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Performance evaluation of mutual funds from the perspective of retail investor

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Abstract
Mutual Funds have become a very popular recently among the investors for participating in the financial markets in an easy, low-cost manner, while maintaining a risk profile suitable for each unique personality of the individual investor. It can play a pivotal role in an individual's investment strategy. With the huge number of mutual fund schemes available in the Indian markets, an investor needs to evaluate and consider various quantitative and qualitative factors before making an investment decision. There are a wide variety of matrices available to evaluate performance of a mutual fund from the fund manager's perspective. However, the return enjoyed by the retail investor is often different than that showcased by the fund. The primary reason being the expense ratios and entry/ exit loads. This study is aimed at finding a measure of performance evaluation from the perspective of a retail investor. In doing so, I have studied in depth the widely popular performance tests like Sharpe ratio, Jensen alpha, Treynor ratio, M square measure and information ratio. All these measures have their own merits. However, the perspective of a retail investor is different from the fund manager and hence, needs to accommodate for the factors that directly affect him. While investing in the mutual fund, the investor already displayed willingness to undertake the systemic risk. However, he doesn't want to undertake the non-systemic risk. Moreover, he would want to be compensated for every additional non-systemic risk undertaken by him through the mutual fund.
Once a measure to evaluate the performance of a mutual fund after adjusting for expense ratio and non-systemic risk has been established, it is used to evaluate the performance of top mutual funds. This is relative measure and provides a relative ranking of mutual funds. The ranking of mutual funds obtained in this manner is then compared with other performance measures such as Sharpe ratio, Jensen alpha, Treynor ratio and information ratio to study if the ranking is consistent.

Keywords: mutual fund performance, performance measurement, retail investors, equity mutual fund

Introduction
A mutual fund is a vehicle that pools the money of people together with certain investment goals. The money is invested in various securities, equities or bonds, depending on the objectives of the fund scheme. The profits or loss so generated are shared among investors in proportion to their invested capital. Investments in securities are spread across a wide portfolio of industries and sectors. Diversification reduces the risk because all invested securities may not move in the same direction in the same proportion at the same time. A mutual fund issues units to the investors in accordance with the quantum of money invested by them. Investors of mutual funds are known as unit-holders. A mutual fund is the most suitable investment to the common man as it offers an opportunity, to invest in a diversified, professionally managed basket of securities at relatively low cost. A mutual house normally come out with a number of schemes with different investment objectives which are launched from time to time. A mutual fund is required to be registered with SEBI-Securities and Exchange Board of India which regulates securities markets in India. The prospectus of the fund which guides the investment objective the fund is also required to be registered with SEBI
Mutual funds can invest in different kinds of publicly listed securities. The most common are stock, and bonds, but there are hundreds of sub-categories. The investment objective defines the area of investment of a mutual fund. Also, since the investment objective is registered with SEBI, the fund manager has to abide by it at all times. Equity funds invest primarily in the shares of listed companies. The can diversify based on the market capitalization of the companies (e.g. large cap, mid cap, small cap), business stage of the company (growth, value) etc. Bond funds can be classified according to risk profile (high-yield bonds, investment-grade bonds), issuer (governments, corporations, or municipalities) or maturity (short-term or long-term). Most mutual fund portfolios are regularly adjusted under the supervision of a fund manager, who forecasts the future performance of investments best suitable for the fund to invest in. A mutual fund is administered through a parent company, which appoints the fund manager.
A mutual is a set up in the form of trust, which has a sponsor, a trustee, an assets management company (AMC) and a custodian. Sponsor establishes the mutual fund. Sponsor must contribute a minimum of 40% of the net worth of the initial investment managed and meet the eligibility criteria as described by SEBI under the Securities and Exchange Board of India (Mutual Funds) Regulations, 1996. In India, the mutual fund is constituted as a trust in accordance with the provisions of the Indian Trusts Act, 1882, by the sponsor.

Trustee is usually a corporate body or a board. The main responsibility of the trustee is to safeguard the interest of the unit holders and also ensure that AMC functions in the interest of investors and in accordance with the applicable regulations. The AMC is appointed by the trustee as the investment manager which also requires an approval from SEBI. The AMC appoints the registrar and the transfer agent for the mutual fund. The registrar and transfer agent handle investor communications and maintain investor records along with subscriptions and redemptions.

