HEDGE FUNDS
THE VOICE OF THE ALTERNATIVE INVESTMENT INDUSTRY REVIEW

The aspects of uniformity

Richard Tomlinson, head of multi-strategy products at Old Mutual Asset Managers (UK) delves into the notion of correlation

Examining correlation within funds of hedge funds, it is important to understand sources of risk premia and their contribution to total return. We examine here alternative risk premia and how we manage risks of alternative beta and add value in portfolio construction through non-parametric techniques.

In a long-only context, the capital asset pricing model (CAPM) enables a manager to generate excess returns (versus the risk free rate) from systematic exposure to market risk (beta) plus added value from the skill of the manager (alpha). This can be shown as follows:

$$E(F_i) = R_f + \beta_{im}(E(R_m) - R_f) + \alpha$$

where:

$E(F_i)$ is the expected return on the fund;
R_f is the risk-free rate of interest;
β_{im} is the sensitivity of the asset returns to market returns;
$E(R_m)$ is the expected return of the market; and
α is the excess return attributable to the manager's skill

Excess return due to the market is the simplest risk premium – the market risk premium. Hedge fund investors have recently started to recognise that a proportion of returns can be attributed to similar systematic risk factors ('alternative betas') rather than simply pure alpha. A simple model to describe this is:

Hedge fund return = traditional beta + alternative beta + alpha

Alternative beta may be thought of as the excess return derived from exposure to those systematic risk factors which are common to hedge funds. As with the traditional CAPM model, alpha is the return from the manager's ability to exploit market inefficiency.

Academic research has gone some way to explaining systematic risk exposures that apply to hedge funds. Much of that work finds returns are generated through both systematic exposure to risk premia and exploiting inefficiencies in imperfect markets – similar to the long-only world. However, whereas a long-only equity manager endeavours to extract equity risk premium, a hedge fund manager may try to extract various other risk premia, for example credit, interest rate or liquidity risk. Nonetheless, while alternative beta and traditional beta both result from systematic market risk exposure, alternative beta is rather more complex.

Quantifying the beta

So how do we determine systematic exposure? There is a significant amount of research into the development of accurate models for hedge fund risk exposures, but here we will stick to a relatively common method.

'Style factor analysis' often arises in such discussions and many commercial analytical tools are available. Factor analysis attempts to regress fund returns on various risk factors (for example market risk, credit risk or liquidity risk) and output a set of loadings to each pre-specified factor. These loadings give an indication of the sensitivity of fund returns to these risk premia. The regression also yields a constant term and residuals:

Hedge fund excess return = Manager's $\alpha + \Sigma (\beta_i{*}Factor_i)$ *+ random fluctuations*

In the case of a long-only manager with constant long bias investing in S&P 500 stocks, factor analysis is likely to provide an accurate estimate of risk exposure. We would expect a high sensitivity to the market return risk factor (traditional beta). If the manager's particularly skilful at selecting stocks, we may get a positive constant term (or 'alpha'). Here, factor analysis can help devise a model successfully tracking returns to a reasonably high level of confidence, because the manager has a constant exposure to the specified risk factor, which is a reasonably obvious one to include in the model.

Hedge funds are very different, not least because of time-varying risk exposures. Factor models use historic data to determine factor loadings, although the active nature of many managers may render these sensitivities out of date because the risk profile has changed. Furthermore, relevant risk factors may be complicated and harder to specify when trying to model the fund and there is the question of which types to include. The option-like payoffs to some of these alternative risk premia are markedly different to traditional betas, introducing non-linearity problems, so how is this best captured in a model? Although tools are available to help model risk exposures, model risk and the inherent complexity of some strategies makes it difficult to build an accurate, dynamic model.

The replicants arrive

So is there a place for alternative beta? The notion that alternative beta makes up a larger part of overall returns than previously thought has resulted in the launch of a number of alternative beta tracker funds.

There is a parallel to be drawn between the launch of these synthetic hedge fund products and long only 'index-tracker' mutual funds launched 20 or more years ago. They took a while to gain critical mass, although their mechanistic approach and lower fee structure eventually found favour. Time will tell whether there is a place for passive hedge fund investment.

By its very nature, alternative beta can be different and therefore add diversification to traditional beta. Furthermore, some alternative betas may be difficult to extract (and replicate), requiring skilled managers. Hedge funds can give investors access to these different risk premia. Moreover, hedge funds are 'active' investors and as such really do shift their risk exposures through time and manage the risks too. A passive alternative beta replication strategy is unlikely to offer these dynamics and some investors might feel this is what they are paying for.

With much talk of alternative beta, is there any real alpha left and will it persist? Following on from the simple factor model example above, one can start to understand why determining the existence of alpha – let alone its magnitude – proves difficult. Let us take the example of a 'zero-alpha' manager picking up credit and liquidity risk premia. A regression model that doesn't incorporate these risk factors is likely to result in a large constant term (alpha). This alpha estimate is wrong purely due to model mis-specification.

Taking into account the problems faced when trying to model non-linear, dynamic exposures to complex risk factors, it is clear that estimating alpha is a process riddled with uncertainties.

