International Journal of Engineering & Technology, 7 (4.36) (2018) 707-712

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

A Factorial Analysis of Information Ratio and Its Causal Effect on Yearly Return of Net Asset Value – A Study of Indian Equity Diversified Mutual Fund Schemes

Suman Chakraborty[1*], Satish Kumar[2], Lumen Shawn Lobo[3]

[1]*Associate Professor, Department of Commerce, MIT Campus, Manipal Academy of Higher Education, Manipal, Karnataka, India.*
[2]*Associate Professor, Department of Commerce, MIT Campus, Manipal Academy of Higher Education, Manipal, Karnataka, India.*
[3]*Assistant Professor, Department of Commerce, MIT Campus, Manipal Academy of Higher Education, Manipal, Karnataka, India.*
E-mail:shawn.lobo@manipal.edu
**Corresponding author E-mail: suman.chakraborty@manipal.edu*

Abstract

Evaluation of performance of mutual fund schemes has gained a wide range of attention from both investors and academicians. The study aims at assessing the returns from equity mutual fund schemes in India by applying risk adjusted performance evaluation techniques. The study is based on secondary data collected for ten years for selected open ended equity diversified mutual funds. A comparative assessment of performance of public sector sponsored equity funds and non-government sponsored sector funds bring forth with an interesting inference. The present study also constitutes a modest attempt to assess the information ratio and its causal effect on the average yearly return of Net Asset Value (NAV). Based on the previous research findings, this paper puts an honest effort to identify twelve independent variables which affects significantly the performance of NAV. The evaluation relies on the Sharpe, Trenor and Jensen's technique, which have been applied in conjunction with parametric and non-parametric statistical tools using. The result shows significant relationship exists between the NAV return and fund's risk, information ratio, macro-economic variables such as inflation, interest rates, market index performance, foreign flow of funds and foreign exchange on the basis of regression analysis.

Keywords*: Mutual fund, performance evaluation technique, net asset value, asset under management.*

1. Introduction

A mutual fund for a small Individual investor as well as trust that pools the savings from different investors who share similar investment goals. The money thus collected from the investors is then invested in various securities in accordance with objectives of the mutual fund schemes. Mutual funds contribute significantlyto mobilizing savings from household and channelizing it towards the capital market. Retail investors enjoy the ease of investing in the capital market without directly involving in stock trading resulting in reduced risk for the investors. It also offers the opportunity for professional management of the investors' money. The portfolio managers try to minimize risk by diversifying their portfolio. According to the data published by Association of Mutual Funds of India the assets managed by the Indian mutual fund industry has grown from 12.11 trillion in March 2015 to 13.55 trillion in March 2016, which rose to 20 trillion in March 2017.The study also reveals that the share of individual investors in the total investments made in mutual fund schemes has gone up from 46.2% in March 2015 to 48.1% (AMFI July 2017). Individual investors mostly hold equity-oriented schemes while institutions hold liquid and debt-oriented schemes. It is also to be noted that the assets held by individual investors in these securities has shown an increasing trend from Rs 5.59 lakh crore inMarch2015 to Rs. 6.16 lakh crore as on March 2016 which further went up to 9.8 lakh crores in 2017. Considering the augmentation in Assets Under Management in equity schemes and its wide spread acceptance by retail investors, performance evaluation of mutual fund schemes has gained a wide range of attention from both investors and academicians. The investors are becoming more conscious about their investment and analyzing the performance in terms of periodic returns considering the scheme's risk vis-a-vis with benchmark index. Performance evaluation helps the investors and fund managers in taking better investment decisions. It is a generally accepted fact that the fund managers are well armed with ready information to analyze the performance of securities as well as of the portfolio. It is the responsibility of fund managers to find the best stocks which provides higher returns to the investors. Mutual fund helps the individual investors and institutional investors those who do not have sufficient knowledge and time in investing in securities market directly to participate in stock market. In India the popularity of investing in mutual fund schemes is growing rapidly. Even at this stage most of the common people are less conscious about evaluating the performance of various schemes of MFs. Higher return from a mutual fund scheme is not only dependent on the ability of the personnel managing the scheme, but there are many other factors which influence the return from a scheme. Thus, resulting in growing importance of research in performance evaluation of mutual funds.

