# OVERVIEW OF RISK ANALYSIS IN MUTUAL FUNDS

## Introduction

Risk analysis is a vital aspect of assessing mutual funds, offering investors valuable insights into the potential challenges associated with their investments. By carefully considering market volatility, credit risk, interest rate risk, and liquidity, investors can make well-informed decisions that align with their financial objectives and risk tolerance.

An investor should make an investment strategy based on risk-tolerance capacity, investment amount, and investment duration. Risk tolerance capacities differ from person to person and the age of investors. Investors generally focus only on the fund's returns, irrespective of risk. When selecting a mutual fund, evaluating your risk tolerance capacity and investment objectives is essential. You may choose a low-beta fund if you are a risk-averse investor. A low beta fund indicates that the fund is less volatile compared to the market. Furthermore, you may choose a fund with a high Sortino ratio, emphasizing limited downside risk. Conversely, if you are inclined to take high risks for higher returns, focus on funds with a high Alpha and Sharpe ratio.

A mutual fund is the best option for investing in long-term goals, as it has several advantages: It is less risky than direct equity, highly operational, transparent, and user-friendly. Mutual funds also have strong regulations, lower costs, are very liquid, are safer than other investment products, and are tax efficient. They diversify investors' money into different asset classes and generate consistent returns over the long run.

Risk denotes the probability of an investor incurring partial or total losses on the original investment. Market risk can be attributed to factors such as macroeconomic trends, global economic crises, geopolitical tension, or regulatory changes. On the other hand, risk arises from multiple sources, such as economic instability, shifts in political scenarios, and specific challenges within certain industries. These factors can significantly impact the performance of mutual funds.



Market risk, the primary risk affecting equity and equity mutual funds, is the risk of loss in the value of securities due to factors affecting the entire stock market. Market risk, also known as systematic risk, is a type of risk that cannot be diversified away. Debt securities and money market investments carry several risks, including interest rate, credit, spread, and liquidity.

## Measurement of Risk in Mutual Funds:

However, it is crucial to consider the risk aspect of the investment since risk and returns are two sides of the same coin. Popular ratios to measure risk in mutual funds are Standard Deviation, Beta, Sharpe Ratio, Treynor's Ratio, Sortino Ratio, Alpha, and R-squared. This will give you a better understanding of risk and volatility and help you choose a better fund when comparing mutual funds in the same sector/ category.

Performance measurement is an accounting function that measures the return earned on a portfolio during an investment period, such as one year, two years, and so on. It is necessary to evaluate your investment mutual fund performance based on the return earned in relation to the market average return and another fund return in the same category.

Seven quantitative vital measures are used to analyze mutual funds' performance & risk: Standard Deviation, Beta, Sharpe Ratio, Treynor's ratio, Sortino Ratio, Alpha, and R-squared.


### 1. Standard Deviation:

Standard deviation, a statistical measure of the dispersion of returns for a given security or market index, measures a fund's total risk. It measures the degree to which the fund fluctuates in relation to its average return over a period of time. A high standard deviation denotes high volatility. A fund with a standard deviation of 14.80% tends to deviate by 14.80% from its category average return.

Let's say an ABC mutual fund scheme has a Standard Deviation of 8% and an average annual return of 21%. Based on the historical data for standard deviation and returns, the investment can be expected to produce a return in the range of 13% to 29% over any given year.

It's important to note that standard deviation is not a measure of good or bad but rather a tool to understand volatility. This measure is essential for understanding the level of uncertainty associated with a fund's return. For instance, funds with a low standard deviation in the 1- 10 range can be seen as more stable, potentially instilling a sense of security in your investment strategy.

### 2. Beta:

Beta is a measure of a portfolio's volatility or systematic risk compared to the market as a whole. It is a statistical measure of non-diversifiable or systematic risk that shows how sensitive a fund is to market forces. The beta for the overall market is equal to 1. Equity funds can have beta values above, less than, or equal to one. They can be positive or negative.

Beta expresses the fundamental trade-off between minimizing risk and maximizing returns. A fund with a beta of 1 will historically move in the same direction as the market. A beta above 1 is more volatile than the overall market, while a beta below 1 is less volatile. If a fund beta is 1.05, it is marginally more volatile than the overall market. If the Sensex is expected to provide a 10 percent rate of return over the next year, a fund with a beta of 1.05 would be expected to increase return by approximately 10.50% (1.05* 10) over the same period.

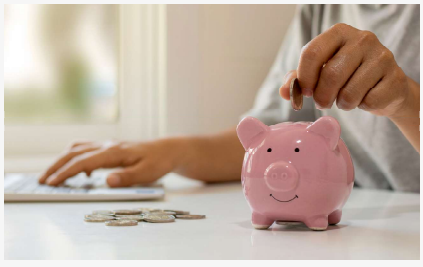
### 3. Sharpe's Ratio:

Sharpe's ratio uses standard deviation to measure a mutual fund's risk-adjusted returns. It will tell you how well your mutual fund portfolio has performed more than the risk-free return (if you would have invested in government securities instead, which are almost risk-free).The higher the Sharpe's ratio, the better the risk-adjusted return of your mutual fund portfolio.

