A STUDY ON RISK-ADJUSTED PERFORMANCE OF SELECTED OPEN-ENDED EQUITY LARGE-CAP MUTUAL FUND SCHEMES IN INDIA BY SHARPE RATIO

Noel Daliwala

Research Scholar,
B.K School of Business Management,
Gujarat University,
Ahmedabad, Gujarat, India.
noeldaliwala@gmail.com

Abstract

Mutual funds have risks involved in the investment. Mutual funds give its investors a return for the amount of risk taken. The performance of a mutual fund will be accurate when the amount of return is compared with the amount of risk involved in getting that return. The risk-adjusted performance is an accurate measure to indicate the superiority of a mutual fund as compared to its counterparts. In this research paper, 27 selected equity large-cap mutual funds schemes are studied using the Sharpe Model by William F. Sharpe, who developed it in 1966. Data of 5 years is taken under the study from 1st January, 2015 to 31st December, 2019. The S&P BSE SENSEX is taken as the benchmark index under this study.

Keywords: Mutual Funds, Sharpe Ratio, Risk-adjusted, Performance, Standard Deviation

1. INTRODUCTION

Mutual funds have become one of the hottest investment prospects in the modern era. The mutual fund industry in India provides a wide array of schemes and fund houses for investors to choose from. Like any other stock investment vehicle, mutual funds are also subject to market risks. Mutual funds evaluated based on the returns they give can prove to be misleading. Evaluators must factor in the risk involved in getting the returns. The performance evaluation of mutual funds is done on a risk-adjusted basis. A large number of earlier studies revealed that the performance of the mutual funds is often correlated with the fund managers. Now the issue that has troubled the researchers for long is whether the portfolio managers can deliver extra returns and outperform the market portfolio. In this respect, there is a need for an accurate and reliable measure by which the performance of various funds, being linked to the performance of their managers can be assessed and evaluated. This is an important issue for academicians. Besides this, the investors need a dependable technique to measure the performance of the actively managed portfolios. In this paper, a risk-adjusted model called the Sharpe ratio is used to analyze the mutual fund schemes under study.

2. LITERATURE REVIEW

Several studies on the performance of mutual fund schemes have been conducted in India and foreign countries. Review of some of the studies is presented in the following discussion.

Aamir Shah, S. M., & Hijazi, S. T. (2005)[1], used Sharpe measure, Treynor measure, Jenson differential measure, and Fama French measure to evaluate the fund performance of 33 open and close-ended mutual funds schemes of Pakistan, they concluded that overall results suggest that mutual funds in Pakistan can add value. Some funds are underperforming and have a diversification problem.

George Comer (2006)[2], evaluated the performance of hybrid mutual funds using two different samples of 58 funds and 56 funds, respectively. The study is conducted for the period between 1992-2000. Treynor and Mauzy model, along with the Sharpe model, were used. The results show that the MFTM model finds less stock timing ability over the 1981–91time period than the TM model and provides evidence of significant stock timing ability across the fund sample over the 1992–2000 time period.

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Khan, A. Q., & Ikram, S. (2011)[3], they evaluated the performance of mutual funds for a decade. Risk and Return Analysis, Sharpe's Measure, Treynor's Measure, Jensen's Measure are the risk-adjusted performance measure used under this study to measure the performance of mutual funds against the benchmark to check the efficiency of Indian capital market. The research proves that mutual funds outperformed the market.

Mansor, F., & Bhatti, M. I. (2011)[4], evaluates overall monthly performances of 128 Islamic mutual funds (IMFs) for the period of January 1990 to April 2009. It employs Sharpe, Treynor, and Jensen ratios to the risk-adjusted return performance based on the extended version of the CAPM model. The evidence-based on aggregate returns performance reveals, on average, IMFs in Malaysia outperform its Conventional peers and the market portfolio proxy by the KLCI return. It also shows the significantly positive stock selectivity skill and market timing ability among Islamic and Conventional mutual fund managers in Malaysia. It indicates that IMFs fund managers have superior performance in stock selectivity skill, but inferior performance in market timing ability relative to their conventional counterparts.

Razzaq, N., Gul, S., Sajid, M., Mughal, S., & Bukhari, S. A. (2012)[5], investigated nine Islamic mutual funds of Pakistan. They examined that returns of funds are in comparison to their level of risk. They also investigated the performance and ability of funds managers using models, such as the Sharpe ratio, Treynor ratio, Jensen's Alpha, and information ratio. The results that are calculated from the function of models are used to estimate the performance of the growing Pakistani Islamic Mutual fund industry.