Structure of mutual fund

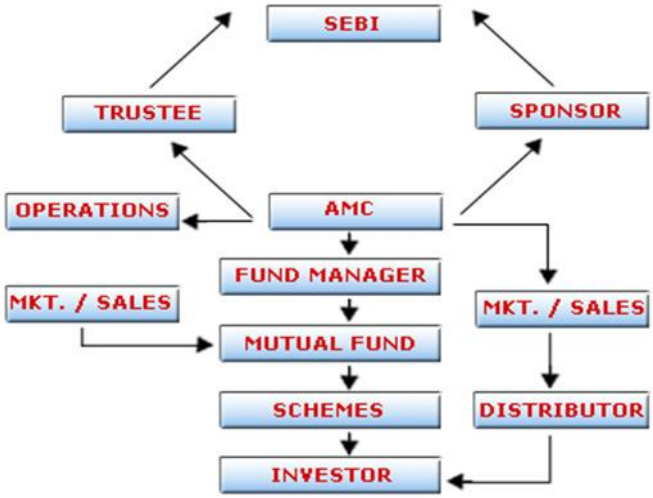

Fig 1

Net asset value

The net asset value, or NAV, is the current market value of a fund's holdings, usually expressed as a per-share amount. For most funds, the NAV is determined daily, after the close of trading on some specified financial exchange. Open-end funds sell and redeem their shares at the NAV, and so process orders only after the NAV are determined. Closed-end funds (the shares of which are traded by investors) may trade at a higher or lower price than their NAV. This is known as a premium or discount, respectively. If a fund is divided into multiple classes of shares, each class will typically have its own NAV, reflecting differences in fees and expenses paid by the different classes. The fund may also have different NAV for different investment plans such as growth vs. dividend or direct vs. regular plan.

Net asset value =sum of market value of shares/debentures + liquid assets/cash held (if any) +dividends/interest accrued-amount due on unpaid assets -expenses accrued but not paid

Expense Ratio

Denotes the annual expenses of the funds, including the management fee, and administrative cost. Low expense ratio is better. Expense ratio is the percentage of total assets that are spent to manage a mutual fund. As returns from bond funds tend to be similar, expenses become an important factor while comparing bond funds. SEBI has stipulated a limit that a fund can charge. The largest component of the expense ratio is management and advisory fees. A lower expense ratio does not necessarily mean that it is a better-managed fund. A good fund is one that delivers good return with minimal expenses.

Standard Deviation (SD)

The total risk (market risk, security-specific risk and portfolio risk) of a mutual fund is measured by standard deviation. It evaluates the volatility of the fund. The SD of a fund measures this risk by measuring the degree to which the fund fluctuates in relation to its average return of a fund over a period of time. A higher SD number indicates that the NAV of the mutual fund is more volatile and, it is riskier than a fund with a lower SD.

Sharpe ratio

An indicator of whether an investment's return is due to good investing decisions or a result of excess risk. Higher Sharpe ratio is better. Sharpe ratio is another important measure that evaluates the return that a fund has generated relative to the risk taken. This is because it implies that it has generated higher returns for every unit of risk that was taken.

Beta

Measures the volatility of a particular fund in relation to the market as a whole. It measures a fund's volatility compared to that of a benchmark. It indicates how much a fund's performance would swing when compared to a benchmark. A fund with a beta of 1 means, it will move as much as the benchmark. Conservative investors should focus on mutual funds schemes with low beta. Aggressive investors can opt to invest in mutual fund schemes which have higher beta value.

R-Squared

R-Squared measures the co-relation between returns generated by a fund and its benchmark index. This is indispensable in ascertaining the reliability of the beta of a fund. It is a statistical measure that represents the percentage of a fund or security's movements that can be explained by movements in a benchmark index. R-squared values range from 0 to 100. An R-squared of 100 means, that all the movements of a fund are completely explained by movements in the index. A high R-squared (between 85 and 100) indicates the fund's performance patterns have been in line with the index. A fund with a low R-squared (70 or less) doesn't act much like the index

Jensen's Alpha (Differential Return)

It represents the average return a scheme would earn over and above the returns are predicted by the Capital Asset Pricing Model (CAPM) given the portfolio's beta and the mean market return. If the actual return of the fund is more than the return as predicted by its Beta, then it has a positive alpha, and if it returns less than the amount predicted by Beta, the fund has a negative alpha. A fund's return and its risk both contribute to its Alpha value. The higher a funds' risk level, the greater the returns. It must generate in order to produce a high Alpha which becomes more volatile. Systematic risk can be reduced through proper diversification of the portfolio of the fund.

