



Defining the link between risk and leverage

How useful is 'leverage' as a statistical measure of risk in hedge funds and its application to managed futures? Winton Capital Management's David Harding argues for a new approach

Many potential investors in hedge funds have become used to assessing the potential risk of a hedge fund using the 'leverage' statistic, a measurement that has become almost synonymous with risk in the aftermath of the LTCM blow-up. As with most summary statistics, leverage has several problems associated with it.

In balance sheet terms, leverage is defined as the ratio of the face value of the assets controlled by the fund to the net asset value of the fund.

Adopting leverage greater than zero can increase the volatility of an investment, enhancing positive performance as well as losses. However, the rules for calculating leverage are much less clear than this simple definition implies. Are short positions to be netted against long positions? How is the correlation of shorts and longs to be taken into account? Is this correlation stable? Suppose a fund is 100 per cent invested in the FTSE 100 index with its face value 100 per cent 'hedged' by DAX futures. The net leverage will be 0 per cent if the two partially correlated exposures are deemed to

cancel, 200 per cent (or '2x' leveraged) if short and long exposures are deemed to add, yet a reasonable estimate of the risk would be that it is less than a naked 100 per cent long position (but still significantly

greater than 0 per cent). More problems lie beyond this definitional conundrum. Even if a conventional definition of leverage were to be agreed upon, taking into account long and short positions and their correlation, this statistic would still contain no information on the level of the underlying risk that is being leveraged.

Supposing a fund is 100 per cent invested in an asset, say short-term bonds, with a volatility of 1 per cent.

If it is 20 times leveraged long then its volatility will be 20 per cent. A fund that is wholly invested in an asset with a volatility of 20 per cent will have the same risk. Thus the first fund, which is leveraged 20 times, is equally risky as the second unleveraged fund. Leverage can be seen to be useless in this circumstance as a measure of risk!

Leverage statistic

Why then is the use of the leverage statistic so common? Under very limited but quite common circumstances it has some utility. If a fund is long a diversified portfolio of stocks of broadly similar volatility (10-30 per cent), and short another similar portfolio, then its net leverage will usually be broadly proportional to its volatility, and thus its risk. This may be a good characterisation of many long/short equity hedge funds, so long as one is in a position to make these assessments about the strategy. It is not true for other types of hedge fund, and

particularly not so for managed futures where long and short positions are held in a variety of instruments of widely varying underlying volatility and with varying and unpredictable cross-correlations.

Use of the leverage statistic is not a good way of understanding potential risk in hedge funds and may well be downright misleading. Quantitative risk is best measured with a dispersion statistic appropriate to the return generating process of periodic returns. Thus, the appropriate means for measuring risk in managed futures strategies are distinct from the definition of leverage that is enjoying wider currency.

For a diversified managed futures programme which produces a leptokurtic (fat-tailed) but symmetric and stationary distribution, a statistic such as semi-variance will provide a good risk estimator. This can be complemented by a less theoretical, more practical measure such as the margin/equity ratio. Using exchange-determined futures margins in the calculation of a risk statistic has the virtue of incorporating independent, transparent and sophisticated assessments of market risk. The margin/equity ratio takes account of all of the individual exchanges' margin setting activity as well as any cross margining reductions available from spreading or other risk reducing positions.

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