Distressed considerations in the construction of hedge fund portfolios

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Since the seminal work of Nobel laureates Markowitz, Sharpe and others, portfolio theory is ubiquitous in the investment industry. When it comes to the construction of portfolios of hedge funds, it is common practice to tackle asset allocation to managers using considerations of efficient frontiers, Sharpe's ratios, and related concepts. It is important to understand that, in order for portfolio theory to deliver what one seeks, namely high returns, low risks and adequate diversification, the assumptions of the theory must be satisfied. One of its basic assumptions, the one that is the subject of this article because it is not satisfied in real markets, is the stability of correlations between managers' returns; in other words, correlations would have to be the same, independent of market conditions.

Anyone who has observed the hedge fund market for some time is fully aware of the beneficial lack of correlations among managers' returns, one of the most lauded characteristics of these types of investments. But one is also aware that, in times of distress (remember the summer of 1998), all managers' returns seem to line up with complete disregard to their measured correlations and analyst's predictions, and the direction of their nav's is the same for all of them: *down.* The net effect of this rather common phenomenon is that many portfolios lose their diversification properties when they need it the most, when losses line up.

This brings to light the necessity of revising the assumptions of portfolio theory, making some room for the managers' occasional escapades into a highly correlated environment, and most importantly making the necessary adjustments so that the portfolio one builds is diversified, not only in times of normal market conditions, but in times of market distress also.

To understand how a cure could be developed, consider not one, but two correlation matrices for when measuring manager's performance: one for normal markets, the other for distressed markets. The two matrices would look somewhat like the ones in the picture; with these two pictures of the world, one would then go ahead and stress test the portfolio under the two states of the world, given by the two matrices, and in this way gain some insight as to how a *bad day* would impact portfolio returns. One would also be able to optimize portfolio performance taking both states into account, attaching adequate probabilities to each. In fact, building adequate extensions to the theories developed by Markowitz and Sharpe, one will in this way end up with combinations efficient frontiers, ones for normal market conditions, the others for distressed situations, one would be able to measure Sharpe's rations again under both types of events, and most importantly one would be able to combine with appropriate likelihood of market events the conclusions obtained with each correlation situation, to obtain diversification and risk control under any market condition.

Two matrices, one measuring the correlation between managers during normal markets, the other measuring the correlation between managers in distressed markets. The high piles correspond to highly correlate managers, whereas the low piles correspond to negative correlations. Note how, during distressed markets, correlations that are usually negative become very highly positive.