Treynor Ratio

The Treynor ratio is a measurement of risk-adjusted performance measure for a portfolio. It measures the excess returns the fund earns over and above the risk free rate of returns with an adjustment to the volatility in the market measure in the form of Beta coefficient of the portfolio. It is also a measurement of efficiency adjusting for the market (systematic) risk measured by Beta. Beta is a measure which measures the sensitivity of the scheme to market movements to gauge the risk. The higher the Treynor Ratio, the better is the performance of the Scheme.

M^2 measure

Modigliani risk-adjusted performance is a measure of the risk-adjusted returns. It measures the returns of the portfolio, adjusted for the risk of the portfolio relative to that of some benchmark (e.g. the market). We can interpret the measure as the difference between the scaled excess return of our portfolio and that of the market, where the scaled portfolio has the same volatility as the market. It is derived from the widely used Sharpe ratio, but it has the significant advantage of being in units of percent return

Information ratio

The information ratio (IR) is a measure of portfolio returns above the returns of a benchmark, usually an index, to the volatility of those returns. The information ratio (IR) measures a portfolio manager's ability to generate excess returns relative to a benchmark, but it also attempts to identify the consistency of the investor.

The information ratio identifies how much a manager has exceeded the benchmark. Higher information ratios indicate a desired level of consistency, whereas low information ratios indicate the opposite. Although compared funds may be different in nature, the IR standardizes the returns by dividing the difference by the standard deviation.

Evaluating mutual fund performance combines data and judgment. The data typically consist of returns on the funds and one or more benchmarks, and the judgment typically involves specifying the benchmarks and their role in defining performance. Investing in mutual funds also combines data and judgment. Rather than accept the standard performance measures at face value, investors can allow their decisions to reflect doubts about either the adequacy of the benchmarks or the stock-picking ability of fund managers.

Given this exponential growth in the mutual fund industry, the Indian market is crowded with over two thousand mutual fund schemes, each promising higher returns compared to their peers. This comes as a challenge for an ordinary retail investor to select the best portfolio to invest making it critical to analyze the performance of these funds. While understanding and analyzing the historical performance of mutual funds do not guarantee future performance, however, this may give an idea of how the fund is likely to perform in different market conditions. Furthermore, as funds are diversified, their performance should not be solely based on absolute returns but instead must take into account risk adjusted returns. Considering the NAV performance is not what a retail investor actually experiences, after deducting for expenses, performance of the mutual funds must also accommodate the net of expenses realized performance when evaluating from a retail investor's point of view. In this research we aim to address this issue.

2. Literature review

The study by Sharad Panwar and Dr. R. Madhumathi of Indian Institute of Technology, Madras (2006) on "characteristics and performance evaluation of selected mutual funds in India", identified differences in characteristics of public-sector sponsored & private-sector sponsored mutual funds and compares their performance using traditional investment measures. Net Asset Value (NAV) for the medium-term period May, 2002 to May, 2005 of selected mutual funds along with the index value of the two benchmark market indices, namely S&P NIFTY and CRISIL Balanced Fund Index were selected. They primarily used Sharpe ratio, Jensen's alpha, excess standard deviation adjusted return (eSDAR) and found out that private-sector Indian sponsored mutual funds have outperformed both Public-sector sponsored and Private-sector foreign sponsored mutual funds.

The paper by Dr. Rao (2002) [11] on "performance evaluation of Indian mutual funds" evaluated the performance of Indian Mutual Fund Schemes in a bear market using relative performance index, risk-return analysis, Treynor's ratio, Sharpe's ratio, Jensen's measure, Fama's measure. The study concludes that medium term debt funds were the best performing funds during the bear period and only 58 of 269 open ended mutual funds provided higher returns than the market returns.

Paper by Mr. Soumya Guha Deb, Prof. Ashok Banerjee & Prof. B Chakrabarti (2007) [9] on "performance of Indian equity mutual funds vis-a vis their style benchmarks: an empirical exploration", used Return Based Style Analysis (RBSA) to evaluate equity mutual funds in India using quadratic optimization of an asset class proposed by Sharpe and analyze the relative performance of the funds against their benchmarks. Their study found that the mutual generated positive monthly returns on the average, during the study period of January 2000 through June 2005. The ELSS funds lagged the growth funds or all funds taken together, with respect to returns generated.

Dr. Sisira Kanti Mishra used exploratory approach to study the different AMC in mutual fund industry, i.e. HDFC mutual fund, ICICI mutual fund, Templeton mutual fund, Reliance mutual fund, covering a period of 3 years, from 2008-09 to 2010-11 and concluded that the industry had Rs. 4,78,258 crores in assets under 35 players, leading to a compounded annual industry growth rate of 26.89% as against the global average of 4% over the last five years, despite the slowdown. ICICI mutual fund and Reliance mutual fund had shown a consistent performance.