2. Literature review

Numerous studies have been conducted on mutual funds in India and abroad. However, some of the relevant and important empirical work has been reviewed. One of the seminal study

published by **Sharpe (1965)** introduced the reward-to-variability to evaluate the risk adjusted performance of the mutual fund schemes. Sharpe studied the performance of 34 open ended schemes during the period 1944-1963. The study was further extended by several researchers by applying Treynor Ratio. Both Shape and Treynor ratios have been utilised by several researchers to evaluate the risk adjusted performance of diverse mutual fund schemes. Later in 1994, **Grinblatt and Titman (1994)** studied 279 mutual fund schemes and 109 passive portfolios using a variety of benchmark portfolios. Finding suggests that both Sharpe and Treynor performance measure techniques provide similar results considering same benchmark, which proves the redundancy of the analytical approach. The authors found that there is a statistical bias in the Jensen's performance evaluation technique which can result in generating lower returns even for successful timers. Observing the above findings, current study attempted to apply both the techniques to arrive at the inferences. Considering evaluation of Indian mutual fund industry,

Jain (2007) studied the performance of selected 40 growth funds in India. The study focused on analyzing the returns in absolute terms of the selected funds and comparing it with the conventional risk-free rate (364 days T-Bill rate) of return. Monthly NAV (Net Asset Value) has been considered for evaluating the performance of the funds. The study found out that all the funds (except ICICI Very Cautious Fund) have performed better than the conventional risk-free rate of return. It was also found out that around 57% of the selected schemes have also outperformed the selected market index. A t-test has also been used by them to test whether the returns are significantly different from the risk-free rate. The result suggests that there is no major difference in the market return and the fund return. Another aspect of the fund performance is significantly found to be influenced by the ability of fund managers. **Edelen (1999)** Study reveals that open-end mutual funds' in some respect may show under-performance due to lack of ability on the fund manager's part in terms of portfolio selection and deviation from the market performance. Under-performance of open ended schemes may result from the liquidity service that fund managers provide to the investors. A contrary study made on the context of Indian open ended mutual fund performances by Brar (2011), discloses open ended growth schemes are more popular than the close ended schemes. This may be because investors make quick bucks by investing in them and exit from the market or from that specific fund. Further to corroborate the above findings, an article published in Economic Times dated 13th February 2017, found closed-end schemes have under-performed their open-ended peers across time periods. Closed-end diversified multi-cap funds' one and two-year average trailing returns stand at 28.5% and 5.85% respectively. A study conducted by **Rakesh Kumar (2012)** evaluated the performance of 28 selected equity diversified schemes for a period from January 2007 to June 2011. The author has also evaluated the market timing and stock selection ability of the schemes. Fama's selectivity mode, Treynor&Mazuy Model and Henrikkson& Merton model are used inthe study. The research found out that for higher performing schemes the correlation between return and risk of the fund is high. But it is also to be noted that the result of regression is not same in the case of lesser performing funds. The result suggests that there are other factors affecting the performance of the schemes. Except six schemes all other schemes have performed well during the study as per the Sharpe ratio.

The reviews cited above indicate that the earlier studies have concentrated on analysing the NAV return using various performance measure measures. But, the studies have not concentrated on relating the parameters, fixed deposit rates, yearly growth in FII investments, yearly risk-free rate (One-year Indian government securities) yearly standard deviation of the selected funds, yearly fund beta, yearly fund risk premium, information ratio of the fund, yearly market return, yearly AUM growth, yearly inflation rate and yearly exchange rate (INR-USD) change, with equity oriented growth mutual fund performance in India.

This study distinguishes itself from prior work in terms of the selection and comparison of two broad categories of mutual funds in India. Firstly, the study extends earlier studies by placing additional emphasis on the performance of Indian government sector and non-government sponsored sectoral MFs. Previous work concludes relationship between net asset value returns and market fundamentals. But considerable work to test the same with respect to public and non-government sponsored mutual funds has not been documented. Secondly, the present study investigates the macro-economic factors which affect NAV returns of both Public and non-government sponsored sector mutual funds schemes in India. Thus in this paper, we attempt to empirically study: (a) To conduct a comparative analyse of performance of public and non-government sponsored sector mutual funds of India, (b) To analyse the impact of economic parameters on NAV performance with a regression analysis.

To arrive at the above objectives defined for the study, following hypotheses are formulated;

H_{0a}: Returns of both public sector and non-government sponsored sector funds are equal.

H_{0b}: Risk of both public sector and non-government sponsored sector mutual funds are similar.

$H_{0c:}$ The standard deviation of public sector and non-government sponsored sector funds are equal.

$H_{0d:}$ There is no significant relation between NAV return and the selected independent variables

3. Research methodology

3.1. Sample selection

Twenty mutual fund schemes (ten each from public and non-government sponsored sector mutual funds) in the open-ended equity diversified category have been selected from the 259 schemes in the CRISIL list of diversified equity growth schemes with the criteria of (i) having the inception date of the scheme prior to 1st April 2006 (ii) schemes having the benchmark index of BSE 200(iii) availability of continuous NAV data. Ten schemes from each sector have been selected such that they are best performers in their category during 2015-16 in terms risk adjusted NAV return. Treasury bill (364 days) rate is considered as risk free rate. Risk adjusted performance measures used in the study are;

(a) Sharpe Ratio (SR) =$SR = \frac{r_p - r_f}{\sigma_p}$

(b) Treynor Ratio (TR) = $SR = \frac{r_p - r_f}{\beta_p}$

(c) Jensen Alpha (α_p) = $E(r_p) = r_f + \beta_p(r_m - r_f)$

Where, r_p is the return from the mutual fund portfolio, $E(r_p)$ is the expected return from the mutual fund portfolio, r_f is the risk-free rate of return, r_m is the return from the market index, β_p is the beta of the mutual fund portfolio, and σ_p measure the total risk of the mutual fund portfolio.