Despite the model mis-specification, it is widely acknowledged that there is less alpha than previously thought. The work being carried out into creating synthetic hedge fund products ('clones') and the investments made so far may indicate that some market participants believe true alpha is very difficult to find.

However, while the capacity for alpha is limited, hedge funds and other alpha hunters remain a comparatively small part of overall global investment capacity.

One might also argue that the flexibility that hedge funds enjoy in finding new opportunities may also offset the reduction caused by a large amount of money chasing the same inefficiencies.

Hedge funds can find new inefficiencies to exploit, but it will become harder to identify and isolate the truly high alpha managers

Assuming that it is possible to find a top alpha-producing manager despite all these difficulties, one might question how performance is to persist. Research from Edhec suggests that performance doesn't persist at an annual level[1] – today's top manager is not the top manager in the future. Hence it may not be productive for investors to seek out the 'top' manager, but rather find a 'good' manager who understands and manages risks they are taking.

The quest for alpha

With the concept of alternative beta a relatively recent one, opinion is still somewhat divided with regard to hedge fund returns.

Those in the alpha camp believe that the key component of hedge fund returns derives from manager skill, whereas the beta lobby argues that exposure to systematic risk is the real driver of returns.

We believe the reality is somewhere in the middle. It is easy to argue that returns incorporate elements of both; but less easy to measure in what proportions, not least because of the model mis-specification issues described earlier.

Finding the highest alpha manager is extremely difficult and there is little to suggest any guarantee that they will continue to be the best.

We believe that hedge funds do take systematic risk exposure to alternative risk premia and that alternative beta has a part to play in a portfolio, providing a potentially more complex and diversified set of systematic exposures.

Some investors may want a cheap source of particular alternative betas, therefore a clone may fit their requirements. Against this, replication strategies may find it difficult to mimic the dynamic and non-linear exposure of some funds to the more complex alternative risk premia, therefore active funds remain the best way for investors to access them.

It is vital to understand that alternative betas do exhibit different payoffs and risks to traditional systematic risks. These risks exposures have to be properly understood in order to make informed decisions on portfolio construction and management.

Mindful of these alpha estimation and performance persistence issues, we believe. It is hard to pick the very best alpha generating managers. However, picking good managers with performance persistence is more achievable. This requires a good balance between qualitative and quantitative techniques, a strong focus on manager profile and continuous dialogue both before and after selection. We also favour low beta managers as we place more value on capturing alpha and alternative beta rather than traditional beta.

Naive diversification

How many managers are needed to 'diversify'? We believe there is a place for alternative beta in the portfolio beside pure alpha. However, we also believe that avoiding 'hyper-diversification' is important to preserve these valuable exposures. For an investor wanting alternative beta/alpha exposure, seeking diversification through investing in a large number of managers is potentially detrimental.

Alternative beta is hard to find, as is alpha, therefore building a portfolio with an overly large number of underlying holdings does not necessarily increase diversification, but instead may just increase the chance of selecting a manager who may not deliver alpha.

Mixing high alpha managers with lower and potentially even negative alpha will result in a lower portfolio alpha. This idea of 'naïve diversification' is just as critical for the resulting portfolio alternative beta exposure. Adding more strategies could potentially diversify away any desired alternative beta exposure, while traditional beta exposure can actually increase through hyperdiversification. Chart 1 (above left)[2] shows the impact on beta of increasing the number of funds.

One could explain this phenomenon intuitively by considering that hyper diversification may diversify away alternative beta, leaving residual market beta.

Therefore there is a powerful argument to be made against over-diversification, which can result in a dramatic reduction of the potential diversification benefits when mixing a hedge fund portfolio with traditional assets.

It is important to identify and understand the desired level of alternative/traditional beta exposure correlation of a hedge fund portfolio prior to construction, rather than just accepting that the individual portfolio constituents have a low correlation with traditional assets and therefore will also do so in aggregate. Given that a greater number of managers does not necessarily equal greater diversification and that random selection does not provide optimal diversification, the mix of individual components must be carefully selected to achieve the desired diversification level.

This requires an understanding of the nature of each strategy and its inherent risks – portfolio risk can be significantly reduced with fewer holdings if those holdings are carefully selected and managed.

Non-parametric techniques

Hedge fund returns are non-normal and often exhibit excess kurtosis, meaning that the probability of extreme returns is higher than depicted by a normal distribution. Alternative risk premia such as credit or volatility risk are prime examples of exposures that contribute to this profile.

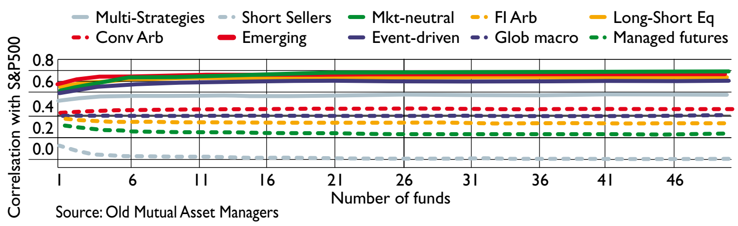
These are often described as event risk because they only tend to incur significant downside losses during certain 'stress' events. At other times, they may exhibit high risk adjusted returns. It is crucial that these alternative beta extreme risks are understood and managed appropriately.

