An Insight into the Computation of Performance Metrics and Ranking of Mutual Funds with Respect to An Indian Small Cap Equity Scheme

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Abstract:

For the last two decades the topic performance evaluation of mutual funds has taken much of time of researchers. Based on commonly used metrics the performance evaluation has been done. Several researchers have tried to analyse the performance of mutual fund schemes by using above commonly used parameters. But in most of these studies analyses have been using already computed secondary data. Computation procedures have been ignored. The present study is aimed at fulfilling this gap. In this paper efforts are there to give an insight to the computation procedure of rating methodology that are being applied widely.

Keywords: Net Asset Value, Absolute Returns, Beta, Sharpe Ratio

Introduction:

Due to relentless efforts of the sub brokers, corporate distributors, Asset Management Companies (AMCs) and also the commercial banks, mutual funds have emerged as the most sought after and lucrative alternative investment vehicle in India in the last decade. There have been many phases in the Indian mutual fund industry where AMCs have launched schemes incessantly. Currently there are 44 mutual funds (AMCs) in India with more than 2500 schemes running. This means Indian investors have a whole lot of choices between schemes. But these eye-popping numbers have also posed a problem for investors and the problem is choice of plenty. In February, 2009 the Assets Under Management (AUM) of the Indian mutual fund industry stood Rs.5.09 trillion. Since then, there has been exponential growth and manifold increase in the total AUM. As on May 31, 2020 the AUM of the Indian mutual fund industry stood at 24.55 trillion (source: AMFI). The number of new schemes launched in different categories of mutual funds are astonishing. In 2016-17 four hundred eighty-four equity-oriented schemes were launched and in 2017-18 the number rose to five hundred and fourteen. The returns provided by many of these schemes have led to this massive growth in the Indian mutual fund industry. As mentioned earlier, choosing a right scheme that is commensurate with the risk-return profile of an ordinary investor has become a serious problem. In addition to this there is a paucity of knowledgeable and trained advisors. Even some of the advisors suggest schemes which are beneficial to them and not for the investors. Though there have been several researches carried out of late to find out a comprehensive set of metrics that can be applied to gauge the performance of different categories of schemes yet there is dearth of comprehensive set of metrics. Some of the commonly used parameters for evaluating the performance of schemes are Compounded Annual Growth Rate (CAGR), Standard Deviation (SD), Sharpe ratio, Sortino ratio and Treynor ratio etc. CAGR is computed by taking point to point returns. It is the cumulative return earned between two periods. SD depicts the variability of

returns from the mean return. Standard deviation comprises both Systematic and Unsystematic risk. Hence it is a measure of total risk. Sharpe Ratio shows excess of portfolio return over risk free rate of return for per unit of risk taken. Treynor Ratio depicts excess of return over risk free return for per unit of systematic risk. To serve the purpose of computation Axis Small Cap Fund has been chosen. Relevant metrics that are used to measure performance of a mutual fund scheme are discussed below. On the basis of the information provided in the following table, different performance metrics have been calculated.

Period	NAV (Rs.)
(End of Month)	
26.12.2018	**26.38**
25.01.2019	26.14
25.02.2019	25.99
25.03.2019	27.19
25.04.2019	27.77
27.05.2019	28.72
25.06.2019	28.86
25.07.2019	28.06
26.08.2019	28.49
25.09.2019	30.52
25.10.2019	31.19
25.11.2019	31.41
26.12.2019	**31.84**
26.12.2016	**20.69**

Source: AMFI

Absolute Returns: Absolute return does not consider risk of investment and it is the return achieved over a certain period of time. There are certain categories of return that fall under absolute return, they are

a. Holding-Period Returns- It is the total returns achieved during a particular period compared with the investment at the beginning of the period. It considers both the capital gain/loss component and income component. From the point of view of an investor the capital gain or loss

Is the price (NAV) change during the holding period and income component is dividend received (if any) during the holding period. In case of the growth option of a mutual fund scheme there is no dividend component. So, if we are to compute the holding period return of Axis Small Cap fund (Growth option) for the period 26.12.2018 - 26.12.2019, we need data for NAV for the beginning and end of this period.

The formula for calculating holding period return is (Price at the end - price at the beginning) + Dividend / price at the beginning $\times 100 = (31.84 - 26.38) + 0 / 26.38 \times 100 = 20.69\%$.

b. Compounded Annual Growth Rate (CAGR)- Compounded Annual Growth Rate is the return that depicts the annualized return grown at the same rate every year and assumes profits are reinvested at the end of each year. It is the rate of return that smooths the investment performance between two points of time.

To elucidate the concept, we can compute the CAGR of Axis Small Cap Fund for three-year period ending on 26.12.2019.

