Performance Evaluation of Index Schemes: A Comparison of Public and Private Sector Mutual Funds in India

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***Abstract*:** The last decade has seen a tremendous growth in the mutual fund industry. Today the Indian market is flooded with more than a thousand mutual fund schemes, promising better returns than others. Mutual Funds are essentially investment vehicles where people with comparable investment objective come together to pool their money and then invest accordingly. With the increase in domestic savings and development in employment of investment through markets, the need and scope for mutual fund operation has improved immensely. But about 75% people are still investing in Post office, MIS and bank deposit because of the lack of awareness in rural areas. For saving investors' money, it becomes necessary to evaluate the performance of mutual fund portfolio so that investors can make their investment decisions rationally. This evaluation would help in checking the main idea of "putting all eggs in different baskets" behind mutual funds and analyzing that the idea is good for investors or not. This study of Performance evaluation would help the investors to choose the best schemes available and will also help the AUM's in better portfolio construction and can rectify the problems of underperforming schemes. Hence in this paper an attempt has been made to evaluate the performance of index funds among SBI & UTI (public sector) and HDFC & ICICI (private sector) on the basis of monthly returns compared to benchmark returns over the period of 3 years and to appraise the performance of different category of funds using risk adjusted measures as suggested by Sharpe, Treynor and Jensen.

***Keywords*:** Mutual Fund, Index Funds, Risk-Return, Performance Evaluation.

OBJECTIVES OF STUDY
The major objectives of the study are as follows:
1.   To evaluate the performance of index schemes of the select mutual fund.
2.   To compare the performance of the select index schemes with the benchmark index.
3.   To assess the difference in the performance of the select schemes across the public and private sector funds.

FINDINGS
This result of the study reveals that using the three different ratios, i.e Sharpe, Treynor, beta and Jensen ratio ICICI Prudential Nifty Index Fund is the best performer whereas SBI Nifty Index Fund is the least performing scheme.

I.   INTRODUCTION
Indian capital market endows with a array of investment alternatives for investors to assist them in various investment tools and to make certain profitable return. Along with diverse range of financial products, mutual fund ensures the maximum return and minimum risks to the investors. Development of various mutual fund schemes in the Indian capital market has proved to be one of the most catalytic investment avenues in generating significant investment growth. The Asset management companies are taking vigorous part in financial affluence and they promote investment practice among the investors.

Indian Mutual Funds have emerged as strong financial stability to the financial system. Mutual Funds have opened new vistas to investors and imported much needed liquidity to the system. Mutual Funds are dynamic financial institutions, which play an important role in an economy by mobilizing savings and investing in the capital markets savings and then investing in the capital markets. Therefore, the activities of Mutual Funds have both short and long term impact on the savings and capital market and on the national economy also. By investing in mutual funds an investor gets enough flexibility and can systematically invest or withdraw funds according to his or her needs and convenience. It is an affordable investment avenue for a retail investor to invest in (Parihar 2009). The safety of the funds invested, favorable credit rating of the funds by reputed credit rating agencies, capital inflation, etc are the features that affect the selection of mutual funds directly or indirectly (Sharma 2013). Therefore, mutual funds offer the advantage of professional management of money, diversification of risk, portfolio diversification, reduced transaction cost and liquidity. These benefits cannot be achieved if any one goes for any other type of investment (Awan & Arshad 2012). Hence, mutual funds put forward a way out to investors to approach most schemes and get well-diversified portfolio because investors with small savings neither have sufficient expertise nor have access to required diversification.

With the exponential growth in the mutual fund industry, the Indian market is crowded with over two thousand mutual fund schemes, each promising higher returns in comparison to their peers. This comes as a challenge for an ordinary investor to choose the best

portfolio to invest, making it difficult 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 over view of how the fund is likely to perform in different market conditions. As, funds are diversified, their performance should not be solely based on absolute returns but must take into consideration the risk adjusted returns. These include evaluating the performance of selected mutual schemes on the basis of risk and return and compare the performance of these selected schemes with benchmark index to see whether the scheme is outperforming or underperforming the benchmark. As the preference for investor is increasing day by day towards mutual funds, the mutual fund companies have come up with the multiplicity of index schemes of mutual funds.

Over the past decade, mutual funds have increasingly become the investor's vehicle of choice for long-term investment. Therefore, it becomes pertinent to study the performance of the various mutual fund schemes. The relation between risk-return determines the performance of a mutual fund scheme. As risk is commensurate with return, therefore, providing maximum return on the investment coupled with the acceptable associated risk level helps in segregating the better performers from the laggards. Many asset management companies are working in India, so it is necessary to study the performance of the schemes offered by them so that the information is useful for the investors to select the right mutual fund.