To achieve the second objective of the study, yearly average of NAV Return (YANR) has been considered as dependent variable. We have included eleven exogenous variables to conduct multiple regression test. Eleven independent variables selected to to AUM, Inflation Rate, Exchange Rate, FII (Foreign Institutional Investors), Market Return, Deposit Rate, Fund Premium, Standard Deviation, Treasury Bill Return (risk free rate), Beta and Information Ratio. Study conducted by Alwin D Hall(2010),found currency risk or the exchange rate risk affects the value of NAV as well as contributes to fund's volatility. It was also observed that the drop in foreign flow of funds significantly affect the value of currency and as a result lowers the fund's NAV return. He has also analysed the impact of interest rate risk on the fund return and it was evident that there was an inverse relationship between market prices and interest rate changes.

Chen, J., Hong, H., Huang, M. and Kubik, J.D (2004) analyse whether fund size influences mutual fund performance. Asset under Management (AUM) it is the total worth of the assets managed by the mutual fund company. Srinivasan, Denis and Warr (2014) analysed the relationship between inflation and equity mutual fund schemes. Inflation is the rapid increase in prices, which is measured by some broad index such as consumer price index) over months or years, and reflected in the correspondingly reduction in the value of the currency. Treasury Bill Rate- these are short term government securities. Relationship between T-Bill returns and fund return is analysed in this study. It is the risk free rate considered for the study and can be considered as a significant variable for the study. Sharpe (1965) developed a novel risk adjusted performance evaluation technique considering the standard deviation of the funds. It is the total risk of a mutual fund which includes market risk, security specific risk and portfolio risk. Treynor (1963*)* used beta to evaluate the risk adjusted performance of the selected schemes. Beta is the measure of volatility of particular mutual fund in comparison with the market as a whole. Market Return- It is the return of the benchmark which can be considered as an important variable for the study. Fund Premium- It is the difference between the return of a fund with that of the risk free rate of return. Information Ratio- It is a ratio of portfolio returns above the returns of a benchmark (usually an index) to the volatility of those returns. It measures a portfolio manager's ability to generate extra returns relative to a benchmark and also attempt to identify the stability of the investors. For analysing the relationship between the selected dependent variable and independent variables and factor analysis has been done with the help of SPSS software package has been used.

4. Analysis and interpretation

4.1. Sharpe ratio

The Sharpe Ratio for the selected twenty schemes for the study and that of the market index (BSE 200) for the ten-year period of the study is presented in Table 1. Study period average Sharpe Ratio for each scheme in the sample and of the market index has also been presented.