To do this, an investment process must truly appreciate the full distribution of returns (that is, capture skew/kurtosis) to capture any extreme events and investigate risks that potentially haven't been realised in historic returns.

We would argue that simple mean-variance methods do not adequately capture these risks and that non-parametric techniques are more appropriate.

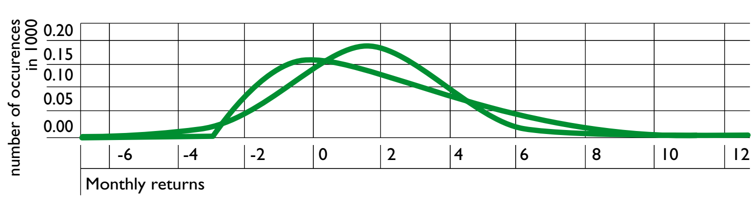
We rely heavily on non-parametric methods to build stable portfolios. These techniques

Chart 1: How much diversification is enough? (Source: see footnote 2)



Source: Old Mutual Asset Managers

Two return distributions with same mean return and same volatility



Source: Old Mutual Asset Managers

take a risk-focused approach and aim to ensure the portfolio takes the appropriate level of risk (including extremes) for the return generated.

This includes the use of metrics such as the Omega function, which looks at the entire return distribution and penalises those portfolios that demonstrate a lower probability of beating a hurdle. The Omega function is calculated as follows:

$$(r) = \frac{\frac{1}{n} \bullet_{i} \max(0, R_i - r)}{\frac{1}{n} \bullet_{i} \max(0, r - R_i)}$$

where r is the return level regarded as the loss threshold

Chart 2 shows two distributions with the same mean and variance.[3] A simple parametric method would have difficulty distinguishing between them, whereas the use of the Omega function would enable a manager to differentiate between them, selecting the non-normal distribution, which has a limited downside and significantly improved potential to realise large gains. One could think of this as penalising high downside fat-tail risk. Furthermore, portfolios are subject to Monte Carlo simulations to understand the portfolio payoffs in various scenarios. By combining these techniques, the investment process ensures the embedded risks are properly understood.

Non-financial risk

Studies show that more than half of all hedge fund failures are due to operational rather than financial risk considerations.[4] By their very nature, hedge funds allow investors to be exposed to different risk factors such as volatility, counterparty, or liquidity risk, since this exposure is considered to be a source of superior returns. Exposure to these risk factors characterises the broad diversity of hedge fund strategies compared with traditional investments.

Furthermore, exposure to these risk factors is clearly diversifiable, given that different hedge fund strategies exhibit low correlation with each other.

Rightly there is a focus on financial, or market, risk only, although the importance of non-financial risk must not be underestimated. A key finding by Capco is that operational risk greatly exceeds investment strategy risk, with at least 56% of hedge fund collapses directly related to a failure of one or more operational processes.

So how can operational risk be minimised? Managed account platforms are a potentially more secure environment in which to manage a fund of hedge funds.

They offer a level of protection that significantly reduces the operational risk associated with direct investment in underlying funds. This is ultimately because the manager has the economies of scale to appoint and manage a single third- party administrator and has the transparency to be able to value and monitor the risk of all of the portfolio positions centrally.

Selecting liquid strategies is clearly a critical part of this capability. The manager is able to monitor in real time where underlying managers are making or losing money and therefore see day-to-day correlations and effectively manage the risk budget.

This structure limits the scope for fraudulent actions and enables the manager to take any remedial risk management action more efficiently. Thus, by mitigating operational risk (which is not rewarded by the market) managers are able to focus their efforts on financial rather than non-financial risk.

Risks associated with alternative beta are different to those of traditional beta and must be understood and managed appropriately. Investors requiring exposure to alternative beta alongside alpha may find that hyperdiversification may be suboptimal, that is, a greater number of underlying funds may reduce diversification rather than increase it.

To this end, mean-variance methods are inadequate to analyse the full range of portfolio risks, with non-parametric techniques considered more appropriate. While it's difficult to identify the best managers who can generate persistent levels of pure alpha, a disciplined, risk-focused portfolio construction process which selects good quality managers should enable a manager to add value through achieving the optimal level of diversification, while avoiding the pitfalls associated with a higher number of holdings. ■

FOOTNOTES

1 *A Survey of the Literature on Hedge Fund Performance*, October 2004, Walter Géhin, Research Associate, Edhec Risk & AM Research Centre

2 *Hedge Fund Diversification: How Much is Enough?*, Hedge Fund Research Paper 52, July 2002, Francçois-Serge L'Habitant & Michelle Learned

3 Old Mutual Asset Managers (UK)

4 Capco, 2002, Working Paper: *Understanding and Mitigating Operational Risk in Hedge Fund Investments*