

# Not all alpha is created equal

**Jon Lukomnik**, managing director of CDC Investment Management Corp, New York, explains why diversification is the one true path towards profit

**H**owever you choose to phrase it, making more money with less uncertainty is the Holy Grail of investors. Unfortunately, however, the road to that divine outcome has become populated by any number of false gods. In the end, the true path remains the same one Harry Markowitz explained half a century ago: diversification.

Diversification is a simple concept, but one with profound implications. This is true for portable alpha strategies, as well as more traditional investments. Diversification implies a very basic truth: all alpha is not created equal.

To understand why, let us compare two managers. Call them Manager A and Manager B. Both managers are US equity managers benchmarked to the S&P 500. To keep the maths simple, let us assume that both managers returned 15% in a year when the S&P returned 10% (and the S&P had a volatility of 20%). So, simply by subtraction, both managers had an alpha, or value added, of 5%. (That actually would be divine - and highly unlikely - since most active US equity managers have negative alpha of about 2%; that is, they lose money relative to the benchmark.) Finally, assume the volatility of the alpha in each portfolio is the same, at 10%.

Moreover the alpha of both managers is highly portable. An investor could swap out the underlying S&P return (either through a swap or by using the futures or options) in return for a cash return and keep the 5% alpha. (The full theory of portable alpha is beyond the scope of this article. See Damsma et al 'Alpha, The Positive Side of Risk,' Investors Press, 1997.)

Table 1 provides a recap of the similarities between Manager A and Manager B.

While there seems to be nothing to choose between these two managers, they are very different. Manager A gained his alpha as a result of a 'high-beta' portfolio. In

this case, his portfolio beta was 1.5. In other words, for every 1% move in the market, his portfolio moved by 1.5%. Thus, when the market returned 10%, his portfolio returned 15%. In effect, a high beta portfolio is the same as a leveraged portfolio, and a beta of 1.5 is the functional equivalent of borrowing 50 cents on a dollar and investing the \$1.50 into the S&P. (Of course, since a high beta portfolio exaggerates every market movement Manager A's portfolio would have exaggerated downward movements by 1.5x as well.) Now, let us assume Manager B's alpha comes from some other source. Table 2 shows that while the alphas may be the same in return space, they are far from equal in risk space for an S&P 500 investor.

Remember, each manager had the same alpha and the same total return. Yet one manager's total portfolio was significantly less risky. That sent the information ratio (excess return/excess risk) soaring to the heavens. What is the difference? True diversification.

The key to diversification is correlation. Simply put,

**Table 1**

Portfolio	'A'	'B'
Total Return	15%	15%
Alpha	5%	5%
Volatility of Alpha	10%	10%

**Table 2**

Portfolio	'A'	'B'
Total Return	15%	15%
Benchmark Return	10%	10%
Alpha	5%	5%
Benchmark Volatility	20%	20%
Total Portfolio Volatility	30%	22.36%
Information Ratio	0.5	2.12

# INVESTMENT MANAGEMENT

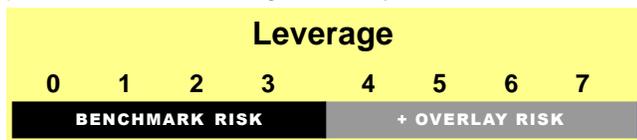
correlation measures how likely two assets are to move together (in this case the benchmark and the alpha). Manager A, you may remember, had what was, in effect, a leveraged S&P portfolio. That portfolio moved in lockstep with the underlying S&P benchmark. Manager B gained his alpha from another source, in this case, one with no correlation to the S&P. In statistical terms, Manager A's alpha had a correlation of 1 with the S&P, while Manager B's portfolio had a correlation of 0.

(While this example is extreme, in order to demonstrate the issue, it is not beyond the bounds of reality. Most active US equity portfolios generally have correlations of greater than 0.8 with the S&P 500. Many hedge funds have correlations with the S&P 500 of between -0.2 and +0.2. Therefore, an investor who seeks to add value by selecting a good, traditional active manager is likely to experience significantly higher total portfolio volatility than an investor who adds the alpha from an absolute return manager onto an S&P 500 index. That is true even if both streams of alpha have the same volatility and same return.)