Deepak Agarwal (2011) analyze the Indian Mutual Fund Industry NAV for 1 week to 5years (10th May, 2002 to 10th May, 2007) along with the index-value of BSE Sensex for the same period. It was concluded that there is relationship between MF industry NAV and the Sensex movements which affects the MF performance and performance of the fund Managers affects the returns of the firm.

Dr. S.M. Tariq Zafar, Dr. D.S. Chaubey and Syed Imran

Nawab Ali (2007-08) evaluated thirteen most preferred public and private sector equity diversified growth schemes over a period of one year, viz., 2007-08 through Jenson's, Treynor's and Sharpe ratio and found that none of the funds can be called as best or worst performer due to different rankings on different ratios. But in fact Taurus, ICICI and Reliance are the best funds w.r.t. portfolio return out of which Taurus had the highest beta amongst all the funds.

Prof. Jalpa Patel and Prof. Mitesh Patel (2012) studied the performance of diversified equity growth schemes of 43 companies for the period of 2003 to 2010 using Sharpe ratio, Treynor's ratio, and Jensen's alpha. Analysis based on the monthly NAV of 43 companies for the period of 2003 to 2010. It was concluded that there was rank conflict as Sharpe's & Treynor's Measures give the same result but in case of Jensen's Alpha measures were different.

Somya has used measures like information ratio, appraisal ratio and M2 measure to bring out additional information about the performance of the fund manager. He has concluded that study period from Jan'2000 to Dec'05 could broadly divided into two phases, the first being a bear period while the second being bull period. He found that, during the out of sample bull period, the funds have not been able outperform their benchmarks.

Rao Narayan and Ravindram have evaluated the performance of the Indian mutual fund industry in a bear market by using measure like relative performance index, risk-return analysis, Treynor's ratio, Sharpe ratio, Jensen's alpha and Fama measure. The result of relative measures suggested that most of the mutual fund schemes in the sample of 58 were able to generate excess returns over expected returns considering both systematic risk and total risk.

Razafitombo (2010) [18] noted that there is ample academic literature on performance measurement, few studies made contrasts between the various measures. The results found in the literature are controversial. If certain studies found no convergence amid funds' rankings obtained with numerous measures. The author chose 15 performance measures (Jensen's alpha, beta, bull beta, bear beta, absolute performance, relative performance, number of negative periods, number of positive periods, standard deviation, max drawdown, tracking error, information ratio, Sharpe ratio, Treynor ratio and Sortino ratio) and tried to recognize which ones are the most relevant ones for evaluating mutual funds. Using a sample of 210 equity mutual funds from the Reuters-Lipper database, he examined their statistical properties, over the phase from 2000 to 2006 and noted that his investigations were clearly comprehensive, associated to other studies, as he conducted three-step tests.

Plantinga and De Groot (2002), others reach unlike conclusions, such as convergence amongst a group of measures, nonetheless with the Sharpe ratio standing apart.

Pedersen and Rudholm-Alfvin (2003) and Eling and Schuhmacher (2007) also accomplish convergence between the ranks produced by numerous measures, and recognize the Sharpe ratio as exhibiting dominance to establish the ranking.

3. Objective of the study

The objectives of the study are

- To understand the gap in current measures of performance of mutual funds
- To create a measure of performance of mutual fund, from the perspective of a retail investor
- To study the performance of the mutual funds from the perspective of a retail investor
- To compare and rank the performance of the equity mutual funds from the perspective of a retail investor

4. Research methodology

Statistical measures

Return

For each mutual fund scheme under study, the monthly returns are computed as:

Return= (NAVt - NAVt-1)/ NAVt-1

Where;

NAVt is Net Asset Value of a mutual fund scheme for a period t

Nav (t-1) is the Net Asset Value for period (t-1)

For the benchmark index, the return is calculated as:

Return = (Indext-Indext-1)/ Indext-1

Sharpe ratio

Sharpe ratio calculates the additional return per unit risk or variability. It is basically return per unit of risk. The rule states that the higher the Sharpe ratio, the better the fund's performance is in relation to the amount of fluctuation. It can be explained through the formula:

$$Sharpe\ Ratio = \frac{R_p - R_f}{\sigma_p}$$

Where;

Rp = average monthly return of fund

Rf = risk free return Risk free return (Rf)