CAGR = [(Ending Value/Beginning Value) ^ (1/N)]-1× 100 {N= Number of years}

= [(31.84/20.69) ^ 1/3]-1× 100 = 15.45%.

C. Average Return- Average return is the simple arithmetic average of returns achieved over a period of time. In this study the monthly return for Axis Small Cap Fund is found out by using the formula [(Closing NAV - Opening NAV)/Opening NAV × 100]. After obtaining monthly returns over twelve months for the period 26.12.2018 to 26.12.2019, the average return is arrived at.

Average return = ∑Monthly Returns / n [where n= Number of observations I.e., months] = **19.33046903/ 12 = 1.610872419**

Risk Measures: Return is always accompanied by risks as regards investment. In simple word risk denotes variability of returns. Various risk metrics are discussed below.

	AXIS SMALL CAP FUND			
Period	**NAV (Rs.)**	**Monthly Return (%)**	**Average Return (%)**	**(Monthly Return-Average Return) ^2**
(End of Month)				
26.12.2018	26.38			
25.01.2019	26.14	-0.909780136	1.610872419	6.353689304
25.02.2019	25.99	-0.573833206	1.610872419	4.772938666
25.03.2019	27.19	4.617160446	1.610872419	9.037767705
25.04.2019	27.77	2.133137183	1.610872419	0.272760484
27.05.2019	28.72	3.420957868	1.610872419	3.276409334
25.06.2019	28.86	0.487465181	1.610872419	1.262043822
25.07.2019	28.06	-2.772002772	1.610872419	19.20959494
26.08.2019	28.49	1.532430506	1.610872419	0.006153134
25.09.2019	30.52	7.125307125	1.610872419	30.40899013
25.10.2019	31.19	2.195281782	1.610872419	0.341534304
25.11.2019	31.41	0.70535428	1.610872419	0.819963099
26.12.2019	31.84	1.368990767	1.610872419	0.058506733
		19.33046903		**75.82035166**

a. Standard Deviation: Perhaps, standard deviation is the best possible measure of risk. Standard deviation measures the variability of returns around the mean.

The Standard Deviation of Axis Small Cap fund σA = √∑ (Monthly Return - Average Return) ^2 / n [where n= Number of observations I.e., months] = √75.82035166/ 12 = 2.5236 %. SD can be annualized by using the following formula

SD* Number of Months^1/2 = 2.5236 *√12 = 8.7420 %.

		NIFTY SMALL CAP 100		
Period	**Value**	**Monthly Return(%)**	**Average Return(%)**	**(Monthly Return-Average Return)^2**
(End of month)				
26.12.2018	6314.75			
25.01.2019	6158.1	-2.480699949	-0.749755718	2.996167929
25.02.2019	5923.45	-3.810428541	-0.749755718	9.36771813
25.03.2019	6436.25	8.657117052	-0.749755718	88.48925531
25.04.2019	6572.25	2.113031657	-0.749755718	8.195551553
27.05.2019	6655.85	1.272014911	-0.749755718	4.087556478
25.06.2019	6161.35	-7.429554452	-0.749755718	44.61971113
25.07.2019	5710.75	-7.313332305	-0.749755718	43.08053762
26.08.2019	5366	-6.036860307	-0.749755718	27.95347494
25.09.2019	5715.9	6.520685799	-0.749755718	52.85931986
25.10.2019	5598.85	-2.047796497	-0.749755718	1.684909865
25.11.2019	5744.6	2.60321316	-0.749755718	11.2424003
26.12.2019	5684.6	-1.044459144	-0.749755718	0.086850109
		-8.997068618		**294.6634532**

The Standard Deviation of the benchmark index Nifty Small Cap 100 = √∑ (Monthly Return - Average Return) ^2/ n [where n= Number of observations I.e., months] = **√294.6634532 / 12 = 4.9553%. In the same way as the fund, the standard deviation of the benchmark index can also be annualized. SD* √12 = 4.9553* √12 = 17.1656 %.**

Beta(β) : Beta represents the systematic or market risk of a security or portfolio. It is the measure of the volatility of returns compared to the entire market. To Compute beta of **Axis Small Cap Fund,we shall have to compute the Covariance between Axis Small Cap Fund and Benchmark Index I.e., Nifty Small Cap 100 (surrogate of market return). Hence, we shall arrive at Beta (β).**