II. REVIEW OF LITERATURE

Review of literature is a brief description about mutual funds research work conducted in India as well as in abroad. Some of these studies have been reviewed in the following paragraphs in order to establish the research gap and need for the present study. As the study on Mutual Fund included the several works of **Jensen (1968), Sharpe (1966) and Treynor (1965)** that used the capital asset pricing model to compare risk adjusted returns of funds with that of a benchmark portfolio. The findings of Sharpe and Jensen demonstrated that the Mutual Fund underperform market indexes and suggest that the returns were not sufficient to compensate investors for the diverse Mutual Fund charges. For the purpose of ranking the performance of various mutual funds the methods such as Sharpe, Treynor and Jensen were applied to the various funds in different schemes. In this context, **Treynor (1965)** developed a methodology for evaluating mutual fund performance that is popular referred to as reward to volatility ratio. Further, **Sharpe (1966)** carried out a well acknowledged and widely quoted work on performance evaluation. He not only developed a composite measure of performance evaluation (Sharpes reward to variability ratio) that considers both return & risk. Similarly, **Jensen's (1968)** classic studies developed an absolute measure of performance based upon the Capital Asset Pricing Model. The excess fund returns were regressed upon the excess market returns to estimate the characteristics line of the regression model. Hence, **Sathya Swaroop Debashish (2009)** measured the performance of the equity based mutual funds in India. 23 schemes were studied over a period of April 1996 to March 2009 (13 years). The analysis was done on the basis of mean return, beta risk, and coefficient of determination, sharp ratio, Treynor ratio and Jensen alpha. The first analysis has been done on the basis of returns, followed by a comparison between market returns and the return on schemes. It was concluded that UTI mutual fund schemes and Franklin Templeton schemes have performed excellently in public and private sectors respectively. Further, on the basis of the parameters like Sharpe ratio, Deutsche, Franklin Templeton, Prudential ICICI (in private sector) and SBI and UTI (in public sector) mutual funds schemes have out-performed the market portfolio with positive values. However, the overall analysis finds Franklin Templeton and UTI being the best performers, and Birla SunLife, HDFC and LIC mutual funds showing poor below-average performance when measured against the risk-return relationship models and measures. In this context**, Amporn Soongswang (2009)** studied 138 open ended equity mutual funds managed by 17 asset management companies in Thailand during the period 2002-2007. When the mutual funds were measured using Treynor ratio, Sharp ratio and Jensen's alpha, showed that performance of Thai open ended mutual funds significantly outperform the market. However, by using the Data Envelopment analysis (DEA) technique, the results suggested that for 3 month time period of investment only, the open ended equity mutual fund significantly outperform the market. Since, Performance measurement plays an important role for investors when deciding to invest in mutual funds. Since **Markowitz (1952)**, several indicators have been developed to assess fund performance. Traditional indicators are also accompanied by the measures that evaluate conditions such as asset allocation and performance persistence. The rising number of indicators might lead to a more confused performance evaluation as the use of the innumerable indicators can lead to wavering results and varying fund rankings. **Plantinga and Groot (2001)** examine to what extent performance measures can be used as alternatives for preference functions. The study consisted of Sharpe ratio, Sharpe's alpha, the expected return measure, the Fouse index, the Sortino ratio and the upside potential ratio. It was found that the first three measures correspond to the inclinations of investors with a low degree of risk aversion, while the latter three measures match to the preferences of investors with medium and high degrees of risk aversion. Therefore, the choice of the suitable performance measure should be determined by the preference function of the investor. On the global front, **Sathya Swaroop Debashish (2009)** measured the performance of equity based mutual funds in India. There was a study of 23 schemes over a period of April 1996 to March 2009 (13 years) using various risk adjusted measures. The results show that UTI, Franklin Templeton, Prudential ICICI (in private sector) and SBI have out-performed the market portfolio with positive values, while Birla SunLife, HDFC and LIC mutual funds showed a poor below-average performance when measured against the risk-return relationship models and measures. A study by **Ramesh and Dhume (2011)** analyzed the performance of sector funds which were Banking, Infrastructure, FMCG, Technology and Pharmaceutical. The study focused on different performance measures. The findings of study discovered that all the except the infrastructure sector funds, other funds have outpaced the market. **Anitha (2011)** assessed the performance of private and public sector mutual funds for a period of two years (2005-2007). Selected funds were studied using Statistical measures like Mean, Variance, Co-variance and Standard Deviation. The performance of all the selected funds has exhibited volatility during period of study leading it to a difficult situation to assign one particular fund that would outperform the others consistently. **Patel and Prajapati (2012)** estimated the performance of mutual funds in India using relative performance indices, Treynor's and Sharpe's ratio, risk-return analysis, Jensen's measure, and Fama's measure and concluded that most of the mutual funds have given positive return during the period of study.