### 4. Treynor's ratio :

Like the Sharpe ratio, Treynor's ratio uses beta to measure mutual funds risk-adjusted returns. It indicates how much excess return was generated for each unit of risk taken. A higher value means the fund has been able to give better returns for the amount of risk taken. It is calculated by subtracting the risk-free return, defined as an Indian Government Bond, from the fund's returns and then dividing by the beta of returns. For example, if fund X and fund Y both have 3-year returns of 18%, and fund X has a Treynor's ratio of 1.50 and fund Y has a Treynor's ratio of 1.20, then you can choose fund X, as it has given higher risk-adjusted return.

Risk-adjusted performance measures include the Sharp ratio and the Treynor ratio. These ratios assess the fund manager's ability to generate excess return per unit of total risk. However, the two ratios measure risk from different angles. Sharp focused on total risk, whereas Treynor used systematic or market risk.



### 5. Sortino ratio:

The Sortino Ratio is similar to the Sharpe Ratio, but its main difference is that it focuses solely on the fund's downside or negative volatility. It makes the Sortino Ratio highly relevant for conservative investors who are more concerned about potential losses than overall volatility. The ratio is calculated by subtracting the risk-free rate from the fund's return and dividing it by its downside deviation. A higher Sortino ratio indicates a lower probability of significant losses, making it a crucial tool for evaluating the risk of negative returns.

### 6. Alpha:

Alpha measures a fund portfolio's volatility (price risk) and compares its risk-adjusted performance to a benchmark index. It gives a measure of your investment's risk-adjusted performance. On the other hand, Alpha is a metric used to understand a mutual fund's performance relative to its benchmark index.

A positive alpha means the fund has outperformed its benchmark index. On the other hand, a negative alpha indicates the fund has underperformed compared to the benchmark index. If a fund alpha is 7.50, it has outperformed by 7.50% more than its benchmark index.

Let's say you invest in an ABC mutual fund, having NIFTY 50 as its benchmark. Let's further assume that the NIFTY 50 Index has given a return of 20% in a specific year. If the given alpha value is positive 4.0, then it means that ABC Mutual Fund has outperformed its benchmark index by 4% and provided 24% as returns for that specific year. Similarly, a negative alpha of 3% may mean that ABC Mutual Fund has underperformed compared to the NIFTY 50 Index and given 17% as returns for the specific year.

For the investor, the more positive a fund's Alpha is, the better for investment. On the other hand, some investors understand Alpha as a measurement of the value added or subtracted by the fund manager. Alpha depends on beta accuracy: If the investor accepts beta as a conclusive definition of risk, a positive alpha would be a conclusive indicator of good fund performance. However, Alpha is based on historical data and does not guarantee future performance.

### 7. R-Squared - Correlation with the benchmark:

R-squared measures how closely a fund's performance correlates with its benchmark. It ranges from 0 to 100%, where a score of 100 % denotes perfect correlation. A high R-squared value in an actively managed fund may indicate that its performance is similar to its benchmark, suggesting a lack of a unique strategy. This means that the fund's performance is heavily influenced by market conditions and that it may provide little diversification benefits. Conversely, a lower R-squared might imply a more distinctive approach or divergence from the benchmark trends. It could mean that the fund's performance is less dependent on market conditions, potentially providing better diversification benefits. This measure can be particularly useful in understanding the diversification benefits a fund might add to the portfolio.

It's important to note that Alpha and R-squared are based on historical data and do not guarantee future performance. This understanding should guide your investment decisions and inform you of the potential risks involved.

You can combine the inferences from the above methods of measuring risk with information like the funds' track records, fund history, past performance, turnover ratio, and expense ratio to identify the best mutual fund schemes for your portfolio and risk profile.

### Summary

All investment avenues carry certain degrees of risk, including business risk, currency risk, operational risk, inflation risk, default risk, interest rate risk, political risk, and market risk. If the returns on these investments are not proportional to the associated risks, pursuing them may not be wise. Therefore, investors should analyze the risks and returns of investment products, develop a strategy before making investment decisions, and set clear financial goals.

Understanding and applying these seven risk measures can significantly assist in selecting suitable mutual funds. However, no single measure provides a complete picture of risk and return analysis. Combining these metrics will offer a comprehensive view of a fund's risk profile and potential performance.

### Disclaimer:

Mutual fund investments are subject to market risks. The information contained in this document is for general purposes only and not investment advice. The above-said information is collated from reliable sources based on publicly available data from various websites, newspapers, and internally developed data. The views expressed are only constituent opinions and, therefore, cannot be considered guidelines, recommendations, or professional guides for readers.

**CMA (Dr.) R K Mohapatra**

CMA (Dr.)R K Mohapatra is a Consultant GM/Finance in IRCON, an Editorial Board Member of "The Worldonomics Times," and an "Eminent Author" awardee. He has 34 years of experience in finance and accounts, portfolio management, cash and wealth management, and tax planning.