Standard deviation

It's one of the most common risk measure used. It is used to measure the variation of returns compared the average return, over a period. Higher SD indicates greater variation in the return.

$$s = \sqrt{\frac{\sum_{i=1}^{N}(x_i - \overline{x})^2}{N-1}}.$$

Where

x = fund return

Beta

Beta Measure reflects the systematic risk assigned to each of the schemes, Beta of the Index is always being 1 (with itself). Beta of a risk free investment is zero. The higher the Beta value, the higher the degree of Correlation with the market index and the fund will be.

$$\beta(beta) = \frac{Cov(R_a R_b)}{Var(R_b)}$$

Where;

Cov(RaRb): Covariance of asset and market
Va(Ra): Variance of market

Jensens's alpha
Jensen's Alpha reflects the return that is expected for the scheme given the risk exposure of the scheme and compares that with the return actually realized over the period under study. If the actual return of the fund is higher than the return as estimated by its fund beta, then it has a positive alpha, and if it returns lower, the fund has a negative alpha. A fund's return and its risk both contribute to its alpha value.

$$\text{Alpha} = R(i) - (R(f) + B \times (R(m) - R(f)))$$

Where:
R(i) = the realized return of the portfolio or investment
R(m) = the realized return of the appropriate market index
R(f) = the risk-free rate of return for the time period
B = the beta of the portfolio of investment with respect to the chosen market index

Traynor ratio
The Treynor ratio, also known as the reward-to-volatility ratio, is a measure of how much excess return was generated for each unit of non-systemic risk undertaken on by a portfolio. Excess return is in comparison of risk-free investment.

$$T = \frac{r_i - r_f}{\beta_i}$$

Where;
Ri= portfolio return
Rf= risk free rate
B = the beta of the portfolio of investment with respect to the chosen market index

M^2 measure
It measures the return of a portfolio, adjusted for the risk relative to a benchmark (usually the market). It is represented in units of percent.

$$M^2 \equiv S \times \sigma_B + \overline{R_F}$$

Where:
S is the Sharpe ratio
Sigma is the standard deviation of the excess returns for some benchmark
Rf is the average risk-free rate

Information ratio
IR is a measure of portfolio returns above the returns of a benchmark, divided by the volatility of those returns. I) measures a portfolio manager's ability to generate excess returns relative to a benchmark and also measure the consistency of the excess returns.

$$\text{Information Ratio} = \frac{(R_p - R_i)}{S_{p\text{-}i}}$$

Where;
Rp = Return of the portfolio
Ri = Return of the index or benchmark
Sp-i = Tracking error (standard deviation of the difference between returns of the portfolio and the returns of the index)

Data collection
Only secondary mode of data collection is involved. Secondary information is collected from mutual fund house websites and research databases, including valuereaserch.com, moneycontrol.com and bseindia.com
Top 5 funds as per rankings from valueresearch.com have been selected in each of the following categories of equity mutual funds-

- Large cap
- Mid cap
- Small cap
- Multi cap
- ELSS

Analysis on the basis of returns over the period of time
Returns are calculated periodically on the basis of various time periods after that rankings have also been provided to the selected equity schemes. Returns of last:

- One Month
- Six Months
- One Year
- Three Years
- Five Years

Performance evaluation has been done on the basis of risk and return evaluation.

5. Analysis
A mutual fund's return is measured as a change in NAV of the fund over a period. Any dividends or income received in the period is added to the ending values of the period. There are different views on including the intermittent flows to the funds. The flows comprise mainly of subscriptions, redemptions, incomes and expenses. For a fairly large mutual fund, the impact of subscriptions and redemptions is minimal in an average period. This is true even in case of open ended funds. Hence, the most important flows which impact the return are income from dividends and coupons (both received and accrued) as well as expenses such as fund management fee and other operational expense. Both of these are fairly predictable and often, under the control of the fund manager. As a result, the return of a mutual fund is calculated daily at the end of the day. The daily return is then chain-linked geometrically to arrive at a return for the period. This is the return as quoted by the mutual fund management.
The performance is a broader term than returns. Performance takes into consideration the risk undertaken for achieving the given return. At the same time, a performance measure attempts to compare the risk adjusted return with a benchmark or a risk free rate. This is considered as a base return. For a retail investor, the base return is a return that could be obtained without undertaking either a market risk or any risk at all. Hence, the performance is basically an attempt to evaluate the returns of the investment keeping in mind the opportunity cost.