III.   OBJECTIVES OF THE STUDY
1)   To evaluate the performance of index schemes of the select mutual fund.

2)   To compare the performance of the select index schemes with the benchmark index.

3)   To assess the difference in the performance of the select schemes across the public and private sector funds.

IV.   HYPOTHESIS

H1: There is a no statistically significant difference in the performance of different mutual fund schemes.
H2: There is no statistically significant difference amongst the performance of public sector and private sector mutual fund schemes.

V.   METHODOLOGY
The present study tries to analyze and interpret the performance of different index schemes of the mutual funds with that of the market performance. The performance of index funds among SBI & UTI (public sector) and HDFC & ICICI (private sector) on the basis of monthly returns is compared to benchmark returns over the period of 3 years. Return of 10 year government bonds has been taken as risk free returns. Secondary data related to monthly returns of mutual funds and benchmark returns has been taken from the website moneycontrol.com and website of NSE. Sharpe ratio, Treynor ratio, Jensen ratio has been used to analyze the data. The study covers a time frame from the period April 2013 to the period March 2016.

TOOLS FOR ANALYSIS
The following tools and techniques were used to analyze the performance of the mutual funds:
➢   Standard deviation
➢   Beta
➢   Sharpe's Performance Index.
➢   Treynor's Performance Index.
➢   Jensen's Performance Index.

Standard Deviation
Standard Deviation is a statistical tool, which measures the variability of returns from the expected value, or volatility. It is denoted by sigma (σ). It is calculated using the formula mentioned below:

$$\sigma = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \overline{x})^2}$$

Where, x is the sample mean, x_i's are the observations (returns), and 'n' is the total number of observations or the sample size. Standard Deviation allows evaluating the volatility of the fund. Volatility is often a direct indicator of the risks taken by the fund. The standard deviation of a fund measures this risk by measuring the degree to which the fund fluctuates in relation to its mean return, the average return of a fund over a period of time.

Beta
Systematic risk is measured in terms of Beta, which represents fluctuations in the NAV of the fund vis-à-vis market. The more responsive the NAV of a Mutual Fund is to the changes in the market; higher will be its beta. Beta is calculated by relating the returns on a Mutual Fund with the returns in the market, Market will have beta 1.0 Mutual fund is said to be volatile, more volatile or less volatile. If beta is greater than 1 the stock is said to be riskier than market. If beta is less than 1, the indication is that stock is less risky in comparison to market. If beta is zero then the risk is the same as that of the market. Negative beta is rare.
Beta is calculated as:

$$\beta = \frac{\text{Covariance (Rx, Rm)}}{\text{Variance (Rm)}}.$$

Where, R_x is the returns on the portfolio or stock(dependent variable), R_m is the market returns or index(independent variable).Variance is the square of standard deviation. Covariance is a statistic that measures how two variables co-vary, and is given by:

$$\text{Co-variance} = \frac{\Sigma(Rxi-Rx^-)(Rmi-Rm^-)}{N-1}$$

Sharpe Ratio
In this model, performance of a fund is evaluated on the basis of Sharpe Ratio, which is a ratio of returns generated by the fund over and above risk free rate of return and the total risk associated with it.

$$\text{Sharpe Index} = \frac{\text{Portfolio Average Return (Rp)} - \text{Risk Free Rate of Return (Rf)}}{\text{Standard Deviations of the Portfolio Return}}$$

Where, S_p = Sharpe's Ratio, R_p = portfolio return, R_f = risk free return, σ_P = standard deviation of portfolio returns. While a high and positive Sharpe Ratio shows a superior risk-adjusted performance of a fund, a low and negative Sharpe Ratio is an indication of unfavorable performance. If Sp of the mutual fund scheme is greater than that of the market portfolio, the fund has outperformed the market. He assumes that a small investor invests fully in the mutual fund and does not hold any portfolio to eliminate unsystematic risk and hence demands a premium for the total risk. A mutual fund scheme with large Treynor ratio and low Sharpe ratio can be concluded to have relatively larger unique risk. Thus the two indices rank the schemes differently.