Table 1: Yearly Sharpe Ratio of Selected Schemes

Sl No	Scheme Name	Sharpe Ratio									
		2006-200	2007-200	2008-200	2009-201	2010-201	2011-201	2012-201	2013-201	2014-201	2015-201
1	Birla Sun Life Advantage Fund	-0.15	0.34	-1.39	2.27	-0.11	-1.11	-0.13	1.11	2.20	-0.51
2	Birla Sun Life Equity Fund	0.14	0.58	-1.49	2.49	-0.19	-0.97	-0.05	0.95	2.35	-0.63
3	Birla Sun Life Frontline Equity	0.50	0.78	-1.27	2.46	0.27	-0.99	0.61	0.80	1.98	-0.67
4	Canara Robeco Equity Diversified Fu	-0.24	0.73	-1.18	2.80	0.30	-0.48	-0.04	0.55	1.66	-0.95
5	Franklin India Opportunities Fund	0.13	0.46	-1.29	1.98	0.06	-0.91	-0.33	0.66	2.69	-0.87
6	HDFC Core and Satellite Fund	-0.21	0.36	-1.54	3.11	0.46	-1.20	-0.90	0.49	1.42	-0.45
7	HDFC Top 200 Fund	-0.13	0.72	-0.95	2.59	0.62	-0.71	-0.18	0.58	1.38	-0.79
8	ICICI Prudential Multi Cap Fund	0.20	0.33	1.68	2.51	0.36	-0.83	10.04	0.85	2.03	-0.54
9	Reliance Equity Opportunities Fund	0.11	0.14	-1.49	3.21	0.50	-0.33	0.42	0.73	2.40	-1.08
10	Reliance Growth Fund	0.22	0.77	-1.64	2.94	-0.09	-0.72	-0.44	0.41	2.32	-0.82
11	Reliance NRI Equity Fund	0.59	0.43	-1.05	2.45	0.57	-0.79	0.24	0.45	1.76	-0.87
12	Reliance Regular Savings Fund	0.47	1.24	-1.47	2.77	0.00	-0.89	-0.02	0.50	2.05	-0.71
13	Reliance Vision Fund	0.06	0.56	-1.38	2.36	0.07	-0.71	-1.01	0.83	2.26	-0.76
14	SBI Contra Fund	0.08	0.79	-1.47	-0.16	-0.68	-0.82	0.24	0.03	2.39	-0.99
15	SBI Magnum Multiplier Fund	-0.01	0.63	-1.65	2.69	-0.12	0.32	-0.11	0.94	2.48	8.37
16	Tata Equity Opportunities Fund	-0.11	0.80	-2.04	2.59	-0.42	-0.65	0.05	0.74	2.48	-0.65
17	UTI Dividend Yield Fund	-0.12	0.64	-1.03	2.87	0.62	-0.51	-0.51	0.33	1.51	-0.83
18	UTI Equity Fund	-0.50	0.67	-1.43	2.65	0.51	-0.73	0.13	0.73	0.63	-0.62
19	UTI Opportunities Fund	-0.79	1.06	-1.07	2.29	0.41	-0.19	-0.21	0.58	1.54	-0.91
20	UTI Top 100 Fund	-0.15	0.53	-1.34	-0.01	0.19	-0.77	-0.25	0.64	2.08	-0.78
	BSE 200(Market Return)	0.13	0.62	-1.21	2.20	0.12	-0.87	-0.11	0.48	1.49	-0.82

Higher Sharpe Ratio indicates better performance of the schemes. Sharpe Ratio of the mutual fund schemes is compared with that of market (Sharpe Ratio of BSE 200 in the present study) to analyse if the schemes have outperformed the market.

Table 1 exhibiting Sharpe's risk adjusted return of non-government sponsored and public section mutual funds. Average yearly returns has been calculated from 2006 to 2016 to opine on the selected fund's NAV performance.

Considering the one-year treasury bill's rate (T-Bill of 364 days) and standard deviation of each fund on annual basis, Sharpe's index has been displayed for each year. Further, to infer the results, each of the fund's average Sharpe Index has been calculated on yearly basis.

Findings clearly establishes that, selected ten non-government sponsored sector funds (average Sharpe index of 10 non-government sponsored funds is 0.45) performed positively at a higher level than its counterpart public sector mutual funds schemes (average Sharpe index of 10 public funds is 0.16).

Further, investigation outlines that ICICI Prudential Multi Cap Fund in the sample has outperformed the market in nine out of the ten years of analysis and two non-government sponsored sector mutual fund schemes such as BSLF Equity and CRED Fund have outperformed in eight out of ten years of analysis. Funds such as Birla Sun Life Advantage Fund and HDFC Core and Satellite Fund under performed in six out of ten years.

It can be observed from Table 1 that one non-government sponsored sector mutual fund scheme (ICICI Prudential Multi Cap Fund) in the sample has outperformed the market in nine out of the ten years of analysis and two non-government sponsored sector mutual fund schemes (BLSF Equity and CRED Fund) have outperformed in eight out of ten years of analysis. One non-government sponsored sector mutual fund scheme has shown poor performance (Franklin India Opportunities Fund) compared to market with Sharpe Ratio less than that of the market in seven out of ten years of the study while two schemes (Birla Sun Life Advantage Fund, HDFC Core and Satellite Fund) underperformed in six out of ten years of analysis. In the case of public sector mutual fund schemes, four (Principal Large Cap Fund, SBI Emerging Business Fund, UTI Dividend Yield Fund and UTI Opportunities Fund) schemes have outperformed the market in seven out of ten years of the study while one fund (SBI Contra Fund) has underperformed in six out of ten years of the study. Hence, it is not clear if there is any difference in fund performances between public sector and non-government sponsored sector mutual funds.

But it can be said that non-government sponsored sector funds have more counts of out performers in terms of scheme-wise comparison of Sharpe Ratio.

Analysis of the Sharpe Ratio presented in Table 1 indicates that ICICI prudential multi-cap fund is the consistent performer in the market followed by SBI Magnum Multiplier Fund and Reliance Equity Opportunities Fund.

It is also evident that, among the selected twenty schemes SBI Contra Fund and UTI Top 100 were among the underperforming funds with reference to the market proxy. It is also to be noted that during the year 2009-2010 all mutual fund except these two funds have recorded highest return of the decade.