If we consider Sharpe ratio- it compared the portfolio return with a risk free rate and adjusts it for the total risk as measured by standard deviation. The assumption is, by investing in risk free rate, the investor is not incurring any risk. However, by investing in the portfolio or the mutual fund, the investor is forgoing the risk-free status of the investment but at the same time, enjoying additional returns. If we looking at the efficient frontier, the additional risk should only be justified if the return received is more than enough to compensate for the volatility. This is why a higher Sharpe ratio is desirable. Similarly, Treynor ratio adjusts the risk by comparing it with beta which is the additional risk over a market portfolio and not only risk free asset.

Adjusting for the expense

Looking at all of these measure, it is evident that a lot of research has gone into adjusting the return and evaluating the performance with respect to different aspects of risk. There is a limited research on the return received by the retail investor. The returns received by the retail investors is not a full replication of the return observed as per the NAV. A retail investor has to bear the expense of fund management fees and operational expense in addition to the trading expense. Fund management fees and operational expenses together can be called as 'fund expenses'. The trading expense is captured in the NAV but not the fund expenses. This research is an attempt to adjust the returns for these fund expenses. NAV returns net of fund expense is what the retail investor can achieve. There is an additional expense in terms on entry and exit loads. In most of the mutual funds in India, the entry loads are 0. At the same time, if the redemption is made after 1 year, the exit load is 0 as well. The period after which the exit load is 0 varies by the funds. However, after 1 year, most of the funds do not charge any exit load in terms of redemption fee. Any cases where the entry or exit loads (together called as 'loads') are not equal to 0, these charges are considered as a part of expenses and the returns are adjusted for these loads as well. However, if a specific retail investor is bound to face any of these loads because of early redemption even when the fund does not have exit load for a long term investor, the said retail investor must adjust their returns to these loads. Another expense that a retail investor often has to bear is the tax consequence. The tax on profits during redemption as well as periodic income recievdd through dividends and coupon payments are taxable at a retail investor level and not at the fund level. Hence, a retail investor has to account for the tax impact as well. However, at a fund level, the loads as well as taxes are not accountable as these charges are passed on the individual investors on case to case basis. Hence, these charges have not been considered for this research. At a fund level, these charges do not impact the performance.

Adjusting for risk

Performance measurement is a relative exercise. Any measurement is relative for something else which is considered as a base or a scale. In the context of mutual fund or portfolio performance analysis, the performance is compared with a benchmark or a risk free rate. I like to view it as an opportunity cost. Meaning, the performance of a portfolio is compared to an opportunity cost of not investing in the risk free rate or the benchmark itself. For a retail investor, there are wide variety of avenues available to invest. He could invest in the benchmark itself i.e. Nifty 50 or Sensex index through ETFs, or he invest in government of India bonds which give him a return of ~7.5% or he could just keep the money in the bank's savings account. in each of the scenario, he is letting go the investment return in one option and investing in the mutual fund. the expectation is to achieve higher returns.

The other side of the higher return is higher risk. The risk profile of each of the options is different. A government of India bond is virtually risk free since the government can always print more money to pay off the debt in local currency. A deposit in savings bank account is also virtually risk free, if invested in systemically important banks such as ICICI bank or a PSU bank such as SBI. The return of course is lower at 3.5-4%. The market portfolio or the benchmark index is often considered as a benchmark for mutual funds. The market index has pure market risk and a well-diversified index has virtually no non-systemic risk.

The investor considered in this research is the investor investing in mutual funds. More specifically, equity mutual funds. Since, he is investing in equity mutual funds, it can be safely assumed that he is willing to take on the market risk or the systemic risk. In other words, his opportunity cost when investing in a mutual fund is not being able to invest in the market portfolio through ETF. Hence, the return of the portfolio is compared and adjusted to the market return in this research, denoted by Rm. The investor is willing to invest in a mutual fund and take on additional risk. The risk profile of a mutual fund may be different from that of the market index. The difference is more commonly termed as non-systemic risk. When the investor invests in mutual funds, he is willing to take on additional non-systemic risk in the expectation of higher return. Hence, the returns should be adjusted to the non-systemic risk only i.e. the beta measure.