Treynor's Ratio

Treynor's ratio is a measurement of the returns earned in excess of what could have been earned on a riskless investment. Higher the Treynor Ratio is meant the better portfolio.

$$\text{Treynor Index} = \frac{\text{Portfolio Average Return(Rp)} - \text{Risk Free Rate of Return (Rf)}}{\text{Beta Coefficient of Portfolio}}$$

Where, T_p = Treynor's performance index, R_p = Portfolio's actual return during a specified time period, R_f = Risk-free rate of return during the same period, β_p = beta coefficient of the portfolio. Whenever $R_p > R_f$ and $\beta_p > 0$ a larger T value means a better portfolio for all investors regardless of their individual risk preferences. In two cases we may have a negative T value: when $R_p < R_f$ or when $\beta_p < 0$. If T is negative because $R_p < R_f$, we judge the portfolio performance as very poor. However, if the negativity of T comes from a negative beta, fund's performance is superb. Finally when R_p- R_f, and β_p are both negative, T will be positive, but in order to qualify the fund's performance as good or bad we should see whether R_p is above or below the security market line pertaining to the analysis period.

Jensen Ratio

It measures the difference between market risk and actual performance of the fund. Positive Jensen Ratio shows Superior Michael C.Jensen (1968) has given different dimension and confined his attention to the problem of evaluating a fund manager's ability of providing higher returns to the investors. He measures the performance as the excess return provided by the portfolio over the expected (CAPM) returns.

J = Portfolio. Return − CAPM. Return

$$Jensen = \alpha_P = R_P - \left[R_f + \beta_P \left(R_M - R_f \right) \right]$$

Where, α_p= Jenson's measure for portfolio, R_p=portfolio return, R_f= risk free return, R_m= Market return, β_P = beta coefficient of the portfolio. A positive value of JP would indicate that the scheme has provided a higher return over the CAPM return and lies above Security Market Line (SML) and a negative value would indicate it has provided a lower than expected returns and lies below SML. Jensen uses α_j as his performance measure. A superior portfolio manager would have a significant positive α_j value because of the consistent positive residuals. Inferior managers, on the other hand, would have a significant negative α_j. Average portfolio managers having no forecasting ability but, still, cannot be considered inferior would earn as much as one could expect on the basis of the CAPM. . In other words, a positive value for Jensen's alpha means a fund manager has beat the market with his or her stock picking skills.

VI.   DATA ANALYSIS AND INTERPRETATION

Table 1: ANOVA Analysis of Funds

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	105.538	4	26.384	1.347	.254
Within Groups	3426.901	175	19.582		
Total	3532.438	179			

The study tries to evaluate that whether there is any significant difference in the returns of the four mutual fund schemes and also compare them with the benchmark returns. The ANOVA results provided in table 1 indicate that the returns are not statistically different as the significance value is more than 0.05.

Further, comparing the benchmark returns with that of the four mutual fund schemes in table 2 using Scheffe Post Hoc test, it is again highlighted that the results do not turn out to be statistically significant. Hence the difference in return values cannot be used to compare the returns of the four funds with that of benchmark returns.

Table 2: Multiple Comparisons of Funds

(I) Fund	(J) Fund	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
HDFC di m en sio n3	ICICI	-.0078820	1.0430268	1.000	-3.255222	3.239458
	SBI	1.9339089	1.0430268	.490	-1.313432	5.181249
	UTI	.0248475	1.0430268	1.000	-3.222493	3.272188
	Nifty 50	.0658151	1.0430268	1.000	-3.181525	3.313156
ICICI di m en sio n3	HDFC	.0078820	1.0430268	1.000	-3.239458	3.255222
	SBI	1.9417910	1.0430268	.485	-1.305550	5.189131
	UTI	.0327295	1.0430268	1.000	-3.214611	3.280070
	Nifty 50	.0736972	1.0430268	1.000	-3.173643	3.321038
SBI di m en sio n3	HDFC	-1.9339089	1.0430268	.490	-5.181249	1.313432
	ICICI	-1.9417910	1.0430268	.485	-5.189131	1.305550
	UTI	-1.9090614	1.0430268	.503	-5.156402	1.338279
	Nifty 50	-1.8680938	1.0430268	.525	-5.115434	1.379247
UTI di m en sio n3	HDFC	-.0248475	1.0430268	1.000	-3.272188	3.222493
	ICICI	-.0327295	1.0430268	1.000	-3.280070	3.214611
	SBI	1.9090614	1.0430268	.503	-1.338279	5.156402
	Nifty 50	.0409676	1.0430268	1.000	-3.206373	3.288308
Nifty di m en sio n3	HDFC	-.0658151	1.0430268	1.000	-3.313156	3.181525
	ICICI	-.0736972	1.0430268	1.000	-3.321038	3.173643
	SBI	1.8680938	1.0430268	.525	-1.379247	5.115434
	UTI	-.0409676	1.0430268	1.000	-3.288308	3.206373

The findings of the study lead to the acceptance of the hypothesis that there is a no statistically significant difference in the performance of different mutual fund schemes.