Roy, S., & Ghosh, S. K. (2012)[6], examined 30 selected Unit Trust of India (UTI) open-ended mutual fund schemes to analyze their selectivity and market timing performances based on traditional and conditional performance measures proposed by Jensen (1968) and Treynor & Mazuy(1966). Furthermore, the theories provide that public information when it is included for evaluating the portfolios and make market timing effective; a better performance estimator is seen. This is known as conditional CAPM (proposed by Ferson and Schadt 1996).

Zaheeruddin, M., Sivakumar, P., & Reddy, K. S. (2013)[7], examined the performance of mutual funds based on their fund return, risk, and performance ratios. As per the performance ratios of 3 companies, ICICI's performance is better when compared to selected funds. They evaluate that Mutual Fund investment is subject to market conditions; therefore for the risk-averse investors, there are so many other investment alternatives available apart from the mutual funds, such as investment in other Financial Assets (stock market, debentures, bonds, Treasury bills, etc.) and other Non-Financial Assets (post office certificates, Bank deposits, Pension schemes, Real estate's) to avoid risk.

Babar, S., Nawaz, S., & Ashraf, S. (2013)[8], studied the Pakistani mutual fund market from 2004 to 2011. Mutual funds' performance was analyzed using various evaluation techniques; Sharpe, Treynor, Jensen's alpha, Sortino, Information/Appraisal ratio, Fama overall performance, and performance attribution analysis. It was found that it is concluded that in Pakistan, overall mutual funds are not able to add value due to the slowdown in the overall economy and liquidity crisis in the market, the mutual fund industry is experiencing a declining trend in returns.

Ashraf, S. H., & Sharma, D. (2014)[9], analyzed equity mutual funds against risk-free return and benchmark indices over five years. The sample consisted of ten open-ended equity growth funds. Results are calculated via various measures and regression analysis. The risk-return analysis revealed that out of ten schemes, three had underperformed and seven are found to have lower total risk than the market, and all the schemes have given returns higher than risk-free rates. The Treynor ratio of fund's show significant returns than the benchmark index and the Sharpe ratio of 3 funds fail to generate returns. Regression analysis reveals that benchmark return has a statistically significant impact on mutual fund return at 5% level of significance.

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Rekha, C. U., & Rajender, K. (2014)[10], had studied the portfolio performance evaluation of some Hybrid growth schemes using NAV, Beta, and Standard Deviation and further used the risk-adjusted evaluation methods such as Sharpe, Treynor, and Sortino Ratio. They selected 12 mutual fund schemes from 6 AMC's for five years. They discovered that fund managers are not able to beat the market consistently.

Choudhary, V., & Chawla, P. S. (2014)[11], attempted to analyze the performance of the growth-oriented equity diversified schemes based on return and risk evaluation. The analysis was achieved by assessing various financial tests like Average Return, Sharpe Ratio, Treynor Ratio, Standard Deviation, Beta, and Coefficient of Determination (R2). The analysis depicts that the majority of funds selected for the study have outperformed under Sharpe Ratio as well as Treynor Ratio.

Jagric, T., Podobnik, B., Strasek, S., & Jagric, V. (2015)[12], tried to study the mutual fund market and apply various tests to evaluate the performance of the funds. They calculated the performance measures of mutual funds and ranked them according to the results. The rankings obtained by performing both the Sharpe and Treynor rules to be almost the same, implying that funds are well diversified. The rankings reveal that all analyzed funds outperformed the market on a risk-adjusted basis.

Gupta, S., Shrivastava, S. K., & Bhatnagar, V. K. (2015)[13], carried out the performance evaluation of Indian mutual funds through relative performance index, risk-return analysis, Treynor's ratio, Sharp's ratio, Sharp's measure, Jensen's measure, and Fama's measure. The data used is the daily closing NAVs. The study period is 1st April 2008 to 31st March 2013. The findings of performance measures point that most of the mutual fund has given a positive return from 2008 to 2012.

Bhagyasree, N., & Kishori, B. (2016)[14], investigated the performance of open-ended, growth equity schemes from April 2011 to March 2015. The daily closing NAV of diversified schemes has been taken to evaluate the returns from the fund schemes. BSE-Sensex is used for the market portfolio. The performance of the sample schemes is assessed based on Treynor, Sharpe, and Jensen's measure, which will help investors in making better investment choices. The research revealed that 14 out of 30 mutual fund schemes had outperformed the benchmark return. The results show that few schemes which underperformed were facing a diversification problem. The positive Sharpe ratio of all funds indicated that funds were achieving returns higher than the risk-free rate. The Jensen measure showed that 19 out of 30 schemes showed positive alpha, which indicated the superior performance of the schemes.