Keeping the above considerations in mind, I propose a new measure to the performance of the mutual funds. The constituents of the measure are as follows-

$$\mathbf{Ra = Rp - E}$$

Where;

Ra= adjusted return

Rp= portfolio return or in this case, returns of the mutual fund

E= fund level expenses incurred by the retail investor including fund management fee, operating expenses etc. as mentioned in the expense ratio of the fund

The expense and risk adjusted performance measure, Pa is

$$\mathbf{Pa = (Ra - Rm)/ B}$$

Where;

Ra= adjusted return

Rm= market return or the returns of the benchmark index such as Nifty or Sensex

B= beta of the portfolio with respect to market index

Deciphering risk adjusted performance measure, Pa

Similar to the Sharpe ratio, the higher the adjusted

performance measure, the better. A higher number will describe how much of additional return the fund has generated, net of expense fee, for every additional unit of non-systemic risk. A point to not here is this measure gives a relative number and it cannot be looked at in isolation. The risk adjusted performance measure gives a better picture when comparing the performance of different mutual funds.

Advantages of Pa

- The biggest advantage of Pa is it accounts and adjusts for the expense ratio as incurred by the retail investor. This gives a better idea of what the retail investor could achieve in his portfolio.
- This measure is easy to calculate. The components of the measure are readily available on the commercial websites like moneycontrol.com, valueresearch.com and also highlighted in the performance measure of the fund brochures. Hence, this is very suitable for a retail investor who does not have the sophisticated research tools available with him.
- The expense ratio could be adjusted to account for retail investor specific expenses such as entry and exit loads, tax implications and so on.
- Since such expenses could be different for different funds where the retail investor has already invested, the adjusted return will also be different, even when the funds have given a similar return at the fund level. This aspect becomes important when the retail investor is looking back at the portfolio after a period of, say 1 year, and trying to decide if he should remain invested in a particular mutual fund in his portfolio, disinvest completely, change allocations or purchase a new mutual fund.
- The risk is measured in terms of beta. Since all mutual funds have a similar level of systemic risk, the differentiating measure is really the beta factor. Moreover, for a retail investor willing to invest in mutual funds has already shown willingness to take on the systemic risk and not invest in other risk free assets which aim at eliminating even the systemic risk.
- A derivative of beta measure is- for a well-diversified mutual fund, the beta would be very close to 1 i.e. the market portfolio. In the case, the difference in return would be largely driven by the expenses incurred while investing in the fund. the retail investor could then take a decision if he is better off investing in ETF or in the said diversified mutual fund when considering the after-expense returns.
- Additionally, this gives the retail investor a flexibility to compare the performance of multiple mutual funds, even when their investment style is different. A passively managed fund could be compared to an actively managed fund and fund investing in large cap stock could be compared to a fund investing in multi cap or small cap stocks.
- The expense ratio is usually higher for actively managed funds. Generally, higher the turnover and level of active management, the higher the expense ratio. Hence. The Pa measure gives an idea as to how much of the active management is favorable to the retail investor.

Data collection

Only secondary mode of data collection is involved. Secondary information is collected from mutual fund house websites and research databases, including valuereaserch.com, moneycontrol.com and bseindia.com

Top 5 funds as per rankings from valueresearch.com have been selected in each of the following categories of equity mutual funds-

- Large cap
- Mid cap
- Small cap
- Multi cap
- ELSS

Note- in each case, the direct plan is evaluated with growth option. Risk free rate is considered as 10-year government of India bond yield i.e. 7.75%

Analysis on the basis of returns over the period of time

Returns are calculated periodically on the basis of various time periods after that rankings have also been provided to the selected equity schemes. Returns of last:

- One Month
- Six Months
- One Year
- Three Years
- Five Years

Fund universe

Table 1

Fund	Category
Reliance Large Cap Fund	Large cap
SBI Blue chip Fund	Large cap
HDFC Top 100 Fund	Large cap
ICICI Pru Blue chip Fund	Large cap
Aditya Birla Sun Life Focused Equity Fund	Large cap
L&T Midcap Fund	Mid cap
ICICI Pru Midcap Fund	Mid cap
Kotak Emerging Equity Scheme	Mid cap
HDFC Mid Cap Opportunities Fund	Mid cap
DSP Midcap Fund	Mid cap
Reliance Small Cap Fund	Small cap
SBI Small Cap Fund	Small cap
DSP Small Cap Fund	Small cap
Franklin India Smaller Companies Fund	Small cap
HDFC Small Cap Fund	Small cap
Reliance Focused Equity Fund	Multi cap
SBI Focused Equity Fund	Multi cap
Aditya Birla Sun Life Equity Fund	Multi cap
Franklin India Focused Equity Fund	Multi cap
Mirae Asset India Equity Fund	Multi cap
Axis Long Term Equity Fund	ELSS
Aditya Birla Sun Life Tax Relief 96	ELSS
Reliance Tax Saver Fund	ELSS
DSP Tax Saver Fund	ELSS
Tata India Tax Savings Fund	ELSS

Ranking of funds based on the performance measures

Performance measure of all the above funds were retrieved and re-calculated from the website valueresearch.com. The

performance measures that were collected are-

- Beta
- Expense ratio
- Historic fund returns- 1 month, 6 months, 1 year, 3 years and 5 years
- Historic market returns- 1 month, 6 months, 1 year, 3 years and 5 years
- Standard deviation
- Sharpe ratio
- Jensen alpha
- R-squared measure
- Treynor ratio

The risk The adjusted performance measure Pa was calculated for all the funds. The data and detailed calculations are in appendix 1.

