Manufacturing Alpha from Beta

A closer look at market timing.

FIELD NOTES

BY TRISTRAM LETT

The title suggests that alpha can be derived from market timing. In the strict statistical sense, it is not considered a source of alpha, but any investment practitioner knows that, relative to a buy and hold position, being in and out of a particular market in a nimble fashion can add value. Of course, being clumsy can subtract value, so this is a practice that does not come without risk.

Market timing has a bad reputation, and justifiably so. Historical data lends support to this negative view and, frankly, so does theory. Market timing is simply difficult to practise. But the rewards are juicy indeed. Do a simple experiment—starting at the beginning of each month, with perfect hindsight, invest all your assets in the better performing of an equity index and cash. There is a substantial over-performance awaiting the prescient investor who can do this in real-time, compared to simply staying perpetually invested in cash or equities. Naturally, such over-performance must be accompanied by significant risk and it is easy to see what it is. Do the same experiment but always invest incorrectly. Substantial underperformance is the result.

How do long-only investment practitioners deal with this? Generally they do it from one or two points of view. Some do nothing and just hold the buy and hold portfolio, frequently rebalancing it to the original asset weights. Others diversify the number of markets they wish to time and limit the amount of timing exposure that will take. The former is a passive strategy and the latter is active. The passive strategy is likely to be the winner over the longer term because its bet requires no information and the portfolio will benefit from mean reversion. The latter traditionally requires forecasts of market returns. Forecasting market returns is the bane of the investment industry. Countless studies show how difficult it is to be consistently right.

So how does an investor manufacture alpha from beta?

This is where absolute return strategies come in or, as they are popularly misnamed, hedge funds. The risk management goal of many hedge fund strategies is to remove most or all of the influence of the market from a portfolio and to concentrate on asset-specific risk as the source of returns. These market neutral strategies are very popular, particularly among institutional investors and they represent a very large share of the dollars allocated to hedge fund strategies. Typically, they are implemented by dollar and beta matching a long and short portfolio of securities. Recently managers have begun to realize that the short side hasn't often been a consistent alpha provider and its real role is to control market risk. Having come to terms with this, many managers are turning to derivatives to control the market risk in their portfolios. This naturally leads to attempts to take advantage of the cheaper and more liquid trading characteristics of these instruments to create alpha from beta.

Creating alpha from beta is a simple notion. If the market is going up, it pays to have the exposure; if it is going down, it saves not to have the exposure and it pays to short it. So what the manager wants to do is harness the upside variance of the market. A naïve form of this would be to estimate the long side beta with 24 to 36 months of data and use the beta to create a hedge ratio. The theory is that there is information in the data that allows the modulation of the hedge to increase exposure in rising markets and to decrease or short exposure in falling markets. One thing is certain: there will be a substantial reduction in *ex post* portfolio variance and likely a lesser reduction in return, thereby causing the Sharpe ratio to rise. Following the classic model, the manager can leverage up the portfolio sufficiently to recapture the lost return and still have lower variance, or continue to leverage it to the original level of variance and have higher performance.

The problem with this naïve model is that it is quite

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inefficient, especially when the return distribution is not normal. It is instructive to examine the features of a standard linear regression model to see what the issues are. When fitting a line statistically through a series of data points, the value where the line cuts the vertical axis is the alpha (distance from the origin) and the slope of the line is the beta. As the slope of the line exceeds 1.0, whatever is occurring on the horizontal axis (the independent variable—the market) is being translated to the vertical axis (the dependent variable—the portfolio) in a leveraged manner and if it is less than one it is being translated in a deleveraged manner. Due to the nature of the calculation, beta is simply an average of the ups and downs around its mean value. Furthermore, and unfortunately, it assumes that those ups and downs around its mean value are symmetric. It cannot differentiate between symmetry and asymmetry where there might be one high outlier and five low values. In other words, it is by default assuming that the ups and downs are normally distributed.

This has a further unfortunate effect on beta's interpretation. When one quotes a portfolio as having a beta of 1.15, the assumption is that the portfolio rises 1.15 times more than the market on the way up and falls 1.15 times more on the way down. Anyone who has done some modest analysis of portfolios in real-time knows the fallacy and cost of that interpretation.

Therefore to more effectively manufacture alpha from beta in the manner described earlier, a more complete statistical measure is necessary. Fortunately one has been recently developed called the Omega function.[1]

THE OMEGA FUNCTION

The Omega function of a distribution is a mathematically exact proxy for the distribution itself. It is a source of new statistics, which the authors have dubbed Omega scores, based upon the geometric properties of the Omega function rather than on the expected values of the distribution.[2]

Omega scores are a generalization of Sharpe ratios. They reward a distribution for the size of its mean and for the degree of concentration around the mean. Unlike Sharpe ratios, however, Omega scores take asymmetry and fat tails into account explicitly. They reward fat tails above the mean and penalize them below the mean. In short, they take into account the things that must be considered in evaluating risk-adjusted return, especially in hedge fund investments.

Instead of beta hedging a portfolio to attempt to extract alpha from beta, using Omega metrics involves creating a portfolio consisting of the fund and an appropriate hedging instrument and weighting the hedging instrument to maximize the Omega score. This will not necessarily create a minimum variance portfolio that is defined by a beta hedge. Instead it will create one with superior risk/reward characteristics. Low variance, positive skew, fatter right tails and low correlation to other alpha sources define these superior characteristics.

In extreme cases of very lopsided, high variance distributions, Omega hedging can improve performance without leverage. In most cases, the dramatic reduction in variance and creation of positive skew allows enhanced return through the judicious application of leverage. From a portfolio manager's viewpoint, the Omega hedging process always causes correlation with other strategies and asset classes to fall to zero, making the resulting return profile a very useful addition to any portfolio.

In conclusion, the theme implies that there are other potential sources of alpha. However one wants to view it, either as an alpha source or purging unwanted beta from a portfolio, it can be a rewarding exercise to contemplate for the asset manager. ▮

REFERENCES

1. A Universal Performance Measure, Con Keating and W.F. Shadwick, The Finance Development Centre, May 2002. This is the article that started it all. Dr. Shadwick presented a summary version of this paper at the Risk Management Conference, August 2002, St. Andrews, New Brunswick.
2. Omega Functions and Omega Metrics, A. Cascon and W.F. Shadwick, The Finance Development Centre, 2004.