Sathish, P., & Srinivasan, K. S. (2016)[15], studied a sample of 20 schemes from the selected asset management companies over a study period of 5 years from January 2010 to December 2014. The performance of sample funds is evaluated by using statistical tools like average rate of return of funds, standard deviation, beta, correlation, regression analysis and risk-adjusted techniques are used by using Sharpe ratio, Treynor ratio and Jensen ratio. Benchmark index has also done for analysis.

K. N. Sheth, Himani Mittal & Falguni Prajapati (2017)[16], with the help of Sharpe, Treynor, and Jensen measures, they evaluated 16 mutual fund schemes. The risk-return analysis is also done using the standard deviation and beta as the measures of risk, which is further used to compare the performance of selected funds concerning the market. Comparing the private and public mutual funds, it was found that private mutual funds are much more beneficial rather than public mutual fund companies for the investors to invest.

Ravichandran, D. M., & Jayraj, A. (2017)[17], aimed at evaluating the performance of mutual funds and also to inspect the role of asset management companies about the public and private sector. The primary objective of this research is to study the financial performance of sample mutual fund schemes through statistical tools such as (beta, standard deviation, coefficient of determination, Sharpe ratio). The findings suggested mixed results as some funds were able to outperform the market and benchmark index while others underperformed.

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Sridevi, O. V. A. M. (2018)[18], attempted to compare the performance of balanced mutual fund schemes between mid-cap and small-cap fund based on return and risk evaluation. The analysis was achieved by assessing various financial tests like Average Return, Sharpe Ratio, Treynor Ratio, Jensen's Ratio, Standard Deviation, Beta, and Alpha. The analysis has reported diversified and varied results. Not all the funds have represented positive values. In the Midcap fund, the performance Axis balanced fund is very insignificant, whereas in the small-cap fund, the performance HSBC Balanced is considered desirable.

Dhandayuthapani, D. S., & Arunpratheep, S. (2018)[19], evaluated the performance of select Mutual fund schemes in HDFC. To conduct this study, open-ended Mutual fund schemes in HDFC have been studied throughout 1-year data, which is from 4th April 2017 to 3rd April 2018. The analysis has been made based on the Sharpe ratio, Treynor ratio, and Jenson's alpha ratio. The data has been collected from various websites of mutual funds. The analysis depicts that most of the funds selected for learning have outperformed below Sharpe Ratio as well as Treynor Ratio and Jenson's alpha ratio.

V. Rathnamani & P.Ravichandran (2018)[20], evaluated that liquid fund has returns at higher rates than what the savings deposits without much of a difference. The present study assessed the performance of liquid fund returns using an arithmetic mean and compounded annual growth rate, risk and return of the fund have been analyzed by standard deviation, beta, Sharpe and Treynor ratio further funds performance has been compared with its benchmark return.

Alwi, S., Ahmad, R., Hashim, I. Z. A., & Naim, N. M. (2019)[21], investigated the Islamic and Conventional Mutual Fund Performance. the performance of 200 Islamic and Conventional mutual funds between 2007-2015. The sub-sample period between2007-2015 will be compared to the era of the financial crisis during 2007-2008. Overall performance for both Islamic and Conventional mutual funds shows a slight difference in terms of average return, standard deviation, Sharpe ratio, and Jensen Alpha. Even though both IMFs and CMFs outperform higher than the market benchmark, IMFs performed slightly better performance than CMFs for both periods.

Tripathi, S., & Japee, D. G. P. (2020)[22], the main aim of this paper was to evaluate the performance of selected open-ended mutual funds through various statistical tools like Jenson's alpha, beta, standard deviation, and Sharpe ratio. The researcher found that 10 funds out of the 15 funds under the study performed satisfactorily in a volatile market. The researcher also found that an investor should take into account the risk ratios of the funds before investing.

Sharma, K. B. (2020)[23], this study is based on secondary data of five debt mutual for a period between January 2017 to December 2019. The study used various statistical tools like alpha, beta, Sharpe ratio, and Jenson's ratio to evaluate the performance of these mutual funds. The study found that three out of the five mutual funds have performed well. This study provides some insight into the performance of mutual fund which will help the investors in taking calculated and rational decisions based on the performance of the mutual fund.