4.2. Jensen's alpha

The estimation for the result is based on the alpha. If a fund shows positive alpha and the value significantly higher than 1 then it can it can be concluded that the fund has outperformed the market.

Table 2: Calculated Yearly Jensen's Alpha

Sl No	Scheme Name	Jensens Alpha									
		2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
1	Birla Sun Life Advantage Fund	-0.06	0.12	-0.60	0.69	-0.02	-0.20	-0.01	0.22	0.48	-0.19
2	Birla Sun Life Equity Fund	0.07	0.31	-1.00	1.29	-0.06	-0.29	0.00	0.33	0.73	-0.21
3	Birla Sun Life Frontline Equity	0.20	0.24	-0.50	0.67	0.04	-0.17	0.09	0.17	0.33	-0.14
4	Canara Robeco Equity Diversified Fu	-0.14	0.38	-0.82	1.29	0.06	-0.10	0.00	0.19	0.59	-0.39
5	Franklin India Opportunities Fund	0.04	0.15	-0.51	0.55	0.01	-0.15	-0.03	0.13	0.39	-0.14
6	HDFC Core and Satellite Fund	-0.10	0.15	-1.00	1.40	0.11	-0.27	-0.23	0.23	0.60	-0.19
7	HDFC Top 200 Fund	-0.05	0.31	-0.67	1.21	0.19	-0.24	-0.04	0.27	0.53	-0.33
8	ICICI Prudential Multi Cap Fund	0.09	0.16	1.11	1.03	0.12	-0.29	2.38	0.29	0.57	-0.17
9	Reliance Equity Opportunities Fund	0.05	0.06	-0.88	1.44	0.14	-0.07	0.11	0.23	0.68	-0.37
10	Reliance Growth Fund	0.10	0.36	-0.86	1.29	-0.03	-0.22	-0.10	0.15	0.83	-0.31
11	Reliance NRI Equity Fund	0.26	0.23	-0.82	1.19	0.16	-0.22	0.07	0.17	0.54	-0.30
12	Reliance Regular Savings Fund	0.22	0.66	-0.90	1.35	0.00	-0.28	0.01	0.17	0.74	-0.27
13	Reliance Vision Fund	0.03	0.27	-0.80	1.12	0.02	-0.23	-0.26	0.31	0.76	-0.31
14	SBI Contra Fund	0.04	0.21	-0.52	-0.07	-0.12	-0.11	0.03	0.02	0.29	-0.15
15	SBI Magnum Multiplier Fund	0.00	0.17	-0.51	0.59	-0.02	0.07	-0.01	0.15	0.33	1.80
16	Tata Equity Opportunities Fund	-0.06	0.30	-0.74	0.70	-0.07	-0.09	0.01	0.15	0.39	-0.13
17	UTI Dividend Yield Fund	-0.05	0.33	-0.47	0.97	0.15	-0.17	-0.09	0.12	0.43	-0.28
18	UTI Equity Fund	-0.20	0.17	-0.46	0.95	0.14	-0.17	0.02	0.12	0.08	-0.12
19	UTI Opportunities Fund	-0.32	0.21	-0.52	0.63	0.06	-0.01	-0.02	0.10	0.25	-0.20
20	UTI Top 100 Fund	-0.07	0.18	-0.45	-0.05	0.06	-0.18	-0.02	0.11	0.25	-0.17

It is evident from the Table No.2 that ICICI prudential multi-cap fund was the most consistent performer among the schemes. Among the selected schemes SBI contra fund and UTI top 100 funds are found to be underperforming throughout the study period. It is also to be noted that Sharpe ratio has also given similar analysis related to the performance of the schemes.

4.3: Mann Whitney U test

Mann Whitney U-Test has been used to find out if two independent samples (returns of non-government sponsored and public sector funds) show significant difference or not. It is primarily utilized to find out whether the two selected samples belong to the same population. Both the category of fund's performance is compared and analyzed. Yearly returns and standard deviation of non-government sponsored sector and public-sector fund is showing substantial difference. Results of Mann-Whitney test shows H**0b:** Returns of non-government sponsored sector and public sector funds are not equal.

Table 3: Mean Ranks (Return)

	Grouping	N	Mean Rank	Sum of Ranks
Average Yearly NAV Return	1(Public)	10	7.60	76.00
	2(Private)	10	13.40	134.00
	Total	20		

The P value as calculated (be considered as having the higher concentration by identifying the mean rank of the set. In this case the mean ranks of non-government sponsored sector funds return are higher than the public sector sponsored funds. So it can be concluded that the non-government sponsored sector funds are earning higher return than public sector funds. The hypothesis formulated to arrive at the outcome is;

Hypothesis testing (return)

$H0_b$: Returns of non-government sponsored sector and public sector funds have no significant difference.
$H1_b$: Returns of the non-government sponsored sector and public sector funds are equal.
The result of the Mann Whitney U Test in SPSS has been shown in table 4. In this case the mean ranks of non-government sponsored sector funds return are higher than the public sector sponsored funds. So it can be concluded that the non-government sponsored sector funds are earning higher return than public sector funds.