Table 3: Analysis of Risk-Adjusted Returns

Name of the Fund	Sharpe Ratio	Treynor's Ratio	Jenson's Ratio
HDFC Index Fund- Nifty Plan	0.7977	3.5743	0.9550
ICICI Prudential Nifty Index Fund (G)	0.8028	3.6469	1.0261
SBI Nifty Index Fund (G)	0.5035	2.2459	-0.3504
UTI Nifty index Fund (G)	0.7144	3.1891	0.5834

Table 4: Ranking of Mutual Funds According to Different Measures

Name of the Fund	Ranking		
	Sharpe Ratio	Treynor's Ratio	Jenson's Ratio
HDFC Index Fund- Nifty Plan	2	2	2
ICICI Prudential Nifty Index Fund (G)	1	1	1
SBI Nifty Index Fund (G)	4	4	4

UTI Nifty index Fund (G)	3	3	3

The performance of the various mutual funds has also been evaluated on the basis of three different ratios namely; Sharpe Ratio, Treynor's Ratio and Jenson Ratio and the results of the same are summarized in tables 3 & 4. Evaluating the return premium of the fund relative to the risk using Sharpe ratio, ICICI Prudential Nifty Index Fund gives the highest value (0.8028), followed by HDFC Index Fund- Nifty Plan (0.7977), UTI Nifty index Fund (0.7144) and lastly the SBI Nifty Index Fund (0.5035). Similar results have been achieved using Treynor ratio and Jenson ratio.

Overall, among the four funds under consideration, ICICI Prudential Nifty Index Fund turns out to be the best performer followed by HDFC Index Fund- Nifty Plan and UTI Nifty index Fund. SBI Nifty Index Fund when compared with other funds did not reveal a better performance level.

In order to evaluate whether there is any statistically significant difference in the values of above calculated ratios, the study uses two way ANOVA on these ratios by comparing the performance of private and public sector Mutual Fund houses.

Table 5: F-Test Two-Sample for Variances using Sharpe Ratio

	Private MF	Public MF
Mean	0.800249066	0.608906415
Variance	0.000012703693	0.022240096
Observations	2	2
Df	1	1
F	0.000571207	
P(F<=f) one-tail	0.015212273	
F Critical one-tail	0.006193959	

Comparing the P value in table 5 with the F critical value it can be concluded that there is no significant difference in the performance of public & private mutual fund houses using Sharpe ratio.

Table 6: F-Test Two-Sample for Variances using Treynor Ratio

	Private MF	Public MF
Mean	3.610610795	2.717484034
Variance	0.002636338	0.444835198
Observations	2	2
Df	1	1
F	0.005926549	
P(F<=f) one-tail	0.048913114	
F Critical one-tail	0.006193959	

Table 6 again shows that the Treynor ratio value for public and private mutual fund houses is not statistically significant.

Table 7: F-Test Two-Sample for Variances using Jenson Ratio

	Private MF	Public MF
Mean	0.990561071	0.116473343
Variance	0.002531939	0.435982978
Observations	2	2
Df	1	1
F	0.005807426	
P(F<=f) one-tail	0.048420955	
F Critical one-tail	0.006193959	

Similarly, the application of ANOVA on Jenson ratio values also depict that the difference is not significant (Table 7).

Hence, it can be stated that the hypothesis that there is no statistically significant difference amongst the performance of public sector and private sector mutual fund schemes is accepted.

VII. CONCLUSION

The study has been carried out with the objective of evaluating the performance of four different mutual fund houses schemes and comparing it with the benchmark performance. Three years data related to returns have been used and the conclusion has been drawn using Sharpe Ratio, Treynor's Ratio and Jenson Ratio and further ANOVA test has been applied. The results of the study reveal that using the three different ratios, ICICI Prudential Nifty Index Fund is the best performer whereas SBI Nifty Index Fund is the least performing scheme. However, the difference in the performance of the various schemes does not turn out to be statistically significant. The findings of the study can be useful to the investors while making their investment decision. Further, considering a longer time span and taking more number of mutual fund schemes would help in getting better insight regarding the performance of different mutual fund schemes.

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