3. OBJECTIVES OF THE STUDY

This paper has analyzed and studied the risk-adjusted performance of open-ended mutual fund schemes in India for 5 years. The objectives of this chapter are as under:

- To examine the risk-return performance of open-ended mutual fund schemes using the Sharpe ratio.
- To evaluate the performance of open-ended mutual fund schemes using the risk-adjusted model of William F Sharpe.

4. SIGNIFICANCE OF THE STUDY

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Mutual funds claim to have satisfactory returns as compared to the market. Majority of the investors do not have much knowledge of the market and that of investing in stocks. Hence, they invest in mutual funds as a substitute. The investor should be aware of which fund to invest in according to his goal and which funds are performing better than most. Herein lies the significance of this study, this study examines the performance of open-ended mutual funds in India. The study evaluates whether the mutual funds have provided their investors with satisfactory returns or not. It will show the investors which fund has a better return to the risk. This study will be a guide for the investors and will help the investors in selecting an appropriate scheme for their investment goals. This study can also help the mutual fund managers in evaluating how their fund has performed compared to the other funds in the market. It will also help the fund managers in knowing how well their competition is performing. Overall this study can be beneficial to both the investors and the fund managers.

5. RESEARCH METHODOLOGY AND DATA

The Sharpe Model given by William F. Sharpe in 1996 is used to evaluate the performance of open-ended equity large-cap mutual funds. The monthly NAV data is collected from amfiindia,com, bseindia.com and morningstar.com.

5.1 Study Period:
Data of 5 years is taken under the study from 1st January, 2015 to 31st December, 2019. Five years is a sufficient time period where the performance of mutual funds can be compared with one another. The COVID-19 pandemic time frame is avoided as it can show abnormal results.

5.2 Calculation of Return:
The monthly returns of open-ended mutual fund schemes are calculated in the following manner,

$$R_{i_t} = \frac{NAV_{i_t} - NAV_{i_{t-1}}}{NAV_{i_{t-1}}} \times 100$$

Here,
- R_{i_t} = The return of ith mutual fund scheme in period t.
- NAV_{i_t} = The net asset value of ith mutual fund scheme in period t.
- $NAV_{i_{t-1}}$ = The net asset value of ith mutual fund scheme in the preceding period t-1.

In the same manner, the return of the benchmark index or the market is calculated as under:

$$R_t = \frac{R_{m_t} - R_{m_{t-1}}}{R_{m_{t-1}}} \times 100$$

Here,
- R_t = Return of the market for period t.
- R_{m_t} = The closing market returns of the last trading day of the month t.
- $R_{m_{t-1}}$ = The closing market return of the last day of the previous month (t-1).

5.3 Measurement of Risk:
There are many methods to gauge the risk of a portfolio. Here we are going to use Standard deviation (σ) as a measure of risk. This is the unsystematic risk of the portfolio. The unsystematic risk of the ith mutual fund scheme is calculated as under,

$$\sigma_i = \sqrt{\frac{1}{n} \sum (R_i - \overline{R}_i)^2}$$

Here,
- σ_i = Unsystematic risk of the ith mutual fund scheme.
- n = Size of the sample.
- R_i = Return of the ith mutual fund scheme.
- $\overline{R}_i$ = Average return of the ith mutual fund scheme.

5.4 Calculation of Sharpe Ratio:
The Sharpe ratio provides the reward to variability trade-off. It calculates the surplus return of a mutual fund scheme over the risk-free rate per unit of total risk or the return of the market index. In other words, it

measures the change in the scheme's return comparing it to a one-unit change in the risk. It is computed as under,

$$S_i = \frac{R_i - R_f}{\sigma_i}$$

Here,
- S_i= The Sharpe ratio of ith scheme.
- R_i= Return of the ith mutual fund scheme.
- R_f= Risk-free rate of return.
- σ_i= Standard deviation of the ith scheme.

5.5 Data and Sources:
A total of 27 open-ended equity large-cap funds are taken under this study from different AMC's. The monthly historical NAV data of the funds are taken from amfiindia.com.

