



Sharpe and Sortino ratios

The Sharpe ratio

The Sharpe ratio is a risk-adjusted measure developed by Nobel Laureate William Sharpe.

It measures the return per unit of risk. In other words, it measures how efficiently the fund is performing relative to its level of risk.

The higher the Sharpe ratio, the higher the return given its risk. The Sharpe ratio is calculated as the ratio of return of the fund above the risk-free return to annualized standard deviation.

Sharpe ratio = $(\text{Annualized Return} - \text{Risk Free Return}) / \text{Annualized Std. Deviation}$

The Sortino ratio

The Sortino ratio is very similar to the Sharpe ratio, except that instead of using standard deviation as the denominator, it uses Downside Deviation. The Sortino ratio was developed to differentiate between "good" and "bad" volatility in the Sharpe ratio.

The Sortino ratio therefore uses downside standard deviation as the proxy for risk for investors, instead of using standard deviation of all the fund's returns, as this number includes upside standard deviation.

This in effect removes the negative penalty that the Sharpe ratio imposes on positive returns.

To help you intuitively use this ratio, imagine a hypothetical portfolio, Portfolio A, which never experiences negative returns. However, Portfolio A has incredible standard deviation in its positive returns: one day it returns 0.1% and another 1000%.

The standard deviation of Portfolio A will therefore be very large.

When measured by Sharpe Ratio, Portfolio A will have a low ratio, because it is symmetric in its treatment of upside and downside deviation.

However, the Sortino ratio of Portfolio A will be infinite!

This is the case because there is zero standard deviation in negative returns.

The Sortino ratio only considers downside standard deviation as important.

Similarly, imagine Portfolio B, where there are only negative returns. In this case, the Sharpe ratio and the Sortino ratio will be exactly the same.

Therefore, **the higher the Sortino ratio, the better the risk adjusted returns** (as measured by downside standard deviation) **are for your portfolio.**

Implementation within Risk101

The NAV of the portfolio is entered on day 1, then Risk101 calculates the Sharpe and Sortino ratios using month-end figures after allowing for capital in- and outflows on the last day of each month..