Another way to visualise the power of correlation and diversification is through geometry. Visualise risk as a line. So, if an inch equals a unit of risk, a four-inch line equals four units of risk. Let us call that the benchmark portfolio.



If you leverage that portfolio by 75% you would add exactly three units of risk to the total. (Remember, the correlation coefficient of leverage is exactly 1.) Another way to put it is that the angle between the benchmark portfolio and the leveraged overlay is 180°.



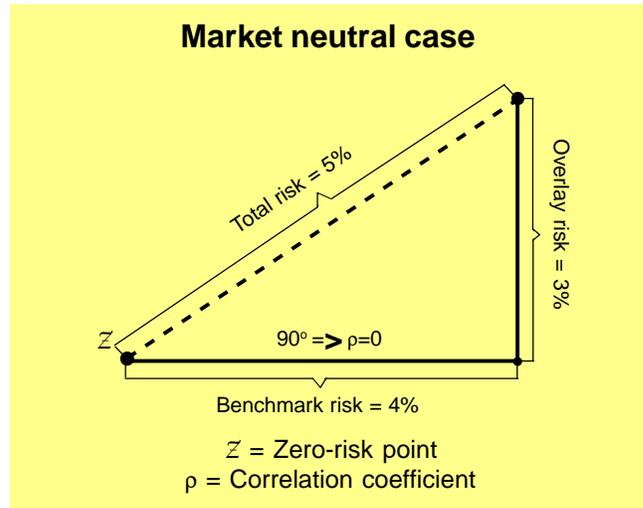
Similarly, a perfect hedge of 75% would move you back three units of risk towards the risk = 0 starting point. (The correlation coefficient of hedging is -1.) The angle between a benchmark and a perfect hedge is 0°.



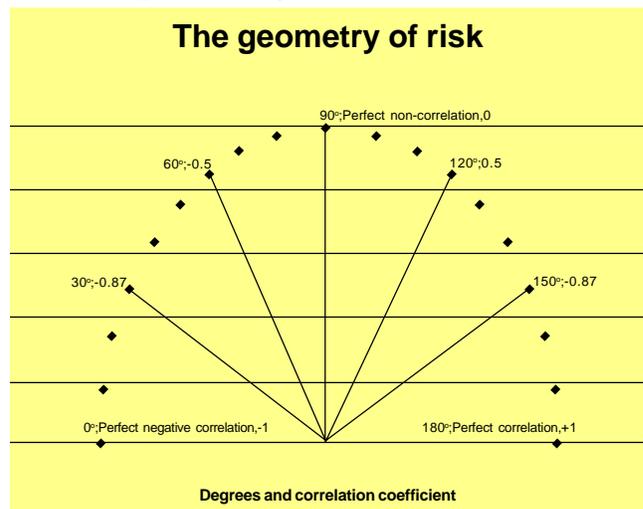
This geometric exercise becomes particularly interesting when there is no correlation (correlation coefficient = 0) between the benchmark and the overlay portfolio, as there was in the case of Manager B. In that

case, the overlay portfolio can be visualised as a straight line with a 90° angle.

Holding constant the risk of the overlay at the same three units, the total portfolio risk would be the hypotenuse. Using the Pythagorean theorem ( $A^2 + B^2 = C^2$ , where C = the hypotenuse), the total risk is 5% (see figure below).



This trigonometric analysis works for correlations other than -1, 0 or +1. The angle is a function of the cosine of the correlation coefficient. You should note, however, that the acuteness of the angle is not linearly proportional to the correlation. Nevertheless, understanding the geometry of risk (see second diagram) gives investors a powerful way to visualise diversification.



Thus, diversification remains the one true way to a divine risk/return profile, even when dealing with such sophisticated strategies as long/short, leverage, hedging, portable alpha and absolute return strategies. All alpha is not created equal: alpha not significantly correlated to the benchmark is much more heavenly than that which is. ■