Funds were ranked based on the above performance measures. The rankings as per different performance measures are as below-

Table 1

	Ranking			
Fund	**Sharpe ratio**	**Jensen alpha**	**Treynor ratio**	**Performance and risk adjusted risk measure (Pa)**
Reliance Large Cap Fund	8	10	9	11
SBI Blue chip Fund	16	15	18	13
HDFC Top 100 Fund	14	14	17	17
ICICI Pru Blue chip Fund	18	18	19	19
Aditya Birla Sun Life Focused Equity Fund	25	25	25	25
L&T Midcap Fund	9	12	12	9
ICICI Pru Midcap Fund	7	9	10	10
Kotak Emerging Equity Scheme	10	11	14	12
HDFC Mid Cap Opportunities Fund	19	19	21	20
DSP Midcap Fund	22	21	23	23
Reliance Small Cap Fund	4	7	4	5
SBI Small Cap Fund	11	16	7	8
DSP Small Cap Fund	15	20	11	14
Franklin India Smaller Companies Fund	12	17	6	16
HDFC Small Cap Fund	17	22	16	24
Reliance Focused Equity Fund	3	4	5	6
SBI Focused Equity Fund	6	6	8	7
Aditya Birla Sun Life Equity Fund	13	13	15	18
Franklin India Focused Equity Fund	21	23	22	21
Mirae Asset India Equity Fund	24	24	24	22
Axis Long Term Equity Fund	1	1	1	1
Aditya Birla Sun Life Tax Relief 96	2	2	2	2
Reliance Tax Saver Fund	5	3	3	3
DSP Tax Saver Fund	20	5	13	4
Tata India Tax Savings Fund	23	8	20	15

6. Summary

When investigating the performance of a mutual fund from a retail investor's point of view, it important to account for the factors which are important for a retail investor. Some of such factors are the fund expenses included in the expense ratio and amount of non-systemic risk, denoted by beta. The risk adjusted performance measure attempts to adjust for these factors and provide a relative measure for comparing the performance of the mutual funds across industry and investment style. This measure is easy to calculate based on readily available information on public websites and fund house's websites. Hence, this is very suitable for a retail investor who does not have the sophisticated research tools available with him. Additionally, this measure is also very useful when taking portfolio rebalancing decisions for a retail investor.

It was observed that Pa rankings are very similar to the rankings based on the Jensen alpha on an overall level. Additionally, the ranking for overall top performing mutual funds and the worst performing mutual funds are very similar. The middle quartiles are bit more fluctuating and diverse in terms of performance ranking. Hence, the Pa measure could give clear indication of which mutual funds are performing better as compared to others and which of them are worse performing. This measure is overall better than any of the popular measures for measuring performance of the mutual funds from the perspective of a retail investor since it accommodates the expenses incurred by the retail investors.

7. Future scope of research

The proposed measure of performance evaluation of mutual funds adjusts the return of the fund for fund expense and then compares it with risk free rate and market beta. The idea is to generate a measure of performance for the retail investors. As a future research, the mutual fund ranking generated by this measure could be used to monitor the performance of the top mutual funds in the future. In is true that the past performance does not guarantee future results. However, the expense and risk adjusted measure could provide a good starting point to fund performance measurement. The relative ranking of funds obtained from this measure could be compared with that obtained from other more commonly used performance

measures such as Sharpe ratio, Treynor ratio, information ratio and so on.

Since such expenses could be different for different funds where the retail investor has already invested, the adjusted return will also be different, even when the funds have given a similar return at the fund level. This aspect becomes important when the retail investor is looking back at the portfolio after a period of, say 1 year, and trying to decide if he should remain invested in a particular mutual fund in his portfolio, disinvest completely, change allocations or purchase a new mutual fund. A portfolio rebalanced based on this measure can be monitored and tracked for performance to evaluate if it gives superior results as compared to any other mutual fund portfolio of a retail investor.

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