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Sharpe and Sortino Ratios

General

Sharpe and Sortino Ratios are measures that seek to quantify the relationship between risk and return. Generally speaking, they are determined by dividing a measure of "excess" return by a measure of risk. The basic idea is that a 20% return can't be determined to be better than a 15% return without understanding the relative levels of risk. By using Sharpe and Sortino ratios, one can compare differing returns with differing risk characteristics. Higher numbers reflect more favorable risk-adjusted performance.

Sharpe

The Sharpe Ratio is the ratio of "excess return" to volatility. Excess return is defined as the annualized rate of return less the risk-free rate (PMI tracks 30 day T-bill returns), compounded monthly. The volatility measure is the annualized standard deviation of monthly excess returns.

Many people calculate Sharpe Ratios using a short cut: basically, take the annualized return of the fund, subtract the annualized return of the risk free rate, then divide that by standard deviation of the return.

PMI uses the textbook method, which is to subtract the risk free rate from the fund return each month; take that monthly "excess return," compound it over time; determine the annualized rate of return and divide that by the annualized standard deviation of those excess returns. Because the risk free rate can change over time – and may have a relationship to volatility – the two methods give slightly different results.

If you read William Sharpe, you'll note that "average" returns may be used; although he notes that over longer periods, it is better to compound.

One may occasionally see a Sharpe Ratio followed by a percentage in parentheses such as "(0%)" or "(5%)." This is an offshoot of the Sortino Ratio which uses a concept of "minimal acceptable return" (MAR), and where the relevant MAR is expressed this way. However, the Sharpe Ratio is built around a risk-free rate, not an acceptable return, so this particular shortcut might be viewed as intellectually lazy.

One might argue that T-bills are not risk free but there is no apparent replacement, so short-term bills are what most Sharpe calculations use.

Sortino

The Sortino Ratio is a variation of the Sharpe ratio which distinguishes between negative and positive volatility. The idea is that volatility in a managed fund would be expected to be asymmetric, since money managers attempt to limit losses. Accordingly, the Sortino ratio replaces standard deviation – which penalizes upside and downside volatility equally – with a different measure.

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The Sortino ratio also uses the concept of an arbitrary "minimal acceptable return" – MAR – instead of the risk-free rate. The measure of negative volatility, or "downside deviation," is calculated on results which are below the monthly MAR. The Sortino Ratio is the return in excess of the MAR divided by the downside deviation. Sortino Ratios are expressed as a ratio with the assumed MAR in parentheses following.

Note that "Downside Deviation" is not the standard deviation of the returns less than the MAR. It has a specific calculation method which can be found at the Sortino web site.

Math Examples

A spreadsheet titled "Sharpe & Sortino Math" is available from PMI that shows an example of the math for a Sharpe Ratio and a Sortino (0%).

Other Measures

There are many other methods of assessing risk and excess return. PMI uses Sharpe & Sortino ratios simply because they are the most commonly used.