Table 4: Mann-Whitney U Test Statistics (Return)

Test Statistics	Average Yearly NAV returns
Mann-Whitney U	21
Wilcoxon W	76
Z	-2.192
Significance Value (Two tailed)	0.028

Table No: 4identifies the statistical significance between the groups. Here both the one tailed and two tailed significance level is less than 0.05, so we can accept the null hypothesis and conclude that there is significant difference in the returns of public sector sponsored funds and non-government sponsored sector sponsored funds.

Table 5: Mean Rank U Test (Risk-Standard Deviation)

	Group 2(Risk)	N	Mean Rank	Sum of Ranks
Yearly Average SD	1(Public)	10	10.10	101.00
	2(Private)	10	10.90	109.00
	Total	20		

Table No.5 depicts the mean rank between public sector sponsored and non-government sponsored sector sponsored funds on the basis of standard deviation. The result represents a marginally higher rank for non-government sponsored sector funds than public sector sponsored funds. It represents a higher risk for non-government sponsored sector funds. As for the relationship of daily institutional flows with stock returns, Table 10 brings out the interesting fact that mutual fund investments in stock markets show a moderately positive correlation with contemporaneous stock returns, while the correlation

Table 6: Test Statistics U test (Risk-Standard Deviation)

Test Statistics[b]

	Yearly Average SD
Mann-Whitney U	46.000
Wilcoxon W	101.000
Z	-.302
Asymp. Sig. (2-tailed)	.762
Exact Sig. [2*(1-tailed Sig.)]	.796[a]
Exact Sig. (2-tailed)	.796
Exact Sig. (1-tailed)	.398
Point Probability	.028

Hypothesis Testing;
$H0_c$: The standard deviation (Risk) of the public sector sponsored and non-government sponsored sector sponsored funds are not equal.
$H1_c$: The standard deviation (Risk) of the public sector sponsored and non-government sponsored sector funds are equal.
The significance value depicted in Table No.6 is more than 0.05. So the null hypothesis is not considered and the alternate hypothesis is selected. It represents that the risk in case of both the sector (public &non-government sponsored) funds are equal.

4.4. Information ratio

It is basically a ratio related to the returns of the portfolio above the returns of the benchmark and to the volatility of the selected benchmark. The ability of the portfolio manager to generate higher return is measured with the help of information ratio. A higher information ratio portrays a more consistent managerthan the other managers. It can also be assumed that the investors of this scheme are also consistent with their investment UTI top 100 fund was having the lowest information ratio.

Table 7: Yearly InformationRatios of the Selected Schemes

Sl No	Scheme Name	Information Ratio									
		2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
1	Birla Sun Life Advantage Fund	-0.14	-0.35	-0.06	0.07	-0.12	-0.06	-0.10	-0.26	0.65	2.26
2	Birla Sun Life Equity Fund	0.01	-0.08	-0.28	0.89	-1.21	-0.08	0.41	-0.18	1.82	3.32
3	Birla Sun Life Frontline Equity	0.62	-0.09	0.17	0.03	0.24	0.04	0.44	0.22	0.58	0.39
4	Canara Robeco Equity Diversified Fund	-0.44	0.13	0.77	0.92	1.38	1.67	0.43	-0.41	2.29	0.80
5	Franklin India Opportunities Fund	0.27	-0.20	0.03	-0.27	-0.92	0.03	-1.03	-0.78	2.09	4.05
6	HDFC Core and Satellite Fund	0.31	-0.47	-0.16	1.49	2.83	-0.10	-1.82	-1.46	1.55	0.46
7	HDFC Top 200 Fund	-0.48	0.02	1.93	0.41	1.99	1.12	-0.33	-0.15	1.65	-0.32
8	ICICI Prudential Multi Cap Fund	-0.16	-0.44	0.72	-0.62	1.40	0.09	0.16	0.08	2.61	1.57
9	Reliance Equity Opportunities Fund	-0.15	-0.71	0.11	1.79	3.67	1.84	1.24	-0.57	2.41	2.38
10	Reliance Growth Fund	0.06	0.08	0.09	1.04	1.67	0.66	-0.76	-1.09	1.93	2.03
11	Principal Large Cap Fund	0.05	-0.02	0.42	0.09	0.15	-0.10	0.21	0.20	0.13	-0.01
12	Principal Growth Fund	15.65	-0.47	-0.20	-0.29	-0.31	0.04	0.33	0.22	0.53	0.14
13	SBI Emerging Business Fund	-0.14	-0.21	-0.79	0.82	0.19	1.01	0.80	-0.37	0.80	0.27
14	SBI Contra Fund	0.50	0.01	-0.03	0.07	0.93	0.04	0.29	-0.01	0.73	0.16
15	SBI Magnum Multicap Fund	-0.20	-0.26	-0.22	0.03	-0.35	0.06	0.12	0.04	0.84	0.36
16	SBI Magnum Multiplier Fund	-0.10	-0.09	-0.03	0.00	0.84	0.26	0.05	-0.17	0.67	0.62
17	UTI Dividend Yield Fund	0.02	-0.04	1.34	-0.40	1.30	0.94	-1.16	-0.87	4.44	0.29
18	UTI Equity Fund	-0.37	-0.05	0.25	-0.68	1.71	0.43	0.22	0.06	0.94	0.12
19	UTI Opportunities Fund	-0.27	0.13	0.83	-0.07	0.26	0.50	-0.01	-0.05	0.91	-0.09
20	UTI Top 100 Fund	-0.79	-0.20	0.09	-1.13	0.21	0.30	-0.05	0.02	0.82	-0.03

