedge fund product spectrum, such as multi-strategy structured products.

Portfolio managers must dedicate significant resources to risk analytics and risk-control mechanisms to ensure monitoring and risk management at both the manager/strategy and portfolio level. It is also imperative to recognise the limitations of individual statistical measures and to adopt a holistic approach to understanding, avoiding, addressing and controlling risk.

In this sense, the whole notion of risk management is inseparable from investment selection, portfolio construction and dynamic portfolio management. Choosing a successful hedge fund manager means selecting one that successfully looks after risk – the returns will look after themselves. ●

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