6. DATA INTERPRETATION AND ANALYSIS

Table 1.1: Risk-Adjusted Performance of Open-Ended Equity Large-Cap Funds using Sharpe Ratio

No.	Scheme Name	$R_i - R_f$	σ_i	S_i	Rank
1	Aditya Birla Sun Life Frontline Equity	7.44	18.37	0.404760621	15
2	**Axis Bluechip Fund**	**9.91**	**15.73**	**0.629982556**	**1**
3	Baroda Large Cap	5.35	18.41	0.290659403	26
4	BNP Paribas Large Cap Fund	8.25	17.01	0.484926902	4
5	Canara Robeco Bluechip Equity Fund	9.01	17.15	0.525334554	3
6	DSP Top 100 Equity	6.93	23.76	0.291460632	25
7	Edelweiss Large Cap Fund	8.20	18.59	0.441004766	9
8	Essel Large Cap Equity Fund	8.05	18.95	0.42481085	14
9	Franklin India Bluechip	6.09	17.78	0.342332205	23
10	HDFC Top 100 Fund	6.96	20.13	0.345998887	22
11	HSBC Large Cap Equity Fund	8.05	18.41	0.437113993	10
12	ICICI Prudential Bluechip Fund	8.46	17.68	0.478635328	7
13	IDBI India Top 100 Equity	6.55	17.27	0.379526845	19
14	IDFC Large Cap Fund	6.38	17.54	0.363685781	21
15	Indiabulls Bluechip	8.94	18.63	0.479906903	6
16	Invesco India Largecap Fund	7.94	18.21	0.436116782	11
17	JM Large Cap Fund	4.39	10.99	0.399443731	17
18	Kotak Bluechip Fund	8.30	18.2	0.45606311	8
19	L&T India Large Cap	6.91	20.32	0.340123455	24
20	LIC MF Large Cap Fund	7.16	16.75	0.427331678	13
21	Mirae Asset Large Cap Fund	11.08	18.73	0.591344293	2
22	Nippon India Large Cap Fund	8.14	20.21	0.403008986	16
23	PGIM India Large Cap Fund	7.44	17.39	0.427866912	12
24	SBI Bluechip	8.80	18.19	0.483789423	5
25	Tata Large Cap Fund	7.09	18.57	0.382036974	18
26	Taurus Largecap Equity Fund	4.60	17.78	0.258997503	27
27	UTI Mastershare	7.30	19.65	0.371475654	20

Table 1. 2: Highest and Lowest Values of Risk-Adjusted Performances of Open-Ended Equity Large Cap Mutual Funds as per Sharpe Ratio

	Highest	Lowest
Sharpe Ratio	0.629982556	0.258997503
Excess returns	11.07587861	4.389886605
Standard Deviation	23.76	10.99

Table 1.3: Overall Average Risk-Adjusted Performances of Open-Ended Equity Large Cap Mutual Funds as per Sharpe Ratio

Average Sharpe Ratio	0.418434768
Average Excess Return	7.55
Average Standard Deviation	18.16296296

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Table 1.1 shows the risk-adjusted performance od open-ended equity large-cap funds as per the Sharpe ratio. It can be observed that the Axis Bluechip Fund is the best performing fund as per the Sharpe ratio. The Axis Bluechip Fund has the highest Sharpe ratio under the study with a calculated Sharpe ratio of 0.629982556. The second-best performing fund is the Mirae Asset Large Cap Fund with a calculated Sharpe ratio of 0.591344293. The difference between the Sharpe ratio of the best and the second-best performing fund is 0.038638263, which is not much. It should be noted that although the Mirae Asset Large Cap Fund has the highest return at 11.08, it is still the second-ranked fund as per the Sharpe ratio. The reason behind this is the standard deviation of the funds or the risk. The Mirae Asset Large Cap Fund has a standard deviation(risk) of 18.73 whereas the Axis Bluechip Fund has a standard deviation of 15.73, hence the lower standard deviation gives the Axis Bluechip Fund an edge over the Mirae Asset Large Cap Fund in terms of performance. The Taurus Largecap Equity Fund is the last ranked fund with the lowest Sharpe ratio, with a calculated Sharpe ratio of 0.258997503. The JM Large Cap Fund has the lowest return in the study and yet it is ranked at 17th in the study as it also has the least standard deviation or risk as compared to the other funds. The DSP Top 100 Equity has the highest standard deviation in this study. Some of the other top-performing funds are the Canara Robeco Bluechip Equity Fund, the BNP Paribas Large Cap Fund and the SBI Bluechip in that order.

7. CONCLUSION

All the funds taken in the study have given positive returns. Majority of the funds in the category have performed well and given satisfactory returns to its investors. Investors that aim at moderate risk and consistent returns without much abnormal returns or risk must invest in equity large cp mutual funds. The Axis Bluechip Fund is the top-performing fund under this study.

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