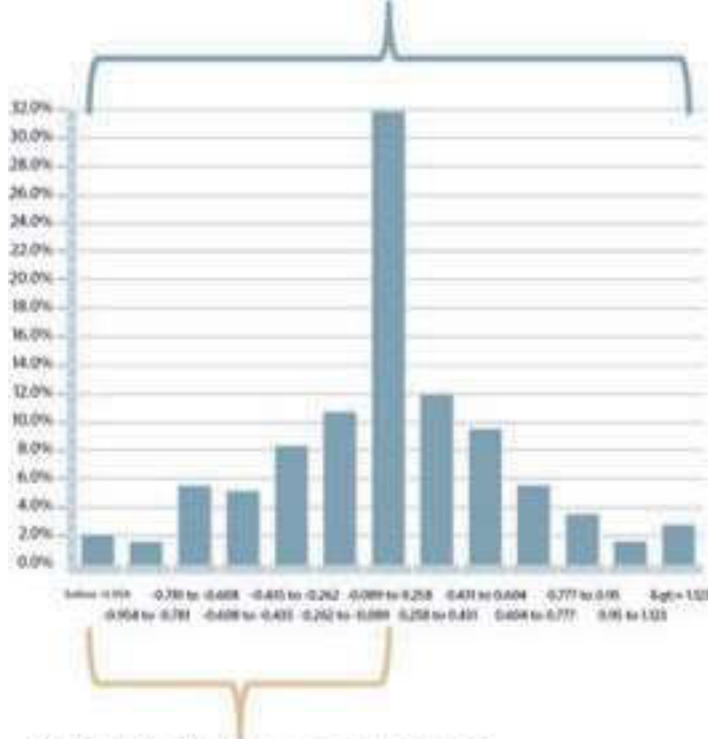
Measuring Risk and Reward

Sharpe and Sortino Ratios

The Sharpe Ratio uses the entire return distribution



The Sortino Ratio uses only downside deviations

The Sharpe Ratio measures the portfolios total risk-to-reward ratio by comparing excess returns to the standard deviation of returns.

Sharpe =

$$\frac{\text{(Annualized return - risk free rate)}}{\text{Annualized standard deviation}}$$

The Sortino Ratio measures the portfolios downside risk-to-reward ratio by comparing excess returns to the downside deviation of returns.

Sortino =

$$\frac{\text{(Annualized return - risk free rate)}}{\text{Annualized downside deviation}}$$

Both the Sharpe Ratio and the Sortino Ratio are meaningful data points for investment analysis. Both point to the efficiency of an investment, measuring return vs. volatility. Both include the "risk free" alternative of U.S. Treasury bills in the calculation. One looks at all volatility, while the other looks only at negative (downside) volatility. Consider the following hypothetical examples.

Mutual fund ABC had a 12% return with a volatility score (standard deviation) of 5.0. T-bills (theoretically risk-free) are paying 2%. The Sharpe Ratio would be **2.0** (12% minus 2%, divided by 5.0).

As a comparison, mutual fund XYZ had a 15% return with volatility of 10.0. T-bills are still paying 2%. The Sharpe Ratio would be **1.3** (15% minus 2%, divided by 10).

ABC is more appealing than XYZ on the basis of the Sharpe Ratio. XYZ has more return, but double the volatility of ABC, thereby reducing XYZ's efficiency.

However, not all volatility (deviation from the average) is bad. Imagine I told you your returns for the past 3 years were 10%, 40%, and 100%. While your actual rates of return show significant deviation from the average, you would probably love the result. That's where the Sortino Ratio comes into play.

While the Sharpe Ratio penalizes any volatility, whether positive or negative, the Sortino Ratio only looks at the downside volatility investors dread. The formula focuses on whether returns are negative, or below expectation, rather than penalizing an investment for volatility alone. The higher the Sortino Ratio, the higher the actual return over expected return, and the more efficient the investment.

Both ratios are worth considering, and we pay attention to both in our extensive and ongoing analysis of your investments and the other investments available to you. The goal remains to find and use quality, efficient funds that are suitable for your situation.

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