Table 7 present the information ratio calculated for the selected schemes for a period of ten years. After analysing the average information ratio of the schemes it was found that Principal growth fund is having the highest information ratio among all other schemes.

It proves that the portfolio manager of the scheme is more consistent.In order to identify and analyse the variables that are significantly influencing the yearly average NAV return of the diversified equity growth schemes the following variables have been selected for the study: AUM, Inflation Rate, Exchange Rate, FII (Foreign Institutional Investors), Market Return, Deposit Rate, Fund Premium, Standard Deviation, Treasury Bill Return (risk free rate), Beta and Information Ratio

4.5 Multiple regression analysis

In accordance with the factor analyse it was found that nine variables were influencing the NAV return of the funds. Multiple regressions will be applied to analyse the individual contribution of the variables.

Table: 8 Model Summary of regression analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.914[a]	.836	.826	.1224220	.836	87.103	11	188	.000

The R Square value (Table No: 8) is found to be .836 which implies that 83.6 percent of the changes are influenced by the selected nine variables through factor analysis.

Table 9: ANOVA Table for Regression

ANOVAb

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.213	11	1.565	151.930	.000
	Residual	1.936	188	.010		
	Total	19.150	199			

In order to apply multiple regression model NAV return is taken as the dependent variable. Here the significant value is less than .05. Therefore, it indicates that the effects will be statistically significant. Statistical results of ANOVA (Table:9) shows that all the variables are significantly affecting the dependent variable. Therefore, it can be included in the regression analysis.

Table 10: Coefficient Matrixes

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.139	.203		-.682	.496		
	Yearly bank FD rate	1.010	1.505	.027	.671	.503	.525	1.906
	Yearly equity FII/FPI	.014	.014	.071	1.026	.306	.181	5.513
	Yearly Risk free rate	1.453	1.251	.074	1.161	.024	.216	4.633
	Yearly Standard Deviation	-.026	.297	-.007	-.089	.929	.148	5.738
	Yearly Beta	.004	.021	.005	.175	.861	.926	1.080
	Yearly Fund Premium	.701	.042	.745	16.689	.000	.438	2.284
	Information Ratio of the schemes	.004	.006	.019	.606	.545	.882	1.134
	Yearly market return	.374	4.465	.007	.084	.933	.519	4.404
	Yearly Aum growth	.028	.015	.059	1.868	.041	.877	1.140
	Yearly inflation rate	.441	.628	.043	.701	.484	.236	4.235
	Yearly exchange Rate change	-.439	.174	-.149	-2.524	.012	.250	4.002

a. Dependent Variable: Yearly NAV Return

Table No: 10 exhibits the coefficient matrix between the NAV return (independent variable) and the selected 11 dependent variables on the basis of literature review. It was found that the Risk free rate, fund premium, AUM growth and inflation rate significantly affects the NAV return. After analysis the following conclusion has been made;

- The time period selected for the study has an influence on the variance.
- All the variables selected for the study has a strong theoretical background.
- We cannot suggest that the variables are suffering from multi-collinearity affect even if the tolerance level is less and the VIF (Variable Inflation Factor) is higher.

In our earlier study we derived that the nature of relationship between MF and FII flows may have undergone a change in the recent period of global uncertainties induced by the Euro zone debt crisis, accompanied by domestic uncertainties attributable to what many have called "policy paralysis".