AXIS SMALL CAP FUND		NIFTY SMALL CAP 100		
Monthly Return (%)	Average Return	Monthly Return (%)	Average Return (%)	(Monthly Return Axis-Average Return Axis) * (Monthly Return Nifty-Average Return Nifty)
-0.909780136	1.610872419	-2.480699949	-0.749755718	4.363108997
-0.573833206	1.610872419	-3.810428541	-0.749755718	6.686669132
4.617160446	1.610872419	8.657117052	-0.749755718	28.27976898
2.133137183	1.610872419	2.113031657	-0.749755718	1.495132973
3.420957868	1.610872419	1.272014911	-0.749755718	3.659577598
0.487465181	1.610872419	-7.429554452	-0.749755718	7.504134244
-2.772002772	1.610872419	-7.313332305	-0.749755718	28.76733699
1.532430506	1.610872419	-6.036860307	-0.749755718	0.414730597
7.125307125	1.610872419	6.520685799	-0.749755718	40.09237504
2.195281782	1.610872419	-2.047796497	-0.749755718	-0.758587186
0.70535428	1.610872419	2.60321316	-0.749755718	-3.036174137
1.368990767	1.610872419	-1.044459144	-0.749755718	0.071283351
				117.5393566

Now COV (Axis, NIFTY) =∑ (Monthly Return Axis-Average Return Axis) * (Monthly Return Nifty-Average Return Nifty) / n = 117.5393566 / 12 = 9.7949.

Beta = COV (Axis, NIFTY) / σNifty^2 = 9.7949 / 4.9553^2 = **0.39.**

c. Alpha (α): Alpha is the measure of the predictive ability of a fund manager against the benchmark index. It is computed by comparing the realized return and expected return based on the Capital Asset Pricing Model (CAPM).Alpha for the same period can be calculated by using Jensen's formula. Jensen used realized return against expected return of the fund using Capital Asset Pricing Model (CAPM). The realized return is computed by using the geometric average return that is depicted by Compounded Annual Growth Rate (CAGR). The average yield of a 10 years GOI bond can be taken as the risk-free return, which is 6.5% (Approx).

Hence

Alpha (α) = R(i) - [(R(f) + β * {(R(m) - R(f)}]

α = [(31.84-26.38)/26.38 * 100] - [6.5 + 0.39*{(5684.6 - 6314.75)/ 6314.75 *100} - 6.5]

= 20.69 - .07318

= 20.61682 %

[where:

R(I) = the realized return of the portfolio or investment I.e., Axis Small Cap Fund

R(m) = the realized return of the appropriate market index. Here it is NIFTY Small Cap 100.

R(f) = the risk-free rate of return for the time period, I.e., 6.5%

β = the beta of the portfolio of investment with respect to the chosen market index

Sharpe Ratio: Sharpe ratio is measure of risk-adjusted return fetched by the portfolio. It is calculated dividing the excess of portfolio return over the risk-free return by the total risk of the portfolio, I.e., the standard deviation (σ) of the fund.

Sharpe Ratio of Axis Small Cap Fund = Rp-Rf / σ

= [(31.84-26.38)/26.38 * 100] - 6.5 / 8.7420 = 1.6240.

Treynor Ratio: It is also a measure of risk-adjusted return of the portfolio. The only difference with Sharpe ratio is that in Treynor ratio systematic risk (denoted by β) is considered instead of total risk (σ).

Treynor Ratio of Axis Small Cap Fund = Rp-Rf / β

= **[(31.84-26.38)/26.38 * 100] - 6.5 / 0.39 = 36.40**

Interpretation&Conclusion:

A rational investor prefers the highest possible return for a given level of risk. The endeavour of a mutual fund manager is also to fetch maximum returns by lowering the risks associated with investment. Though absolute return metrics do not consider risk yet these measures can be helpful in gauging the performance of a mutual fund. For an investor, higher the absolute returns the better.

As discussed earlier, the standard deviation measures the dispersion of data from its mean. Higher standard deviation of a mutual fund means greater deviation of returns from the expected return based on historical performance. A consistent performing mutual fund will exhibit a low standard deviation figure. Beta is a single number that depicts the tendency of a security's or a portfolio's return in relation to the overall market. It is the sensitivity of a mutual fund's return to its benchmark index. A mutual fund with beta >1 represents an aggressive portfolio and it means if market return changes by 1%, the fund return will change by more than 1% in the same direction. Beta < 1 signifies defensive portfolio. A change in 1% return in the market index leads to less than 1% change in the fund's return in the same direction. Though theoretically possible yet negative beta is rarely found in practice. A negative beta means a fund will fetch negative return for positive change in market return. A fund's alpha helps to measure the predictive ability of the fund manager. It compares the realized return with the expected return of a fund based on the Capital Asset Pricing Model (CAPM). If the actual realized return is more than the expected return, there is a positive alpha. Alpha is an acceptable metric to measure the performance of an active portfolio. When it comes to performance measurement of mutual funds taking risk into consideration, sharpe ratio and treynor ratio become handy. Sharpe ratio depicts the amount of risk premium per unit of total risk. Higher the ratio the better the fund is. Treynor ratio considers per unit of systematic or market risk instead of total risk. Again, a high treynor ratio signifies good performance.

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