

# Risk. Capital. Conventional Asset Allocation is Inadequate.

It is almost elementary to professional investors that when investment decisions are made, the appropriate sizing of the investment is based on the quantity of risk that is taken and not the quantity of capital. This has a parallel in the Sharpe Ratio measurement of investment performance. Returns are only useful in the context of the risk associated in obtaining them. Similarly, returns are obtained at a price, which is risk. To obtain returns, one should allocate risk and not capital.

Here is a practical example. Say an investor would like to invest 100 USD and allocate equally to equities and bonds. If they were to allocate capital, they would invest 50 USD in equities and 50 USD in bonds. The volatility of equities, however, is roughly twice that of bonds. As a result, the investor is inadvertently taking more risk in equities than in bonds. If the investor intended to have an equal exposure to the returns and the risks of equities and bonds, they should in fact allocate twice as much capital to bonds as to equities, so that the contribution of risk to the portfolio from equities and bonds is equal. That means a 66 USD allocation to bonds and a 33 USD allocation to equities. We have made a simplifying assumption that bonds and equities are independent and thus uncorrelated.

Mean variance optimization in portfolio construction is the full blown implementation of this concept. It allocates capital (not risk) in such a way as to minimize the risk for a given target return, or conversely, it allocates capital in such a way as to maximize the expected return for a given level of risk. The generalization in mean variance optimization means that the interdependence of assets in the portfolio is accounted for in the allocation decision, but the principle is the same. If all the assets in the portfolio were mutually independent and the expected returns of each asset were equal, then a mean variance optimization would result in the efficient portfolio comprising assets sized inversely proportionately to their volatility, which is a proxy for risk.

Despite the widespread acceptance of mean variance optimization in portfolio construction, it is surprising that many professional investors continue to allocate

capital instead of risk in their asset allocation.