Table 11: T Statistics Results

	NAV Return	AUM	Inflation	Exchange	Deposit	T Bill	SD	Beta	Information Ratio	Market Return
Mean	0.144203	0.341488	0.08515	0.04688	0.08035	0.07366	0.2101	0.551437	0.3703875	0.222314
Variance	0.101437	0.665539	0.000808	0.009953	6.37E-05	0.000223	0.005651	0.16942	0.889410064	0.010475336
Observations	200	200	200	200	200	200	200	200	200	200
Pearson Correla	0.280831	0.280831	0.101875	-0.38342	-0.12166	-0.00646	-0.13333	0.052448	0.136439695	-0.318827642
df	199	199	199	199	199	199	199	199	199	199
t Stat	-3.54036	-3.54036	2.635656	3.735525	2.825806	3.12797	-2.76653	-11.358	-3.355240566	-3.032454953
P(T<=t) one-tail	0.000249	0.000249	0.00453	0.000122	0.002599	0.001012	0.0031	1.14E-23	0.000474791	0.001374372
t Critical one-ta	1.652547	1.652547	1.652547	1.652547	1.652547	1.652547	1.652547	1.652547	1.652546747	1.652546747
P(T<=t) two-tail	0.000498	0.000498	0.009059	0.000245	0.005197	0.002024	0.006199	2.28E-23	0.000949582	0.002748744
t Critical two-ta	1.971956	1.971956	1.971956	1.971956	1.971956	1.971956	1.971956	1.971956	1.971956498	1.971956498

In Table No: 11 the 'P' value for the selected independent variables are found to be less than 0.05.

5. Findings & suggestions

After reviewing various literatures related to the performance evaluation of MFs it was found that the number of investors

opting for equity schemes has increased by a tremendous number over the period of time. It should be noted that equity schemes is attached with higher risk factor compared with the other schemes available in the market. The decision regarding investment in equity schemes should be made after careful analysis. One or two year return of a fund cannot be considered as sufficient criteria for investment. Historical returns of the fund and standard deviation should be carefully analysed to reach at a conclusion. The main objective of the present study was to evaluate the performance of diversified equity growth schemes over a period of 10 years. It was found out that Sharpe and Jensen's risk adjusted performance evaluation techniques has given similar results in case of top performing funds and low performing funds. Comparative study has also been conducted between the performance evaluation of government sector sponsored and non-government sponsored sector MFs on the basis of NAV return and risk(standard deviation). It was found out that even though both the category of funds has similar risk profile the return of public sector funds is comparatively lower than that of non-government sponsored sector funds. The factor analysis has come up with relevant variables that significantly affect the NAV return of a mutual fund scheme.

6. Scope for future research

The present study has analysed 20 equity diversified schemes for a period of 10 years, more number of schemes can be analysed and better clarity results can also be obtained. There are many other variables affecting the NAV return of a scheme such as turnover ratio, expense ratio etc. Analysis can be conducted to assess the impact of such variables on the AV return of a fund. The study can also be directed towards analysing the investors' perception towards equity mutual fund schemes. It is also advisable to select mutual fund sectors from other sectors apart from equity to evaluate the performance of such schemes.

References

[1] Agarwal, K & Patwa P, "A Comparative Performance Evaluation of Private Sector and Public Sector Equity Funds of India", *IUP Journal of Financial Risk Management*, Vol.11, No.2, (2014), pp.25-33.

[2] Bose S, "Mutual Fund Investments, FII Investments and Stock Market Returns in India", *Money & Finance, ICRA Bulletin*, (2012).

[3] Business Dictionary.com. *What is inflation? Definition and meaning*, (2016).

[4] Chakraborty M, Jain PK & Kallianpur V, "Mutual Fund Performance: An Evaluation of Select Growth Funds in India", *South Asian Journal of Management*, Vol.15, No.4, (2008), pp.79-92.

[5] Chen J, Hong H, Huang M & Kubik JD, "Does fund size erode mutual fund performance? The role of liquidity and organization", *American Economic Review*, Vol.94, No.5, (2004), pp.1276-1302.

[6] Duggimpudi R, Abdou HAH & Zaki M, "An evaluation of equity diversified mutual funds: the case of the Indian market", *Investment Management and Financial Innovations*, Vol.7, No.4, (2010) pp.77-84.

[7] Grinblatt M & Titman S, "Mutual fund performance: An analysis of quarterly portfolio holdings", *Journal of business*, (1989), pp.393-416.

[8] Kumar R, "Market timing, selectivity and mutual fund performance: an empirical investigation of selective equity diversified schemes in India", *IUP Journal of Financial Economics*, Vol.10, No.1, (2012), pp.62-84.

[9] Sharpe WF, "The sharpe ratio", *The journal of portfolio management*, Vol.21, No.1, (1994), pp.49-58.

[10] Treynor JL, "How to rate management of investment funds?", *Harvard business review*, Vol.43, No.1, (1965), pp.63-75.